```
**********************************************************

        Her foelger XPRESS-MP loesningsfiler
        til oppgaver i H.P Williams,
        Model Building in Mathematical Programming,
        Third Edition, Revised, John Wiley & Sons 1990

        Dette er filer modellert av studenter ved
        sivilingenioerstudiet i teknologiledelse og
        industriell oekonomi ved NTNU, Trondheim
        som har tatt faget Operasjonsanalyse 2
        hoesten 1995 og hoesten 1996

        Som en av disse studenetene har jeg paatatt meg
        oppgaven aa samle inn alle disse filene.

        Flere XPRESS-MP loesningsfiler kan sendes til

        nsaa@stud.ntnu.no

        og alle filene legges ut paa

        http://www.stud.ntnu.no/~nsaa/lf/lf.html

        Jeg tar ikke paa meg noe ansvar for feil etc., da
        jeg stort sett bare har gjengitt hva mine
        medstudenter har sendt meg av oppgaver.

        Oppgavene(ikke 12.9 og 12.18-19 forslag 1) har
        jeg kjoert gjennom mp-model og mp-opt vha
        scriptet xal under UNIX-plattformen paa sol.


        Stud. Techn. Nikolai Aasen , 13.12.1996

****************************************************************************************
********************
*                                                *
*                                                *
*       Oppgave 1 og 2 i Williams                *
*                                                *
*       Loest av:                                *
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*       Erik Nordbø (erikno@foa.unit.no)         *
*                                                *
*       Foelgende filer kommer fortloepende:     *

        food.cst
        food.for
        food.hrd
        food.ist
        food.kat
        food.lgr
        food.lst
        food.mat
        food.mnd
        food.mod
        food.opg
        food.pri
        food.prt
        food.rrt

*                                                *
*                                                *
**************************************************

! filnavn food.cst
!
```



```
! Prisestimat paa raaolje i forskjellige perioder
!
!
! Det er dimmensjonert for 3 typer olje i hver kategori
! NB!!1 Hvis denne tabell ¢nskes utvidet maa "food.pri" ogsaa forandres
!
! veg1  veg2              Perioder:\
  110,  120             ! januar
  130,  130             ! februar
  110,  140             ! mars
  120,  110             ! april
  100,  120             ! mai
   90,  100             ! juni
! oil1    oil2    oil3
  130,    110,    115  ! januar
  110,     90,    115  ! februar
  130,    100,     95  ! mars
  120,    120,    125  ! april
  150,    110,    105  ! mai
  140,     80,    135  ! juni
!
!
! Model: food.for
!
! Angir maksimalforbruk for kategori k per tidsperiode
!
! \kategori  1,2 og 3 =>
!
! Vegetabilsk olje, Ikke vegetabilsk olje
       200,            250              !
!
!
!


! Filnavn: food.hrd
!
!
! Hardhetsindekser for de forskjellige oljetyper
! NB!! MÅ ANGI LIKE MANGE TYPER I HVER KATEGORI SOM DET DEFIERES I FOOD.PRI
!
! \type
!       veg1    veg2
                                ! Kategori\
        8.8,    6.1,            ! 1
!
!       oil1    oil2    oil3
        2.0,    4.2,    5.0     ! 2
!
! Filnavn: food.ist
!
!
! Initialbholdning av raaoljer
! NB!! MÅ ANGI LIKE MANGE TYPER SOM DET DEFINERES I FOOD.PRI
!
!\type
!       veg1    veg2              Kategori\
        500,    500,            ! 1
!
!       oil1    oil2    oil3
        500,    500,    500     ! 2
!
! Filnavn: food.kat
!
!
! Angir hvor mange oljetyper det er i kategoriene.
!
! Kategori 1 er vegetabilsk olje
! Kategori 2 er ikke vegetabilsk olje
!
```

```
! NB!!! IKKE ANGI FLERE KATEGORIER ENN DET SOM DEFINERES I FOOD.PRI
!
!
!       Kat.1   Kat.2
        2,      3        ! Antall oljetyper
!
!

! Model: food.lgr
!
! Angir utgaaende beholdning av olje for hver type i
! kategoriene
!
! NB!!! OPPGI SAMME ANTALL KATEGORIER OG TYPER SOM DEFINERT I FOOD.PRI
!
!\type
!       1       2       3       ! kategori\
        500,    500,    0       ! 1
        500,    500,    500     ! 2
!
!
!
XPRESS Modeller Log for problem: food
RESTORE
INPUT
!
!
TABLES
DUALVERD(MAXM,MAXK)
!
!
ASSIGN
       DUALVERD(M=1:MAXM,K=1:MAXK) = dual(KAT1(M,K))
!
!
PRINT
!
!
! SVAR TIL OPPGAVE 12.1
!
! Maalfunksjonsverdi
PROF
 107842.5926
!
!
! Bruk av raastoffer i periode 6
bo(6,1,1)
  159.259259
bo(6,1,2)
   40.740741
bo(6,2,1)
     .000000
bo(6,2,2)
  250.000000
bo(6,2,3)
     .000000
!
!
! Lagerbeholdning av raastoffer i periode 2
lo(2,1,1)
  181.481481
lo(2,1,2)
  418.518519
lo(2,2,1)
  500.000000
lo(2,2,2)
     .000000
lo(2,2,3)
  500.000000
```



```
!
!
! Innkjop av de ulike raastoffene i periode 3
ko(3,1,1)
     .000000
ko(3,1,2)
     .000000
ko(3,2,1)
     .000000
ko(3,2,2)
     .000000
ko(3,2,3)
  750.000000

!
!
! Skyggepriser for raffineringskapasitetene i f¢rste periode
DUALVERD
   75.000000,   65.000000
   70.000000,   60.000000
   65.000000,   55.000000
   60.000000,   50.000000
   55.000000,   45.000000
   49.629630,   76.666667
!
!
! SVAR TIL OPPGAVE 12.2
!
! Målfunksjonsverdi 12.2
PROF
 107842.5926
! Råstoffene som brukes i produksjon i periode 3
bo(3,1,1)
   11.111111
bo(3,1,2)
  188.888889
bo(3,2,1)
     .000000
bo(3,2,2)
     .000000
bo(3,2,3)
  250.000000
!
! Lager i periode 2
lo(2,1,1)
  181.481481
lo(2,1,2)
  418.518519
lo(2,2,1)
  500.000000
lo(2,2,2)
     .000000
lo(2,2,3)
  500.000000

QUIT
NAME          FOOD
ROWS
 N  PROF
 E  MB1  211
 E  MB1  212
 E  MB1  221
 E  MB1  222
 E  MB1  223
 E  MB1  311
 E  MB1  312
 E  MB1  321
 E  MB1  322
```

```
 E  MB1  323
 E  MB1  411
 E  MB1  412
 E  MB1  421
 E  MB1  422
 E  MB1  423
 E  MB1  511
 E  MB1  512
 E  MB1  521
 E  MB1  522
 E  MB1  523
 E  MB1  611
 E  MB1  612
 E  MB1  621
 E  MB1  622
 E  MB1  623
 E  MB2  111
 E  MB2  112
 E  MB2  121
 E  MB2  122
 E  MB2  123
 L  UHRD  01
 L  UHRD  02
 L  UHRD  03
 L  UHRD  04
 L  UHRD  05
 L  UHRD  06
 G  LHRD  01
 G  LHRD  02
 G  LHRD  03
 G  LHRD  04
 G  LHRD  05
 G  LHRD  06
 E  VOLUM 01
 E  VOLUM 02
 E  VOLUM 03
 E  VOLUM 04
 E  VOLUM 05
 E  VOLUM 06
 L  KAT10101
 L  KAT10102
 L  KAT10201
 L  KAT10202
 L  KAT10301
 L  KAT10302
 L  KAT10401
 L  KAT10402
 L  KAT10501
 L  KAT10502
 L  KAT10601
 L  KAT10602
COLUMNS
    ko   111  PROF       -110.000000   MB2  111       1.000000
    ko   211  PROF       -130.000000   MB1  211       1.000000
    ko   311  PROF       -110.000000   MB1  311       1.000000
    ko   411  PROF       -120.000000   MB1  411       1.000000
    ko   511  PROF       -100.000000   MB1  511       1.000000
    ko   611  PROF        -90.000000   MB1  611       1.000000
    ko   121  PROF       -130.000000   MB2  121       1.000000
    ko   221  PROF       -110.000000   MB1  221       1.000000
    ko   321  PROF       -130.000000   MB1  321       1.000000
    ko   421  PROF       -120.000000   MB1  421       1.000000
    ko   521  PROF       -150.000000   MB1  521       1.000000
    ko   621  PROF       -140.000000   MB1  621       1.000000
    ko   112  PROF       -120.000000   MB2  112       1.000000
    ko   212  PROF       -130.000000   MB1  212       1.000000
    ko   312  PROF       -140.000000   MB1  312       1.000000
    ko   412  PROF       -110.000000   MB1  412       1.000000
    ko   512  PROF       -120.000000   MB1  512       1.000000
```



```
    ko   612  PROF       -100.000000   MB1  612       1.000000
    ko   122  PROF       -110.000000   MB2  122       1.000000
    ko   222  PROF        -90.000000   MB1  222       1.000000
    ko   322  PROF       -100.000000   MB1  322       1.000000
    ko   422  PROF       -120.000000   MB1  422       1.000000
    ko   522  PROF       -110.000000   MB1  522       1.000000
    ko   622  PROF        -80.000000   MB1  622       1.000000
    ko   123  PROF       -115.000000   MB2  123       1.000000
    ko   223  PROF       -115.000000   MB1  223       1.000000
    ko   323  PROF        -95.000000   MB1  323       1.000000
    ko   423  PROF       -125.000000   MB1  423       1.000000
    ko   523  PROF       -105.000000   MB1  523       1.000000
    ko   623  PROF       -135.000000   MB1  623       1.000000
    bo   111  MB2  111     -1.000000   UHRD  01       8.800000
    bo   111  LHRD  01      8.800000   VOLUM 01       1.000000
    bo   111  KAT10101      1.000000
    bo   211  MB1  211     -1.000000   UHRD  02       8.800000
    bo   211  LHRD  02      8.800000   VOLUM 02       1.000000
    bo   211  KAT10201      1.000000
    bo   311  MB1  311     -1.000000   UHRD  03       8.800000
    bo   311  LHRD  03      8.800000   VOLUM 03       1.000000
    bo   311  KAT10301      1.000000
    bo   411  MB1  411     -1.000000   UHRD  04       8.800000
    bo   411  LHRD  04      8.800000   VOLUM 04       1.000000
    bo   411  KAT10401      1.000000
    bo   511  MB1  511     -1.000000   UHRD  05       8.800000
    bo   511  LHRD  05      8.800000   VOLUM 05       1.000000
    bo   511  KAT10501      1.000000
    bo   611  MB1  611     -1.000000   UHRD  06       8.800000
    bo   611  LHRD  06      8.800000   VOLUM 06       1.000000
    bo   611  KAT10601      1.000000
    bo   121  MB2  121     -1.000000   UHRD  01       2.000000
    bo   121  LHRD  01      2.000000   VOLUM 01       1.000000
    bo   121  KAT10102      1.000000
    bo   221  MB1  221     -1.000000   UHRD  02       2.000000
    bo   221  LHRD  02      2.000000   VOLUM 02       1.000000
    bo   221  KAT10202      1.000000
    bo   321  MB1  321     -1.000000   UHRD  03       2.000000
    bo   321  LHRD  03      2.000000   VOLUM 03       1.000000
    bo   321  KAT10302      1.000000
    bo   421  MB1  421     -1.000000   UHRD  04       2.000000
    bo   421  LHRD  04      2.000000   VOLUM 04       1.000000
    bo   421  KAT10402      1.000000
    bo   521  MB1  521     -1.000000   UHRD  05       2.000000
    bo   521  LHRD  05      2.000000   VOLUM 05       1.000000
    bo   521  KAT10502      1.000000
    bo   621  MB1  621     -1.000000   UHRD  06       2.000000
    bo   621  LHRD  06      2.000000   VOLUM 06       1.000000
    bo   621  KAT10602      1.000000
    bo   112  MB2  112     -1.000000   UHRD  01       6.100000
    bo   112  LHRD  01      6.100000   VOLUM 01       1.000000
    bo   112  KAT10101      1.000000
    bo   212  MB1  212     -1.000000   UHRD  02       6.100000
    bo   212  LHRD  02      6.100000   VOLUM 02       1.000000
    bo   212  KAT10201      1.000000
    bo   312  MB1  312     -1.000000   UHRD  03       6.100000
    bo   312  LHRD  03      6.100000   VOLUM 03       1.000000
    bo   312  KAT10301      1.000000
    bo   412  MB1  412     -1.000000   UHRD  04       6.100000
    bo   412  LHRD  04      6.100000   VOLUM 04       1.000000
    bo   412  KAT10401      1.000000
    bo   512  MB1  512     -1.000000   UHRD  05       6.100000
    bo   512  LHRD  05      6.100000   VOLUM 05       1.000000
    bo   512  KAT10501      1.000000
    bo   612  MB1  612     -1.000000   UHRD  06       6.100000
    bo   612  LHRD  06      6.100000   VOLUM 06       1.000000
    bo   612  KAT10601      1.000000
    bo   122  MB2  122     -1.000000   UHRD  01       4.200000
    bo   122  LHRD  01      4.200000   VOLUM 01       1.000000
```

```
    bo    122  KAT10102       1.000000
    bo    222  MB1  222      -1.000000   UHRD  02       4.200000
    bo    222  LHRD  02       4.200000   VOLUM 02       1.000000
    bo    222  KAT10202       1.000000
    bo    322  MB1  322      -1.000000   UHRD  03       4.200000
    bo    322  LHRD  03       4.200000   VOLUM 03       1.000000
    bo    322  KAT10302       1.000000
    bo    422  MB1  422      -1.000000   UHRD  04       4.200000
    bo    422  LHRD  04       4.200000   VOLUM 04       1.000000
    bo    422  KAT10402       1.000000
    bo    522  MB1  522      -1.000000   UHRD  05       4.200000
    bo    522  LHRD  05       4.200000   VOLUM 05       1.000000
    bo    522  KAT10502       1.000000
    bo    622  MB1  622      -1.000000   UHRD  06       4.200000
    bo    622  LHRD  06       4.200000   VOLUM 06       1.000000
    bo    622  KAT10602       1.000000
    bo    123  MB2  123      -1.000000   UHRD  01       5.000000
    bo    123  LHRD  01       5.000000   VOLUM 01       1.000000
    bo    123  KAT10102       1.000000
    bo    223  MB1  223      -1.000000   UHRD  02       5.000000
    bo    223  LHRD  02       5.000000   VOLUM 02       1.000000
    bo    223  KAT10202       1.000000
    bo    323  MB1  323      -1.000000   UHRD  03       5.000000
    bo    323  LHRD  03       5.000000   VOLUM 03       1.000000
    bo    323  KAT10302       1.000000
    bo    423  MB1  423      -1.000000   UHRD  04       5.000000
    bo    423  LHRD  04       5.000000   VOLUM 04       1.000000
    bo    423  KAT10402       1.000000
    bo    523  MB1  523      -1.000000   UHRD  05       5.000000
    bo    523  LHRD  05       5.000000   VOLUM 05       1.000000
    bo    523  KAT10502       1.000000
    bo    623  MB1  623      -1.000000   UHRD  06       5.000000
    bo    623  LHRD  06       5.000000   VOLUM 06       1.000000
    bo    623  KAT10602       1.000000
    lo    111  PROF          -5.000000   MB1  211       1.000000
    lo    111  MB2  111      -1.000000
    lo    211  PROF          -5.000000   MB1  211      -1.000000
    lo    211  MB1  311       1.000000
    lo    311  PROF          -5.000000   MB1  311      -1.000000
    lo    311  MB1  411       1.000000
    lo    411  PROF          -5.000000   MB1  411      -1.000000
    lo    411  MB1  511       1.000000
    lo    511  PROF          -5.000000   MB1  511      -1.000000
    lo    511  MB1  611       1.000000
    lo    611  PROF          -5.000000   MB1  611      -1.000000
    lo    121  PROF          -5.000000   MB1  221       1.000000
    lo    121  MB2  121      -1.000000
    lo    221  PROF          -5.000000   MB1  221      -1.000000
    lo    221  MB1  321       1.000000
    lo    321  PROF          -5.000000   MB1  321      -1.000000
    lo    321  MB1  421       1.000000
    lo    421  PROF          -5.000000   MB1  421      -1.000000
    lo    421  MB1  521       1.000000
    lo    521  PROF          -5.000000   MB1  521      -1.000000
    lo    521  MB1  621       1.000000
    lo    621  PROF          -5.000000   MB1  621      -1.000000
    lo    112  PROF          -5.000000   MB1  212       1.000000
    lo    112  MB2  112      -1.000000
    lo    212  PROF          -5.000000   MB1  212      -1.000000
    lo    212  MB1  312       1.000000
    lo    312  PROF          -5.000000   MB1  312      -1.000000
    lo    312  MB1  412       1.000000
    lo    412  PROF          -5.000000   MB1  412      -1.000000
    lo    412  MB1  512       1.000000
    lo    512  PROF          -5.000000   MB1  512      -1.000000
    lo    512  MB1  612       1.000000
    lo    612  PROF          -5.000000   MB1  612      -1.000000
    lo    122  PROF          -5.000000   MB1  222       1.000000
    lo    122  MB2  122      -1.000000
```



```
    lo    222  PROF          -5.000000   MB1  222      -1.000000
    lo    222  MB1  322       1.000000
    lo    322  PROF          -5.000000   MB1  322      -1.000000
    lo    322  MB1  422       1.000000
    lo    422  PROF          -5.000000   MB1  422      -1.000000
    lo    422  MB1  522       1.000000
    lo    522  PROF          -5.000000   MB1  522      -1.000000
    lo    522  MB1  622       1.000000
    lo    622  PROF          -5.000000   MB1  622      -1.000000
    lo    123  PROF          -5.000000   MB1  223       1.000000
    lo    123  MB2  123      -1.000000
    lo    223  PROF          -5.000000   MB1  223      -1.000000
    lo    223  MB1  323       1.000000
    lo    323  PROF          -5.000000   MB1  323      -1.000000
    lo    323  MB1  423       1.000000
    lo    423  PROF          -5.000000   MB1  423      -1.000000
    lo    423  MB1  523       1.000000
    lo    523  PROF          -5.000000   MB1  523      -1.000000
    lo    523  MB1  623       1.000000
    lo    623  PROF          -5.000000   MB1  623      -1.000000
    prod  01   PROF         150.000000   UHRD  01      -6.000000
    prod  01   LHRD  01      -3.000000   VOLUM 01      -1.000000
    prod  02   PROF         150.000000   UHRD  02      -6.000000
    prod  02   LHRD  02      -3.000000   VOLUM 02      -1.000000
    prod  03   PROF         150.000000   UHRD  03      -6.000000
    prod  03   LHRD  03      -3.000000   VOLUM 03      -1.000000
    prod  04   PROF         150.000000   UHRD  04      -6.000000
    prod  04   LHRD  04      -3.000000   VOLUM 04      -1.000000
    prod  05   PROF         150.000000   UHRD  05      -6.000000
    prod  05   LHRD  05      -3.000000   VOLUM 05      -1.000000
    prod  06   PROF         150.000000   UHRD  06      -6.000000
    prod  06   LHRD  06      -3.000000   VOLUM 06      -1.000000
RHS
    RHS00001  MB2  111    -500.000000   MB2  112    -500.000000
    RHS00001  MB2  121    -500.000000   MB2  122    -500.000000
    RHS00001  MB2  123    -500.000000   KAT10101     200.000000
    RHS00001  KAT10102     250.000000   KAT10201     200.000000
    RHS00001  KAT10202     250.000000   KAT10301     200.000000
    RHS00001  KAT10302     250.000000   KAT10401     200.000000
    RHS00001  KAT10402     250.000000   KAT10501     200.000000
    RHS00001  KAT10502     250.000000   KAT10601     200.000000
    RHS00001  KAT10602     250.000000
BOUNDS
 UP BOUND001  lo   111   1000.000000
 UP BOUND001  lo   211   1000.000000
 UP BOUND001  lo   311   1000.000000
 UP BOUND001  lo   411   1000.000000
 UP BOUND001  lo   511   1000.000000
 FX BOUND001  lo   611    500.000000
 UP BOUND001  lo   121   1000.000000
 UP BOUND001  lo   221   1000.000000
 UP BOUND001  lo   321   1000.000000
 UP BOUND001  lo   421   1000.000000
 UP BOUND001  lo   521   1000.000000
 FX BOUND001  lo   621    500.000000
 UP BOUND001  lo   112   1000.000000
 UP BOUND001  lo   212   1000.000000
 UP BOUND001  lo   312   1000.000000
 UP BOUND001  lo   412   1000.000000
 UP BOUND001  lo   512   1000.000000
 FX BOUND001  lo   612    500.000000
 UP BOUND001  lo   122   1000.000000
 UP BOUND001  lo   222   1000.000000
 UP BOUND001  lo   322   1000.000000
 UP BOUND001  lo   422   1000.000000
 UP BOUND001  lo   522   1000.000000
 FX BOUND001  lo   622    500.000000
 UP BOUND001  lo   123   1000.000000
 UP BOUND001  lo   223   1000.000000
```

```
 UP BOUND001  lo   323   1000.000000
 UP BOUND001  lo   423   1000.000000
 UP BOUND001  lo   523   1000.000000
 FX BOUND001  lo   623    500.000000
ENDATA
! Modell: food.mnd
!
!
! Denne filen angir hvilke månder som de tre tilleggsbetingesene i oppgave
! 12.2 skal gjelde for.
! Skriv et 1-tall for de måndene som ¢nskes spesifisert, blank rute ellers.
!
! NB! Kun to månder kan velges samtidig!!
!
! januar, februar,  mars,  april,    mai,  juni
        ,       ,     1 ,       ,       ,   1    !
!
!
!
MODEL FOOD
!
!
!
TABLES
        KONST(10)                 ! Se diskdata
!
!
DISKDATA
        KONST  = food.pri        ! Henter salgspris, lagerkostnad, #kategorier
                                 ! oljetyper i en kategori og antall perioder
                                 ! i nevnte rekkef¢lge
!
!
LET SALGSP = KONST(1)            ! Salgspris for olje
LET LAGERC = KONST(2)            ! Kostnad ved å ha lager
LET MAXK = KONST(3)              ! Antall kategorier i modellen
LET MAXT = KONST(4)              ! Maks antall typer i en kategori
LET MAXM = KONST(5)              ! Maks antall månder som det beregnes for
LET MAXX = KONST(6)              ! Maks deltaverdier
LET OVGRH = KONST(7)             ! ¢vre grense
LET NEGRH = KONST(8)             ! Nedre grense
LET LAMAX = KONST(9)             ! Maks lager
LET BRUKMIN = KONST(10)          ! Minimumskrav til bruk under oppg. 12.2
!
!
TABLES
        COST(MAXK*MAXM, MAXT)      ! Kostnad ved aa kjope olje t i
                                   ! periode t
        HARD(MAXK, MAXT)           ! Hardhet til oljetypene
        ISTO(MAXK, MAXT)           ! Initialbeholdning av oljetypene
        USTO(MAXK, MAXT)           ! Krav til utgaaende beholding av
                                   ! oljetypene
        FORBRK(MAXK)               ! Maksforbruk av oljekategori k
                                   ! (lik for alle perioder for hver k)
        MAKST(MAXK)                ! Antall oljetypeer i kategori k
        MAXMND(MAXM)               ! Angir hvilke månder som velges til
                                   ! oppgave 12.2 (1=valgt mnd., 0 ellers)
        OPGAVE(1)                  ! Angir hvilken oppgave som velges
                                   ! (0= oppg. 12.1 og 1= oppg.12.2
        KS(MAXK, MAXM, MAXT)       ! 3 dim. matrise for kostnader i periode
                                   ! m, for kategori k og type t

!
!
DISKDATA
        COST = food.cst          ! Henter priser paa olje i for periode t
        HARD = food.hrd          ! Henter hardhet paa oljevariantene
        ISTO = food.ist          ! henter initialbeholding av raaoljer
        FORBRK = food.for        ! henter maksforbruksverdier for kat. k
```



```
        USTO   = food.lgr       ! Henter utgaaende lagerbeholdninger for
                                ! k og t
        MAKST = food.kat        ! Henter antall oljetyper i kategoriene
        MAXMND= food.mnd        ! Henter valgte månder i oppg. 12.2
        OPGAVE= food.opg        ! Henter valgt oppgavetype
!
!
ASSIGN
                                ! Tilordner 2 dim. kostnads matrise til
                                ! 3 dim. matrise
        KS(K=1:MAXK, M=1:MAXM, T=1:MAKST(K)) = COST((K-1)*MAXM+M, T)
!
!
VARIABLES
        ko(M=1:MAXM, K=1:MAXK, T=1:MAXT)! olje type i, i kategori k som er
                                        ! kjopt i periode t
        bo(M=1:MAXM, K=1:MAXK, T=1:MAXT)! olje type i, i kategori k som er
                                        ! brukt i periode t
        lo(M=1:MAXM, K=1:MAXK, T=1:MAXT)! olje type i, i kategori k som er
                                        ! lagret i periode t
        prod(MAXM)                      ! Total olje solgt i periode t
        co(M=1:MAXM, K=1:MAXK,T=1:MAXT) ! kostnader for periode, kategori
                                        ! og type
        x(M=1:MAXM, K=1:MAXK, T=1:MAXT|OPGAVE(1)==1)    ! Deltaverdier for
                                                        ! oppgave 12.2
!
!
CONSTRAINTS
!
!


                        ! Objektfunkjson (maksimering)
PROF:   -SUM(M=1:MAXM,K=1:MAXK,T=1:MAKST(K))            &
        KS(K,M,T)*ko(M,K,T)                             &
        +SUM(M=1:MAXM) SALGSP*prod(M)                   &
        -SUM(M=1:MAXM,K=1:MAXK,T=1:MAKST(K))            &
        LAGERC*lo(M,K,T)                                $
!
!
                        ! Materialbalanse for raaoljer
MB1(M=2:MAXM,K=1:MAXK,T=1:MAKST(K)):                    &
                        lo(M-1,K,T)+ko(M,K,T)-bo(M,K,T) &
                        = lo(M,K,T)
MB2(M=1:1,K=1:MAXK,T=1:MAKST(K)):                       &
                        ISTO(K,T)+ko(M,K,T)-bo(M,K,T)   &
                        = lo(M,K,T)

!
!
!
                        ! Hardhetskrav til oljeblanding
UHRD(M=1:MAXM): SUM(K=1:MAXK,T=1:MAKST(K))              &
                HARD(K,T)*bo(M,K,T)                     &
                - OVGRH*prod(M)  < 0
LHRD(M=1:MAXM): SUM(K=1:MAXK,T=1:MAKST(K))              &
                HARD(K,T)*bo(M,K,T)                     &
                - NEGRH*prod(M) >0
!
!
                        ! Produksjonsvolum
VOLUM(M=1:MAXM):                                        &
                SUM(K=1:MAXK,T=1:MAKST(K))              &
                bo(M,K,T) = prod(M)
!
!
                        ! Maksimalforbruk av raaoljer i hver periode
KAT1(M=1:MAXM,K=1:MAXK):                                &
                SUM(T=1:MAKST(K)) bo(M,K,T) < FORBRK(K)
!
```

```
!
IF OPGAVE(1)==1          ! Krav til oppgave 12.2
                         ! Maks sum deltaverdier i hver mnd.
DLTA(M=1:MAXM|MAXMND(M)<>0):                             &
        SUM(K=1:MAXK,T=1:MAKST(K)) x(M,K,T) < 3
!
!
                         ! Hvis olje brukes tilordnes delta verdi
                         ! og olje som brukes må ligge mellom 20 tonn
                         ! og maksimalt forbruk i kategori k
MND(M=1:MAXM,K=1:MAXK,T=1:MAKST(K) | MAXMND(M)<>0):      &
                bo(M,K,T) - BRUKMIN*x(M,K,T) > 0
MD(M=1:MAXM,K=1:MAXK,T=1:MAKST(K) | MAXMND(M)<>0):       &
                bo(M,K,T) - FORBRK(K)*x(M,K,T) < 0

!
!
                       ! Hvis kategori 1, type 1 eller 2 brukes må kategori 2
                       ! type 3 også brukes
BT(M=1:MAXM,K=1:1,T=1:1):                                &
                x(M,K,T) + x(M,K,T+1) - 2*x(M,K+1,T+2) < 0
!
!
BOUNDS
!
!
x(M=1:MAXM,K=1:MAXK,T=1:MAKST(K)|MAXMND(M)<>0) .BV.
!
!
ENDIF   ! Slutt spesielle krav til oppgave 12.2
!
!
BOUNDS
                         ! Kapasitet paa raavarelageret
lo(M=1:MAXM-1,K=1:MAXK,T=1:MAKST(K)) < LAMAX
!
!
                         ! Ugaaende lagerbeholdning ved beregningsslutt
lo(M=MAXM:MAXM,K=1:MAXK,T=1:MAKST(K)) = USTO(K,T)
!
!
GENERATE
!
!
TABLES
DUALVERD(MAXM,MAXK)
!
!
ASSIGN
       DUALVERD(M=1:MAXM,K=1:MAXK) = dual(KAT1(M,K))
!
!
PRINT
!
!
! SVAR TIL OPPGAVE 12.1
!
! Maalfunksjonsverdi
PROF
!
!
! Bruk av raastoffer i periode 6
bo(6,1,1)
bo(6,1,2)
bo(6,2,1)
bo(6,2,2)
bo(6,2,3)
!
!
```



```
! Lagerbeholdning av raastoffer i periode 2
lo(2,1,1)
lo(2,1,2)
lo(2,2,1)
lo(2,2,2)
lo(2,2,3)

!
!
! Innkjop av de ulike raastoffene i periode 3
ko(3,1,1)
ko(3,1,2)
ko(3,2,1)
ko(3,2,2)
ko(3,2,3)

!
!
! Skyggepriser for raffineringskapasitetene i f¢rste periode
DUALVERD
!
!
! SVAR TIL OPPGAVE 12.2
!
! Målfunksjonsverdi 12.2
PROF
! Råstoffene som brukes i produksjon i periode 3
bo(3,1,1)
bo(3,1,2)
bo(3,2,1)
bo(3,2,2)
bo(3,2,3)
!
! Lager i periode 2
lo(2,1,1)
lo(2,1,2)
lo(2,2,1)
lo(2,2,2)
lo(2,2,3)

QUIT
! Modell: food.opg
!
!
! Denne filen leser inn verdien 1 hvis oppgave 12.2 skal benyttes. Hvis
! oppgave 12.1 skal benyttes i programmet leses eller skrives tallet 0
! i innlesningslinjen.
!
! Oppgave 12.1 skriv "0"
! Oppgave 12.2 skriv "1"
!
!
 0
!---------
!
!
! Modell: food.pri
!
!
! Fil for antall perioder, oljetyper(max antall i en
! kategori), kategorier (konstant),salgspris og
! lagerkostnad
!
! type
!
! Salgspris, lagerkost., kat., oljetyp, perioder, Maks delta,  ¥vre grense hardhet, Nedr
e grense hardhet,Makslager,Min. forbuk
        150,    5      ,  2  ,     3  ,    6    ,     3    ,        6          ,
        3      ,  1000   ,   20
```

!
!

Problem Statistics
Matrix FOOD
Objective PROF
RHS RHS00001
Problem has 61 rows and 96 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after 60 iterations
Objective function value is 107842.5926

Rows Section

	Number	Row	At	Value	Slack Value	Dual Value	RHS
N	1	PROF	BS	107842.5926	-107842.5926	.000000	.000000
E	2	MB1 211	EQ	.000000	.000000	-80.000000	.000000
E	3	MB1 212	EQ	.000000	.000000	-80.000000	.000000
E	4	MB1 221	EQ	.000000	.000000	-110.000000	.000000
E	5	MB1 222	EQ	.000000	.000000	-90.000000	.000000
E	6	MB1 223	EQ	.000000	.000000	-90.000000	.000000
E	7	MB1 311	EQ	.000000	.000000	-85.000000	.000000
E	8	MB1 312	EQ	.000000	.000000	-85.000000	.000000
E	9	MB1 321	EQ	.000000	.000000	-115.000000	.000000
E	10	MB1 322	EQ	.000000	.000000	-95.000000	.000000
E	11	MB1 323	EQ	.000000	.000000	-95.000000	.000000
E	12	MB1 411	EQ	.000000	.000000	-90.000000	.000000
E	13	MB1 412	EQ	.000000	.000000	-90.000000	.000000
E	14	MB1 421	EQ	.000000	.000000	-120.000000	.000000
E	15	MB1 422	EQ	.000000	.000000	-100.000000	.000000
E	16	MB1 423	EQ	.000000	.000000	-100.000000	.000000
E	17	MB1 511	EQ	.000000	.000000	-95.000000	.000000
E	18	MB1 512	EQ	.000000	.000000	-95.000000	.000000
E	19	MB1 521	EQ	.000000	.000000	-125.000000	.000000
E	20	MB1 522	EQ	.000000	.000000	-105.000000	.000000
E	21	MB1 523	EQ	.000000	.000000	-105.000000	.000000
E	22	MB1 611	EQ	.000000	.000000	-90.000000	.000000
E	23	MB1 612	EQ	.000000	.000000	-100.000000	.000000
E	24	MB1 621	EQ	.000000	.000000	-130.000000	.000000
E	25	MB1 622	EQ	.000000	.000000	-80.000000	.000000
E	26	MB1 623	EQ	.000000	.000000	-110.000000	.000000
E	27	MB2 111	EQ	-500.000000	.000000	-75.000000	-500.000000
E	28	MB2 112	EQ	-500.000000	.000000	-75.000000	-500.000000
E	29	MB2 121	EQ	-500.000000	.000000	-105.000000	-500.000000
E	30	MB2 122	EQ	-500.000000	.000000	-85.000000	-500.000000
E	31	MB2 123	EQ	-500.000000	.000000	-85.000000	-500.000000
L	32	UHRD 01	UL	.000000	.000000	.000000	.000000
L	33	UHRD 02	UL	.000000	.000000	.000000	.000000
L	34	UHRD 03	BS	-200.000000	200.000000	.000000	.000000
L	35	UHRD 04	UL	.000000	.000000	.000000	.000000
L	36	UHRD 05	UL	.000000	.000000	.000000	.000000
L	37	UHRD 06	UL	.000000	.000000	3.703704	.000000
G	38	LHRD 01	BS	1350.000000	1350.000000	.000000	.000000
G	39	LHRD 02	BS	1350.000000	1350.000000	.000000	.000000
G	40	LHRD 03	BS	1150.000000	1150.000000	.000000	.000000
G	41	LHRD 04	BS	1350.000000	1350.000000	.000000	.000000
G	42	LHRD 05	BS	1350.000000	1350.000000	.000000	.000000
G	43	LHRD 06	BS	1350.000000	1350.000000	.000000	.000000
E	44	VOLUM 01	EQ	.000000	.000000	-150.000000	.000000
E	45	VOLUM 02	EQ	.000000	.000000	-150.000000	.000000
E	46	VOLUM 03	EQ	.000000	.000000	-150.000000	.000000
E	47	VOLUM 04	EQ	.000000	.000000	-150.000000	.000000
E	48	VOLUM 05	EQ	.000000	.000000	-150.000000	.000000
E	49	VOLUM 06	EQ	.000000	.000000	-172.222222	.000000
L	50	KAT10101	UL	200.000000	.000000	75.000000	200.000000

L	51	KAT10102	UL	250.000000	.000000	65.000000	250.000000
L	52	KAT10201	UL	200.000000	.000000	70.000000	200.000000
L	53	KAT10202	UL	250.000000	.000000	60.000000	250.000000
L	54	KAT10301	UL	200.000000	.000000	65.000000	200.000000
L	55	KAT10302	UL	250.000000	.000000	55.000000	250.000000
L	56	KAT10401	UL	200.000000	.000000	60.000000	200.000000
L	57	KAT10402	UL	250.000000	.000000	50.000000	250.000000
L	58	KAT10501	UL	200.000000	.000000	55.000000	200.000000
L	59	KAT10502	UL	250.000000	.000000	45.000000	250.000000
L	60	KAT10601	UL	200.000000	.000000	49.629630	200.000000
L	61	KAT10602	UL	250.000000	.000000	76.666667	250.000000

Columns Section

	Number	Column	At	Value	Input Cost	Reduced Cost
C	62	ko 111	LL	.000000	-110.000000	35.000000
C	63	ko 211	LL	.000000	-130.000000	50.000000
C	64	ko 311	LL	.000000	-110.000000	25.000000
C	65	ko 411	LL	.000000	-120.000000	30.000000
C	66	ko 511	LL	.000000	-100.000000	5.000000
C	67	ko 611	BS	659.259259	-90.000000	.000000
C	68	ko 121	LL	.000000	-130.000000	25.000000
C	69	ko 221	LL	.000000	-110.000000	.000000
C	70	ko 321	LL	.000000	-130.000000	15.000000
C	71	ko 421	BS	.000000	-120.000000	.000000
C	72	ko 521	LL	.000000	-150.000000	25.000000
C	73	ko 621	LL	.000000	-140.000000	10.000000
C	74	ko 112	LL	.000000	-120.000000	45.000000
C	75	ko 212	LL	.000000	-130.000000	50.000000
C	76	ko 312	LL	.000000	-140.000000	55.000000
C	77	ko 412	LL	.000000	-110.000000	20.000000
C	78	ko 512	LL	.000000	-120.000000	25.000000
C	79	ko 612	BS	540.740741	-100.000000	.000000
C	80	ko 122	LL	.000000	-110.000000	25.000000
C	81	ko 222	LL	.000000	-90.000000	.000000
C	82	ko 322	LL	.000000	-100.000000	5.000000
C	83	ko 422	LL	.000000	-120.000000	20.000000
C	84	ko 522	LL	.000000	-110.000000	5.000000
C	85	ko 622	BS	750.000000	-80.000000	.000000
C	86	ko 123	LL	.000000	-115.000000	30.000000
C	87	ko 223	LL	.000000	-115.000000	25.000000
C	88	ko 323	BS	750.000000	-95.000000	.000000
C	89	ko 423	LL	.000000	-125.000000	25.000000
C	90	ko 523	LL	.000000	-105.000000	.000000
C	91	ko 623	LL	.000000	-135.000000	25.000000
C	92	bo 111	BS	159.259259	.000000	.000000
C	93	bo 211	BS	159.259259	.000000	.000000
C	94	bo 311	BS	11.111111	.000000	.000000
C	95	bo 411	BS	85.185185	.000000	.000000
C	96	bo 511	BS	85.185185	.000000	.000000
C	97	bo 611	BS	159.259259	.000000	.000000
C	98	bo 121	LL	.000000	.000000	20.000000
C	99	bo 221	LL	.000000	.000000	20.000000
C	100	bo 321	LL	.000000	.000000	20.000000
C	101	bo 421	LL	.000000	.000000	20.000000
C	102	bo 521	LL	.000000	.000000	20.000000
C	103	bo 621	LL	.000000	.000000	41.851852
C	104	bo 112	BS	40.740741	.000000	.000000
C	105	bo 212	BS	40.740741	.000000	.000000
C	106	bo 312	BS	188.888889	.000000	.000000
C	107	bo 412	BS	114.814815	.000000	.000000
C	108	bo 512	BS	114.814815	.000000	.000000
C	109	bo 612	BS	40.740741	.000000	.000000
C	110	bo 122	BS	250.000000	.000000	.000000
C	111	bo 222	BS	250.000000	.000000	.000000
C	112	bo 322	LL	.000000	.000000	.000000
C	113	bo 422	LL	.000000	.000000	.000000
C	114	bo 522	LL	.000000	.000000	.000000
C	115	bo 622	BS	250.000000	.000000	.000000
C	116	bo 123	BS	.000000	.000000	.000000

```
 C    117  bo   223  LL       .000000       .000000       .000000
 C    118  bo   323  BS    250.000000       .000000       .000000
 C    119  bo   423  BS    250.000000       .000000       .000000
 C    120  bo   523  BS    250.000000       .000000       .000000
 C    121  bo   623  LL       .000000       .000000     32.962963
 C    122  lo   111  BS    340.740741     -5.000000       .000000
 C    123  lo   211  BS    181.481481     -5.000000       .000000
 C    124  lo   311  BS    170.370370     -5.000000       .000000
 C    125  lo   411  BS     85.185185     -5.000000       .000000
 C    126  lo   511  LL       .000000     -5.000000     10.000000
 C    127  lo   611  LL    500.000000     -5.000000     95.000000
 C    128  lo   121  BS    500.000000     -5.000000       .000000
 C    129  lo   221  BS    500.000000     -5.000000       .000000
 C    130  lo   321  BS    500.000000     -5.000000       .000000
 C    131  lo   421  BS    500.000000     -5.000000       .000000
 C    132  lo   521  BS    500.000000     -5.000000       .000000
 C    133  lo   621  LL    500.000000     -5.000000    135.000000
 C    134  lo   112  BS    459.259259     -5.000000       .000000
 C    135  lo   212  BS    418.518519     -5.000000       .000000
 C    136  lo   312  BS    229.629630     -5.000000       .000000
 C    137  lo   412  BS    114.814815     -5.000000       .000000
 C    138  lo   512  BS       .000000     -5.000000       .000000
 C    139  lo   612  LL    500.000000     -5.000000    105.000000
 C    140  lo   122  BS    250.000000     -5.000000       .000000
 C    141  lo   222  BS       .000000     -5.000000       .000000
 C    142  lo   322  BS       .000000     -5.000000       .000000
 C    143  lo   422  BS       .000000     -5.000000       .000000
 C    144  lo   522  LL       .000000     -5.000000     30.000000
 C    145  lo   622  LL    500.000000     -5.000000     85.000000
 C    146  lo   123  BS    500.000000     -5.000000       .000000
 C    147  lo   223  BS    500.000000     -5.000000       .000000
 C    148  lo   323  BS   1000.000000     -5.000000       .000000
 C    149  lo   423  BS    750.000000     -5.000000       .000000
 C    150  lo   523  BS    500.000000     -5.000000       .000000
 C    151  lo   623  LL    500.000000     -5.000000    115.000000
 C    152  prod  01  BS    450.000000    150.000000       .000000
 C    153  prod  02  BS    450.000000    150.000000       .000000
 C    154  prod  03  BS    450.000000    150.000000       .000000
 C    155  prod  04  BS    450.000000    150.000000       .000000
 C    156  prod  05  BS    450.000000    150.000000       .000000
 C    157  prod  06  BS    450.000000    150.000000       .000000

Problem Statistics
Matrix FOOD
Objective PROF
RHS RHS00001
Problem has     61 rows and     96 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     60 iterations
Objective function value is  107842.5926

N PROF      107842.5926  687607861.3      .000000             ko   111 LL
BS     1   -107842.5926  107842.5903      .000000             prod  01 LL

E MB1  211      .000000      .000000      .000000             lo   211 LL
EQ     2        .000000  1.25000E+34      .000000             ko   211 LL

E MB1  212      .000000      .000000      .000000             lo   212 LL
EQ     3        .000000  1.25000E+34      .000000             ko   212 LL

E MB1  221      .000000      .000000      .000000             lo   221 LL
EQ     4        .000000  1.25000E+34      .000000             ko   221 LL

E MB1  222      .000000      .000000      .000000             lo   222 LL
EQ     5        .000000  1.25000E+34      .000000             ko   222 LL

E MB1  223      .000000      .000000      .000000             lo   223 LL
```



```
EQ     6        .000000  1.25000E+34      .000000             ko   223 LL

E MB1  311      .000000      .000000      .000000             lo   311 LL
EQ     7        .000000  1.25000E+34      .000000             ko   311 LL

E MB1  312      .000000      .000000      .000000             lo   312 LL
EQ     8        .000000  1.25000E+34      .000000             ko   312 LL

E MB1  321      .000000      .000000      .000000             lo   321 LL
EQ     9        .000000  1.25000E+34      .000000             ko   321 LL

E MB1  322      .000000      .000000      .000000             lo   322 LL
EQ    10        .000000  1.25000E+34      .000000             ko   322 LL

E MB1  323      .000000      .000000      .000000             lo   323 LL
EQ    11        .000000  1.25000E+34      .000000             ko   323 LL

E MB1  411      .000000      .000000      .000000             lo   411 LL
EQ    12        .000000  1.25000E+34      .000000             ko   411 LL

E MB1  412      .000000      .000000      .000000             lo   412 LL
EQ    13        .000000  1.25000E+34      .000000             ko   412 LL

E MB1  421      .000000      .000000      .000000             lo   421 LL
EQ    14        .000000  1.25000E+34      .000000             ko   421 LL

E MB1  422      .000000      .000000      .000000             lo   422 LL
EQ    15        .000000  1.25000E+34      .000000             ko   422 LL

E MB1  423      .000000      .000000      .000000             lo   423 LL
EQ    16        .000000  1.25000E+34      .000000             ko   423 LL

E MB1  511      .000000 -6250000.488      .000000             lo   511 LL
EQ    17        .000000  1.25000E+34      .000000             ko   511 LL

E MB1  512      .000000 -6250000.488      .000000             lo   512 LL
EQ    18        .000000  1.25000E+34      .000000             ko   512 LL

E MB1  521      .000000 -6250000.488      .000000             lo   521 LL
EQ    19        .000000  1.25000E+34      .000000             ko   521 LL

E MB1  522      .000000 -6250000.488      .000000             lo   522 LL
EQ    20        .000000  1.25000E+34      .000000             ko   522 LL

E MB1  523      .000000 -6250000.488      .000000             lo   523 LL
EQ    21        .000000  1.25000E+34      .000000             ko   523 LL

E MB1  611      .000000      .000000      .000000             bo   611 LL
EQ    22        .000000  1.25000E+34      .000000             ko   611 LL

E MB1  612      .000000      .000000      .000000             bo   612 LL
EQ    23        .000000  1.25000E+34      .000000             ko   612 LL

E MB1  621      .000000      .000000      .000000             bo   621 LL
EQ    24        .000000  1.25000E+34      .000000             ko   621 LL

E MB1  622      .000000      .000000      .000000             bo   622 LL
EQ    25        .000000  1.25000E+34      .000000             ko   622 LL

E MB1  623      .000000      .000000      .000000             bo   623 LL
EQ    26        .000000  1.25000E+34      .000000             ko   623 LL

E MB2  111  -500.000000  -500.000000      .000000             lo   111 LL
EQ    27        .000000  1.25000E+34      .000000             ko   111 LL

E MB2  112  -500.000000  -500.000000      .000000             lo   112 LL
EQ    28        .000000  1.25000E+34      .000000             ko   112 LL

E MB2  121  -500.000000  -500.000000      .000000             lo   121 LL
```

```
EQ    29        .000000  1.25000E+34      .000000             ko   121 LL

E MB2  122  -500.000000  -500.000000      .000000             lo   122 LL
EQ    30        .000000  1.25000E+34      .000000             ko   122 LL

E MB2  123  -500.000000  -500.000000      .000000             lo   123 LL
EQ    31        .000000  1.25000E+34      .000000             ko   123 LL

L UHRD  01      .000000      .000000      .000000             prod  01 LL
UL    32        .000000      .000000      .000000             bo   111 LL

L UHRD  02      .000000      .000000      .000000             prod  02 LL
UL    33        .000000      .000000      .000000             bo   211 LL

L UHRD  03  -200.000000  -200.000000      .000000             prod  03 LL
BS    34     200.000000  -200.000000      .000000             bo   311 LL

L UHRD  04      .000000      .000000      .000000             prod  04 LL
UL    35        .000000      .000000      .000000             bo   411 LL

L UHRD  05      .000000      .000000      .000000             prod  05 LL
UL    36        .000000      .000000      .000000             bo   511 LL

L UHRD  06      .000000      .000000      .000000             prod  06 LL
UL    37        .000000 -6875000.488      .000000             bo   611 LL

G LHRD  01  1350.000000  1350.000000      .000000             prod  01 LL
BS    38    1350.000000  1350.000000      .000000             bo   111 LL

G LHRD  02  1350.000000  1350.000000      .000000             prod  02 LL
BS    39    1350.000000  1350.000000      .000000             bo   211 LL

G LHRD  03  1150.000000  1150.000000      .000000             prod  03 LL
BS    40    1150.000000  1150.000000      .000000             bo   311 LL

G LHRD  04  1350.000000  1350.000000      .000000             prod  04 LL
BS    41    1350.000000  1350.000000      .000000             bo   411 LL

G LHRD  05  1350.000000  1350.000000      .000000             prod  05 LL
BS    42    1350.000000  1350.000000      .000000             bo   511 LL

G LHRD  06  1350.000000  1350.000000      .000000             prod  06 LL
BS    43    1350.000000 -6873650.390      .000000             bo   611 LL

E VOLUM 01      .000000      .000000      .000000             prod  01 LL
EQ    44        .000000      .000000      .000000             bo   111 LL

E VOLUM 02      .000000      .000000      .000000             prod  02 LL
EQ    45        .000000      .000000      .000000             bo   211 LL

E VOLUM 03      .000000      .000000      .000000             prod  03 LL
EQ    46        .000000      .000000      .000000             bo   311 LL

E VOLUM 04      .000000      .000000      .000000             prod  04 LL
EQ    47        .000000      .000000      .000000             bo   411 LL

E VOLUM 05      .000000      .000000      .000000             prod  05 LL
EQ    48        .000000      .000000      .000000             bo   511 LL

E VOLUM 06      .000000      .000000      .000000             prod  06 LL
EQ    49        .000000 -6250000.488      .000000             bo   611 LL

L KAT10101   200.000000   200.000000      .000000
UL    50        .000000   200.000000      .000000             bo   111 LL

L KAT10102   250.000000   250.000000      .000000
UL    51        .000000   250.000000      .000000             bo   121 LL

L KAT10201   200.000000   200.000000      .000000
```



```
UL    52        .000000   200.000000      .000000             bo   211 LL

L KAT10202   250.000000   250.000000      .000000
UL    53        .000000   250.000000      .000000             bo   221 LL

L KAT10301   200.000000   200.000000      .000000
UL    54        .000000   200.000000      .000000             bo   311 LL

L KAT10302   250.000000   250.000000      .000000
UL    55        .000000   250.000000      .000000             bo   321 LL

L KAT10401   200.000000   200.000000      .000000
UL    56        .000000   200.000000      .000000             bo   411 LL

L KAT10402   250.000000   250.000000      .000000
UL    57        .000000   250.000000      .000000             bo   421 LL

L KAT10501   200.000000   200.000000      .000000
UL    58        .000000   200.000000      .000000             bo   511 LL

L KAT10502   250.000000   250.000000      .000000
UL    59        .000000   250.000000      .000000             bo   521 LL

L KAT10601   200.000000   200.000000      .000000
UL    60        .000000 -6249800.292      .000000             bo   611 LL

L KAT10602   250.000000   250.000000      .000000
UL    61        .000000 -6249750.488      .000000             bo   621 LL

C ko   111      .000000      .000000   -35.000000 -1.00000E+30 MB2  111 LL
LL    62    -110.000000      .000000    35.000000   -75.000000 MB2  111 UL

C ko   211      .000000      .000000   -50.000000 -1.00000E+30 MB1  211 LL
LL    63    -130.000000      .000000    50.000000   -80.000000 MB1  211 UL

C ko   311      .000000      .000000   -25.000000 -1.00000E+30 MB1  311 LL
LL    64    -110.000000      .000000    25.000000   -85.000000 MB1  311 UL

C ko   411      .000000      .000000   -30.000000 -1.00000E+30 MB1  411 LL
LL    65    -120.000000      .000000    30.000000   -90.000000 MB1  411 UL

C ko   511      .000000      .000000    -5.000000 -1.00000E+30 MB1  511 LL
LL    66    -100.000000      .000000     5.000000   -95.000000 MB1  511 UL

C ko   611      .000000      .000000      .000000   -90.000000 MB1  611 LL
BS    67     -90.000000      .000000      .000000   -90.000000 MB1  611 UL

C ko   121      .000000      .000000   -25.000000 -1.00000E+30 MB2  121 LL
LL    68    -130.000000      .000000    25.000000  -105.000000 MB2  121 UL

C ko   221      .000000      .000000      .000000 -1.00000E+30 MB1  221 LL
LL    69    -110.000000      .000000      .000000  -110.000000 MB1  221 UL

C ko   321      .000000      .000000   -15.000000 -1.00000E+30 MB1  321 LL
LL    70    -130.000000      .000000    15.000000  -115.000000 MB1  321 UL

C ko   421      .000000      .000000      .000000  -120.000000 MB1  421 LL
BS    71    -120.000000      .000000      .000000  -120.000000 MB1  421 UL

C ko   521      .000000      .000000   -25.000000 -1.00000E+30 MB1  521 LL
LL    72    -150.000000      .000000    25.000000  -125.000000 MB1  521 UL

C ko   621      .000000      .000000   -10.000000 -1.00000E+30 MB1  621 LL
LL    73    -140.000000      .000000    10.000000  -130.000000 MB1  621 UL

C ko   112      .000000      .000000   -45.000000 -1.00000E+30 MB2  112 LL
LL    74    -120.000000      .000000    45.000000   -75.000000 MB2  112 UL

C ko   212      .000000      .000000   -50.000000 -1.00000E+30 MB1  212 LL
```

```
LL     75    -130.000000      .000000    50.000000    -80.000000 MB1  212 UL

C ko   312      .000000      .000000   -55.000000 -1.00000E+30 MB1  312 LL
LL     76    -140.000000      .000000    55.000000    -85.000000 MB1  312 UL

C ko   412      .000000      .000000   -20.000000 -1.00000E+30 MB1  412 LL
LL     77    -110.000000      .000000    20.000000    -90.000000 MB1  412 UL

C ko   512      .000000      .000000   -25.000000 -1.00000E+30 MB1  512 LL
LL     78    -120.000000      .000000    25.000000    -95.000000 MB1  512 UL

C ko   612      .000000      .000000      .000000   -100.000000 MB1  612 LL
BS     79    -100.000000      .000000      .000000   -100.000000 MB1  612 UL

C ko   122      .000000      .000000   -25.000000 -1.00000E+30 MB2  122 LL
LL     80    -110.000000      .000000    25.000000    -85.000000 MB2  122 UL

C ko   222      .000000      .000000      .000000 -1.00000E+30 MB1  222 LL
LL     81     -90.000000      .000000      .000000    -90.000000 MB1  222 UL

C ko   322      .000000      .000000    -5.000000 -1.00000E+30 MB1  322 LL
LL     82    -100.000000      .000000     5.000000    -95.000000 MB1  322 UL

C ko   422      .000000      .000000   -20.000000 -1.00000E+30 MB1  422 LL
LL     83    -120.000000      .000000    20.000000   -100.000000 MB1  422 UL

C ko   522      .000000      .000000    -5.000000 -1.00000E+30 MB1  522 LL
LL     84    -110.000000      .000000     5.000000   -105.000000 MB1  522 UL

C ko   622      .000000      .000000      .000000    -80.000000 MB1  622 LL
BS     85     -80.000000      .000000      .000000    -80.000000 MB1  622 UL

C ko   123      .000000      .000000   -30.000000 -1.00000E+30 MB2  123 LL
LL     86    -115.000000      .000000    30.000000    -85.000000 MB2  123 UL

C ko   223      .000000      .000000   -25.000000 -1.00000E+30 MB1  223 LL
LL     87    -115.000000      .000000    25.000000    -90.000000 MB1  223 UL

C ko   323      .000000      .000000      .000000    -95.000000 MB1  323 LL
BS     88     -95.000000      .000000      .000000    -95.000000 MB1  323 UL

C ko   423      .000000      .000000   -25.000000 -1.00000E+30 MB1  423 LL
LL     89    -125.000000      .000000    25.000000   -100.000000 MB1  423 UL

C ko   523      .000000      .000000      .000000 -1.00000E+30 MB1  523 LL
LL     90    -105.000000      .000000      .000000   -105.000000 MB1  523 UL

C ko   623      .000000      .000000   -25.000000 -1.00000E+30 MB1  623 LL
LL     91    -135.000000      .000000    25.000000   -110.000000 MB1  623 UL

C bo   111      .000000      .000000      .000000      .000000 MB2  111 UL
BS     92       .000000      .000000      .000000      .000000 UHRD  01 UL

C bo   211      .000000      .000000      .000000      .000000 MB1  211 UL
BS     93       .000000      .000000      .000000      .000000 MB1  211 LL

C bo   311      .000000      .000000      .000000      .000000 MB1  311 UL
BS     94       .000000      .000000      .000000      .000000 MB1  311 LL

C bo   411      .000000      .000000      .000000      .000000 MB1  411 UL
BS     95       .000000      .000000      .000000      .000000 MB1  411 LL

C bo   511      .000000      .000000      .000000      .000000 MB1  511 UL
BS     96       .000000      .000000      .000000      .000000 MB1  511 LL

C bo   611      .000000      .000000      .000000      .000000 LHRD  06 UL
BS     97       .000000      .000000      .000000      .000000 MB1  611 LL

C bo   121      .000000      .000000   -20.000000 -1.00000E+30 MB2  121 UL
```



```
LL     98       .000000      .000000    20.000000    20.000000 UHRD  01 UL

C bo   221      .000000      .000000   -20.000000 -1.00000E+30 MB1  221 UL
LL     99       .000000      .000000    20.000000    20.000000 MB1  221 LL

C bo   321      .000000      .000000   -20.000000 -1.00000E+30 MB1  321 UL
LL    100       .000000      .000000    20.000000    20.000000 MB1  321 LL

C bo   421      .000000      .000000   -20.000000 -1.00000E+30 MB1  421 UL
LL    101       .000000      .000000    20.000000    20.000000 MB1  421 LL

C bo   521      .000000      .000000   -20.000000 -1.00000E+30 MB1  521 UL
LL    102       .000000      .000000    20.000000    20.000000 MB1  521 LL

C bo   621      .000000      .000000   -41.851852 -1.00000E+30 LHRD  06 UL
LL    103       .000000      .000000    41.851852    41.851852 MB1  621 LL

C bo   112      .000000      .000000      .000000      .000000 MB2  112 UL
BS    104       .000000      .000000      .000000      .000000 UHRD  01 UL

C bo   212      .000000      .000000      .000000      .000000 MB1  212 UL
BS    105       .000000      .000000      .000000      .000000 MB1  212 LL

C bo   312      .000000      .000000      .000000      .000000 MB1  312 UL
BS    106       .000000      .000000      .000000      .000000 MB1  312 LL

C bo   412      .000000      .000000      .000000      .000000 MB1  412 UL
BS    107       .000000      .000000      .000000      .000000 MB1  412 LL

C bo   512      .000000      .000000      .000000      .000000 MB1  512 UL
BS    108       .000000      .000000      .000000      .000000 MB1  512 LL

C bo   612      .000000      .000000      .000000      .000000 LHRD  06 UL
BS    109       .000000      .000000      .000000      .000000 MB1  612 LL

C bo   122      .000000      .000000      .000000      .000000 MB2  122 UL
BS    110       .000000      .000000      .000000      .000000 UHRD  01 UL

C bo   222      .000000      .000000      .000000      .000000 MB1  222 UL
BS    111       .000000      .000000      .000000      .000000 MB1  222 LL

C bo   322      .000000      .000000      .000000 -1.00000E+30 MB1  322 UL
LL    112       .000000      .000000      .000000      .000000 MB1  322 LL

C bo   422      .000000      .000000      .000000 -1.00000E+30 MB1  422 UL
LL    113       .000000      .000000      .000000      .000000 MB1  422 LL

C bo   522      .000000      .000000      .000000 -1.00000E+30 MB1  522 UL
LL    114       .000000      .000000      .000000      .000000 MB1  522 LL

C bo   622      .000000      .000000      .000000      .000000 LHRD  06 UL
BS    115       .000000      .000000      .000000      .000000 MB1  622 LL

C bo   123      .000000      .000000      .000000      .000000 MB2  123 UL
BS    116       .000000      .000000      .000000      .000000 UHRD  01 UL

C bo   223      .000000      .000000      .000000 -1.00000E+30 MB1  223 UL
LL    117       .000000      .000000      .000000      .000000 MB1  223 LL

C bo   323      .000000      .000000      .000000      .000000 MB1  323 UL
BS    118       .000000      .000000      .000000      .000000 MB1  323 LL

C bo   423      .000000      .000000      .000000      .000000 MB1  423 UL
BS    119       .000000      .000000      .000000      .000000 MB1  423 LL

C bo   523      .000000      .000000      .000000      .000000 MB1  523 UL
BS    120       .000000      .000000      .000000      .000000 MB1  523 LL

C bo   623      .000000      .000000   -32.962963 -1.00000E+30 LHRD  06 UL
```

```
LL   121        .000000      .000000    32.962963    32.962963 MB1  623 LL

C lo   111       .000000      .000000      .000000    -5.000000 MB2  111 UL
BS   122       -5.000000      .000000      .000000    -5.000000 MB1  211 UL

C lo   211       .000000      .000000      .000000    -5.000000 MB1  211 UL
BS   123       -5.000000      .000000      .000000    -5.000000 MB1  211 LL

C lo   311       .000000      .000000      .000000    -5.000000 MB1  311 UL
BS   124       -5.000000      .000000      .000000    -5.000000 MB1  311 LL

C lo   411       .000000      .000000      .000000    -5.000000 MB1  411 UL
BS   125       -5.000000      .000000      .000000    -5.000000 MB1  411 LL

C lo   511       .000000      .000000   -10.000000 -1.00000E+30 MB1  611 LL
LL   126       -5.000000      .000000    10.000000     5.000000 MB1  511 LL

C lo   611    500.000000   500.000000   -95.000000 -1.00000E+30 MB1  611 UL
LL   127       -5.000000   500.000000    95.000000    90.000000 MB1  611 LL

C lo   121       .000000      .000000      .000000    -5.000000 MB2  121 UL
BS   128       -5.000000      .000000      .000000    -5.000000 MB1  221 UL

C lo   221       .000000      .000000      .000000    -5.000000 MB1  221 UL
BS   129       -5.000000      .000000      .000000    -5.000000 MB1  221 LL

C lo   321       .000000      .000000      .000000    -5.000000 MB1  321 UL
BS   130       -5.000000      .000000      .000000    -5.000000 MB1  321 LL

C lo   421       .000000      .000000      .000000    -5.000000 MB1  421 UL
BS   131       -5.000000      .000000      .000000    -5.000000 MB1  421 LL

C lo   521       .000000      .000000      .000000    -5.000000 MB1  621 LL
BS   132       -5.000000      .000000      .000000    -5.000000 MB1  521 LL

C lo   621    500.000000   500.000000  -135.000000 -1.00000E+30 MB1  621 UL
LL   133       -5.000000   500.000000   135.000000   130.000000 MB1  621 LL

C lo   112       .000000      .000000      .000000    -5.000000 MB2  112 UL
BS   134       -5.000000      .000000      .000000    -5.000000 MB1  212 UL

C lo   212       .000000      .000000      .000000    -5.000000 MB1  212 UL
BS   135       -5.000000      .000000      .000000    -5.000000 MB1  212 LL

C lo   312       .000000      .000000      .000000    -5.000000 MB1  312 UL
BS   136       -5.000000      .000000      .000000    -5.000000 MB1  312 LL

C lo   412       .000000      .000000      .000000    -5.000000 MB1  412 UL
BS   137       -5.000000      .000000      .000000    -5.000000 MB1  412 LL

C lo   512       .000000      .000000      .000000    -5.000000 MB1  612 LL
BS   138       -5.000000      .000000      .000000    -5.000000 MB1  512 LL

C lo   612    500.000000   500.000000  -105.000000 -1.00000E+30 MB1  612 UL
LL   139       -5.000000   500.000000   105.000000   100.000000 MB1  612 LL

C lo   122       .000000      .000000      .000000    -5.000000 MB2  122 UL
BS   140       -5.000000      .000000      .000000    -5.000000 MB1  222 UL

C lo   222       .000000      .000000      .000000    -5.000000 MB1  222 UL
BS   141       -5.000000      .000000      .000000    -5.000000 MB1  222 LL

C lo   322       .000000      .000000      .000000    -5.000000 MB1  322 UL
BS   142       -5.000000      .000000      .000000    -5.000000 MB1  322 LL

C lo   422       .000000      .000000      .000000    -5.000000 MB1  422 UL
BS   143       -5.000000      .000000      .000000    -5.000000 MB1  422 LL

C lo   522       .000000      .000000   -30.000000 -1.00000E+30 MB1  622 LL
```



```
LL   144      -5.000000      .000000    30.000000    25.000000 MB1  522 LL

C lo   622   500.000000   500.000000   -85.000000 -1.00000E+30 MB1  622 UL
LL   145      -5.000000   500.000000    85.000000    80.000000 MB1  622 LL

C lo   123      .000000      .000000      .000000    -5.000000 MB2  123 UL
BS   146      -5.000000      .000000      .000000    -5.000000 MB1  223 UL

C lo   223      .000000      .000000      .000000    -5.000000 MB1  223 UL
BS   147      -5.000000      .000000      .000000    -5.000000 MB1  223 LL

C lo   323      .000000      .000000      .000000    -5.000000 MB1  323 UL
BS   148      -5.000000      .000000      .000000    -5.000000 MB1  323 LL

C lo   423      .000000      .000000      .000000    -5.000000 MB1  423 UL
BS   149      -5.000000      .000000      .000000    -5.000000 MB1  423 LL

C lo   523      .000000      .000000      .000000    -5.000000 MB1  623 LL
BS   150      -5.000000      .000000      .000000    -5.000000 MB1  523 LL

C lo   623   500.000000   500.000000  -115.000000 -1.00000E+30 MB1  623 UL
LL   151      -5.000000   500.000000   115.000000   110.000000 MB1  623 LL

C prod  01      .000000      .000000      .000000   150.000000 UHRD  01 UL
BS   152    150.000000      .000000      .000000   150.000000 LHRD  01 UL

C prod  02      .000000      .000000      .000000   150.000000 UHRD  02 UL
BS   153    150.000000      .000000      .000000   150.000000 LHRD  02 UL

C prod  03      .000000      .000000      .000000   150.000000 UHRD  03 UL
BS   154    150.000000      .000000      .000000   150.000000 LHRD  03 UL

C prod  04      .000000      .000000      .000000   150.000000 UHRD  04 UL
BS   155    150.000000      .000000      .000000   150.000000 LHRD  04 UL

C prod  05      .000000      .000000      .000000   150.000000 UHRD  05 UL
BS   156    150.000000      .000000      .000000   150.000000 LHRD  05 UL

C prod  06      .000000      .000000      .000000   150.000000 UHRD  06 UL
BS   157    150.000000      .000000      .000000   150.000000 LHRD  06 UL

*************************************************
*                                               *
*                                               *
*       Oppgave 3 og 4 i Williams               *
*                                               *
*       Loest av:                               *
*       Aasmund Høigaard (aasmundh@foa.unit.no) *
*       Roar Myhre (roarmyh@foa.unit.no)        *
*                                               *
*       Foelgende filer kommer fortloepende:    *

        maskin.ant
        maskin.ett
        maskin.ind
        maskin.lag
        maskin.lma
        maskin.lst
        maskin.max
        maskin.mod
        maskin.pro
        maskin.prt
        maskin.rrt
        maskin.slu
        maskin.tid
        maskin.ved

*                                               *
*                                               *
```

```
*************************************************

!
!
!
!   Antall maskiner av hver type maskin m
!
!      1 = GR = Grinder
!      2 = VD = Vertical driller
!      3 = HD = Horizontal driller
!      4 = BR = Borer
!      5 = PL = Planner
!
!        GR    VD    HD    BR    PL
! m=     1     2     3     4     5
         4  ,  2  ,  3  ,  1  ,  1
!
! Tabell som viser maksimal etterp¢rsel etter et produkt (i)
! i måned (t)
!
! PROD     PROD    PROD     PROD     PROD     PROD     PROD
!  1         2       3        4        5        6        7
  500  ,   1000  ,  300  ,   300  ,   800  ,   200  ,   100  ! Januar
  600  ,    500  ,  200  ,     0  ,   400  ,   300  ,   150  ! Februar
  300  ,    600  ,    0  ,     0  ,   500  ,   400  ,   100  ! Mars
  200  ,    300  ,  400  ,   500  ,   200  ,     0  ,   100  ! April
    0  ,    100  ,  500  ,   100  ,  1000  ,   300  ,     0  ! Mai
  500  ,    500  ,  100  ,   300  ,  1100  ,   500  ,    60  ! Juni


! Tabell med foelgende innhold:
!
! Maksimalverdi for antall produkter (IMAX)
! Maksimalverdi for antall maskiner (MMAX)
! Maksimalverdi for antall maaneder med produksjon (TMAX)
!
!  IMAX      MMAX      TMAX
     7   ,    5    ,    6
!
! Tabell som viser kostnaden ved å ha produkt (i) på lager
! i periode (t). ($/enhet)
!
! PROD    PROD    PROD    PROD    PROD    PROD    PROD
!  1        2       3       4       5       6       7
  0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5   ! Januar
  0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5   ! Februar
  0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5   ! Mars
  0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5   ! April
  0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5   ! Mai
  0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5 ,   0.5   ! Juni
!
! Tabell som viser maksimal lagerbeholdning av produkt (i)
! i periode/måned (t)
!
!  PROD      PROD      PROD     PROD      PROD     PROD     PROD
!   1          2         3        4         5        6        7
   100   ,    100   ,  100   ,   100   ,   100  ,   100 ,    100  ! Januar
!   100  ,    100   ,  100   ,   100   ,   100  ,   100 ,    100  ! Februar
!   100  ,    100   ,  100   ,   100   ,   100  ,   100 ,    100  ! Mars
!   100  ,    100   ,  100   ,   100   ,   100  ,   100 ,    100  ! April
!   100  ,    100   ,  100   ,   100   ,   100  ,   100 ,    100  ! Mai
!   100  ,    100   ,  100   ,   100   ,   100  ,   100 ,    100  ! Juni




!
! Tabell som viser maksimal antall timer kj¢ring for maskin (m)
! i måned/periode (t). Hver måned/periode består av 24 arbeidsdager, og
```



```
! arbeidet foregår på to skift av 8 timer.
!
! Maskin   Maskin    Maskin     Maskin    Maskin
!  (1)       (2)       (3)        (4)       (5)
   384   ,   384   ,   384  ,    384  ,     384     ! Januar
   384   ,   384   ,   384  ,    384  ,     384     ! Februar
   384   ,   384   ,   384  ,    384  ,     384     ! Mars
   384   ,   384   ,   384  ,    384  ,     384     ! April
   384   ,   384   ,   384  ,    384  ,     384     ! Mai
   384   ,   384   ,   384  ,    384  ,     384     ! Juni
!
!       Obligatorisk dataoeving i Operasjonsanalyse II
!       Utfoert av Roar Myhre og Aasmund Hoeigaard
!       23.10.96 - 3.11.96
!
MODEL MASKIN
!
!
TABLES
!
!
!
 INDEKS(3)
!
!
DISKDATA
 INDEKS(1) = maskin.ind
!
LET IMAX = INDEKS(1)    ! Indeks for produkttype
LET MMAX = INDEKS(2)    ! Indeks for maskintype
LET TMAX = INDEKS(3)    ! Indeks for tidsperiode
!
!
!
TABLES
 ETTE(TMAX,IMAX)      ! Etterspoersel av produkt i i periode p
 ANTALL(MMAX)         ! Antall maskiner av type m
 KTID(TMAX,MMAX)      ! Max kjoeretid for maskin m i periode t
 PROFBI(IMAX)         ! Profittbidrag fra produkttype i
 TFOR(MMAX,IMAX)      ! Tidsforbruk av maskin m ved produksjon av prod. i
 LKOS(TMAX,IMAX)      ! Lager kostnad for produkt i i periode t
 VEDL(TMAX,MMAX)      ! Antall maskiner under vedlikehold av type m i periode t
 SLUT(TMAX,IMAX)      ! Krav til sluttlager for produkt i
 LMAX(IMAX)           ! Maks. lagerkapasitet for produkt i
!
!
!
DISKDATA
 ETTE(1,1) = maskin.ett
 ANTALL(1) = maskin.ant
 KTID(1,1) = maskin.max
 PROFBI(1) = maskin.pro
 TFOR(1,1) = maskin.tid
 LKOS(1,1) = maskin.lag
 VEDL(1,1) = maskin.ved
 SLUT(1,1) = maskin.slu
 LMAX(1) = maskin.lma
!
!
!
VARIABLES
 prod(t=1:TMAX,i=1:IMAX)  ! Antall produserte enheter av prod. i i periode t
 lage(t=1:TMAX,i=1:IMAX)  ! Antall enheter av prod. i paa lager i periode t
 salg(t=1:TMAX,i=1:IMAX)  ! Antall enheter av prod. i solgt i periode t
!
!
!
CONSTRAINTS
!
```

```
!          Maalfunksjon: profitt = inntekt - lagerkostnader
!
 MAXOBJ: &
        SUM(t=1:TMAX,i=1:IMAX) PROFBI(i)*salg(t,i)    &
 -      SUM(t=1:TMAX,i=1:IMAX) LKOS(t,i)*lage(t,i)   $
!
!      Forbruk av maskintid er mindre eller lik tilgjengelig maskintid
!
 TBEG(t=1:TMAX,m=1:MMAX): &
        SUM(i=1:IMAX) TFOR(m,i)*prod(t,i) < KTID(t,m)*(ANTALL(m) - VEDL(t,m))
!
!
!
 VBAA(t=1:1,i=1:IMAX): &
        prod(t,i) - salg(t,i) &
-       lage(t,i) = SLUT(t,i)
!
!
 VBAB(t=2:(TMAX-1),i=1:IMAX): &
        lage(t-1,i) &
+       prod(t,i) - salg(t,i) &
-       lage(t,i) = SLUT(t,i)
!
!
 VBAC(t=TMAX:TMAX,i=1:IMAX): &
        lage(t-1,i) &
+       prod(t,i) - salg(t,i) = SLUT(t,i)


 BALA(i=1:IMAX): &
        SUM(t=1:TMAX) prod(t,i)  &
 -      SUM(t=1:TMAX) salg(t,i)  &
 -      lage(TMAX,i) = 0
!
!
BOUNDS
!
!      Antall solgte enheter er mindre eller lik etterspoerselen
!
 salg(t=1:TMAX,i=1:IMAX) < ETTE(t,i)
!
!      Antall enheter paa leger er mindre eller lik lagerkapasiteten
!
        lage(t=1:TMAX,i=1:IMAX) < LMAX(i)
!
!
!      Modell er ferdig
!
GENERATE
!
! Tabell som viser produkt (i)'s bidrag til total profitt ($/enhet).
!
! PROD   PROD   PROD   PROD   PROD   PROD   PROD
!  1       2      3      4      5      6      7
  10  ,    6  ,   8  ,   4  ,  11  ,   9  ,   3

Problem Statistics
Matrix MASKIN
Objective MAXOBJ
RHS RHS00001
Problem has     80 rows and    126 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     47 iterations
Objective function value is  93715.17857


Rows Section
```


	Number	Row	At	Value	Slack Value	Dual Value	RHS
N	1	MAXOBJ	BS	93715.17857	-93715.17857	.000000	.000000
L	2	TBEG0101	UL	1152.000000	.000000	8.571429	1152.000000
L	3	TBEG0102	BS	437.714286	330.285714	.000000	768.000000
L	4	TBEG0103	BS	406.000000	746.000000	.000000	1152.000000
L	5	TBEG0104	BS	152.657143	231.342857	.000000	384.000000
L	6	TBEG0105	BS	43.825000	340.175000	.000000	384.000000
L	7	TBEG0201	BS	1105.000000	431.000000	.000000	1536.000000
L	8	TBEG0202	BS	370.000000	398.000000	.000000	768.000000
L	9	TBEG0203	UL	384.000000	.000000	.625000	384.000000
L	10	TBEG0204	BS	123.000000	261.000000	.000000	384.000000
L	11	TBEG0205	BS	38.675000	345.325000	.000000	384.000000
L	12	TBEG0301	BS	80.000000	1456.000000	.000000	1536.000000
L	13	TBEG0302	BS	240.000000	528.000000	.000000	768.000000
L	14	TBEG0303	BS	.000000	1152.000000	.000000	1152.000000
L	15	TBEG0304	UL	.000000	.000000	200.000000	.000000
L	16	TBEG0305	BS	.000000	384.000000	.000000	384.000000
L	17	TBEG0401	BS	420.000000	1116.000000	.000000	1536.000000
L	18	TBEG0402	BS	230.000000	154.000000	.000000	384.000000
L	19	TBEG0403	BS	420.000000	732.000000	.000000	1152.000000
L	20	TBEG0404	BS	82.000000	302.000000	.000000	384.000000
L	21	TBEG0405	BS	19.000000	365.000000	.000000	384.000000
L	22	TBEG0501	BS	510.000000	642.000000	.000000	1152.000000
L	23	TBEG0502	BS	230.000000	154.000000	.000000	384.000000
L	24	TBEG0503	BS	540.000000	612.000000	.000000	1152.000000
L	25	TBEG0504	BS	128.000000	256.000000	.000000	384.000000
L	26	TBEG0505	BS	66.000000	318.000000	.000000	384.000000
L	27	TBEG0601	BS	770.000000	766.000000	.000000	1536.000000
L	28	TBEG0602	BS	600.000000	168.000000	.000000	768.000000
L	29	TBEG0603	BS	110.000000	658.000000	.000000	768.000000
L	30	TBEG0604	BS	68.500000	315.500000	.000000	384.000000
L	31	TBEG0605	UL	.000000	.000000	800.000000	.000000
E	32	VBAA0101	EQ	.000000	.000000	-4.785714	.000000
E	33	VBAA0102	EQ	.000000	.000000	-6.500000	.000000
E	34	VBAA0103	EQ	.000000	.000000	-.500000	.000000
E	35	VBAA0104	EQ	.000000	.000000	-.500000	.000000
E	36	VBAA0105	EQ	.000000	.000000	-3.071429	.000000
E	37	VBAA0106	EQ	.000000	.000000	-2.214286	.000000
E	38	VBAA0107	EQ	.000000	.000000	-4.785714	.000000
E	39	VBAB0201	EQ	.000000	.000000	-.625000	.000000
E	40	VBAB0202	EQ	.000000	.000000	-.500000	.000000
E	41	VBAB0203	EQ	.000000	.000000	-1.000000	.000000
E	42	VBAB0204	EQ	.000000	.000000	-.500000	.000000
E	43	VBAB0205	EQ	.000000	.000000	-.500000	.000000
E	44	VBAB0206	EQ	.000000	.000000	-.500000	.000000
E	45	VBAB0207	EQ	.000000	.000000	-.875000	.000000
E	46	VBAB0301	EQ	.000000	.000000	-10.500000	.000000
E	47	VBAB0302	EQ	.000000	.000000	-6.500000	.000000
E	48	VBAB0303	EQ	.000000	.000000	-.500000	.000000
E	49	VBAB0304	EQ	.000000	.000000	-1.000000	.000000
E	50	VBAB0305	EQ	.000000	.000000	-11.500000	.000000
E	51	VBAB0306	EQ	.000000	.000000	-.500000	.000000
E	52	VBAB0307	EQ	.000000	.000000	-1.375000	.000000
E	53	VBAB0401	EQ	.000000	.000000	-.500000	.000000
E	54	VBAB0402	EQ	.000000	.000000	-.500000	.000000
E	55	VBAB0403	EQ	.000000	.000000	-.500000	.000000
E	56	VBAB0404	EQ	.000000	.000000	-.500000	.000000
E	57	VBAB0405	EQ	.000000	.000000	-.500000	.000000
E	58	VBAB0406	EQ	.000000	.000000	.000000	.000000
E	59	VBAB0407	EQ	.000000	.000000	-.500000	.000000
E	60	VBAB0501	EQ	.000000	.000000	-.500000	.000000
E	61	VBAB0502	EQ	.000000	.000000	-.500000	.000000
E	62	VBAB0503	EQ	.000000	.000000	-.500000	.000000
E	63	VBAB0504	EQ	.000000	.000000	-.500000	.000000
E	64	VBAB0505	EQ	.000000	.000000	-.500000	.000000
E	65	VBAB0506	EQ	.000000	.000000	-.500000	.000000
E	66	VBAB0507	EQ	.000000	.000000	-.500000	.000000
E	67	VBAC0601	EQ	50.000000	.000000	-.500000	50.000000
E	68	VBAC0602	EQ	50.000000	.000000	-.500000	50.000000

E	69	VBAC0603	EQ	50.000000	.000000	-8.500000	50.000000
E	70	VBAC0604	EQ	50.000000	.000000	-.500000	50.000000
E	71	VBAC0605	EQ	50.000000	.000000	-11.500000	50.000000
E	72	VBAC0606	EQ	50.000000	.000000	-.500000	50.000000
E	73	VBAC0607	EQ	50.000000	.000000	-3.500000	50.000000
E	74	BALA 01	EQ	.000000	.000000	.500000	.000000
E	75	BALA 02	EQ	.000000	.000000	.500000	.000000
E	76	BALA 03	EQ	.000000	.000000	.500000	.000000
E	77	BALA 04	EQ	.000000	.000000	.500000	.000000
E	78	BALA 05	EQ	.000000	.000000	.500000	.000000
E	79	BALA 06	EQ	.000000	.000000	.500000	.000000
E	80	BALA 07	EQ	.000000	.000000	.500000	.000000

Columns Section

	Number	Column	At	Value	Input Cost	Reduced Cost
C	81	prod0101	BS	500.000000	.000000	.000000
C	82	prod0201	BS	700.000000	.000000	.000000
C	83	prod0301	BS	.000000	.000000	.000000
C	84	prod0401	BS	200.000000	.000000	.000000
C	85	prod0501	BS	.000000	.000000	.000000
C	86	prod0601	BS	550.000000	.000000	.000000
C	87	prod0102	BS	888.571429	.000000	.000000
C	88	prod0202	BS	600.000000	.000000	.000000
C	89	prod0302	LL	.000000	.000000	.000000
C	90	prod0402	BS	300.000000	.000000	.000000
C	91	prod0502	BS	100.000000	.000000	.000000
C	92	prod0602	BS	550.000000	.000000	.000000
C	93	prod0103	BS	382.500000	.000000	.000000
C	94	prod0203	BS	117.500000	.000000	.000000
C	95	prod0303	BS	.000000	.000000	.000000
C	96	prod0403	BS	400.000000	.000000	.000000
C	97	prod0503	BS	600.000000	.000000	.000000
C	98	prod0603	BS	.000000	.000000	.000000
C	99	prod0104	BS	300.000000	.000000	.000000
C	100	prod0204	BS	.000000	.000000	.000000
C	101	prod0304	LL	.000000	.000000	13.500000
C	102	prod0404	BS	500.000000	.000000	.000000
C	103	prod0504	BS	100.000000	.000000	.000000
C	104	prod0604	BS	350.000000	.000000	.000000
C	105	prod0105	BS	800.000000	.000000	.000000
C	106	prod0205	BS	500.000000	.000000	.000000
C	107	prod0305	LL	.000000	.000000	9.000000
C	108	prod0405	BS	200.000000	.000000	.000000
C	109	prod0505	BS	1100.000000	.000000	.000000
C	110	prod0605	LL	.000000	.000000	29.000000
C	111	prod0106	BS	200.000000	.000000	.000000
C	112	prod0206	BS	300.000000	.000000	.000000
C	113	prod0306	BS	400.000000	.000000	.000000
C	114	prod0406	LL	.000000	.000000	.500000
C	115	prod0506	BS	300.000000	.000000	.000000
C	116	prod0606	BS	550.000000	.000000	.000000
C	117	prod0107	BS	.000000	.000000	.000000
C	118	prod0207	BS	250.000000	.000000	.000000
C	119	prod0307	LL	.000000	.000000	15.125000
C	120	prod0407	BS	100.000000	.000000	.000000
C	121	prod0507	BS	100.000000	.000000	.000000
C	122	prod0607	LL	.000000	.000000	37.000000
C	123	lage0101	LL	.000000	-.500000	4.660714
C	124	lage0201	UL	100.000000	-.500000	-9.375000
C	125	lage0301	LL	.000000	-.500000	10.500000
C	126	lage0401	LL	.000000	-.500000	.500000
C	127	lage0501	LL	.000000	-.500000	.500000
C	128	lage0601	BS	50.000000	-.500000	.000000
C	129	lage0102	LL	.000000	-.500000	6.500000
C	130	lage0202	UL	100.000000	-.500000	-5.500000
C	131	lage0302	LL	.000000	-.500000	6.500000
C	132	lage0402	LL	.000000	-.500000	.500000
C	133	lage0502	LL	.000000	-.500000	.500000
C	134	lage0602	BS	50.000000	-.500000	.000000

C	135	lage0103	BS	82.500000	-.500000	.000000
C	136	lage0203	LL	.000000	-.500000	1.000000
C	137	lage0303	LL	.000000	-.500000	.500000
C	138	lage0403	LL	.000000	-.500000	.500000
C	139	lage0503	UL	100.000000	-.500000	-7.500000
C	140	lage0603	BS	50.000000	-.500000	.000000
C	141	lage0104	LL	.000000	-.500000	.500000
C	142	lage0204	BS	.000000	-.500000	.000000
C	143	lage0304	LL	.000000	-.500000	1.000000
C	144	lage0404	LL	.000000	-.500000	.500000
C	145	lage0504	LL	.000000	-.500000	.500000
C	146	lage0604	BS	50.000000	-.500000	.000000
C	147	lage0105	LL	.000000	-.500000	3.071429
C	148	lage0205	UL	100.000000	-.500000	-10.500000
C	149	lage0305	LL	.000000	-.500000	11.500000
C	150	lage0405	LL	.000000	-.500000	.500000
C	151	lage0505	UL	100.000000	-.500000	-10.500000
C	152	lage0605	BS	50.000000	-.500000	.000000
C	153	lage0106	LL	.000000	-.500000	2.214286
C	154	lage0206	LL	.000000	-.500000	.500000
C	155	lage0306	LL	.000000	-.500000	1.000000
C	156	lage0406	LL	.000000	-.500000	.000000
C	157	lage0506	LL	.000000	-.500000	.500000
C	158	lage0606	BS	50.000000	-.500000	.000000
C	159	lage0107	LL	.000000	-.500000	4.410714
C	160	lage0207	BS	100.000000	-.500000	.000000
C	161	lage0307	LL	.000000	-.500000	1.375000
C	162	lage0407	LL	.000000	-.500000	.500000
C	163	lage0507	UL	100.000000	-.500000	-2.500000
C	164	lage0607	BS	50.000000	-.500000	.000000
C	165	salg0101	UL	500.000000	10.000000	-5.714286
C	166	salg0201	UL	600.000000	10.000000	-9.875000
C	167	salg0301	BS	100.000000	10.000000	.000000
C	168	salg0401	UL	200.000000	10.000000	-10.000000
C	169	salg0501	LL	.000000	10.000000	-10.000000
C	170	salg0601	UL	500.000000	10.000000	-10.000000
C	171	salg0102	BS	888.571429	6.000000	.000000
C	172	salg0202	UL	500.000000	6.000000	-6.000000
C	173	salg0302	BS	100.000000	6.000000	.000000
C	174	salg0402	UL	300.000000	6.000000	-6.000000
C	175	salg0502	UL	100.000000	6.000000	-6.000000
C	176	salg0602	UL	500.000000	6.000000	-6.000000
C	177	salg0103	UL	300.000000	8.000000	-8.000000
C	178	salg0203	UL	200.000000	8.000000	-7.500000
C	179	salg0303	LL	.000000	8.000000	-8.000000
C	180	salg0403	UL	400.000000	8.000000	-8.000000
C	181	salg0503	UL	500.000000	8.000000	-8.000000
C	182	salg0603	BS	50.000000	8.000000	.000000
C	183	salg0104	UL	300.000000	4.000000	-4.000000
C	184	salg0204	LL	.000000	4.000000	-4.000000
C	185	salg0304	LL	.000000	4.000000	-3.500000
C	186	salg0404	UL	500.000000	4.000000	-4.000000
C	187	salg0504	UL	100.000000	4.000000	-4.000000
C	188	salg0604	UL	300.000000	4.000000	-4.000000
C	189	salg0105	UL	800.000000	11.000000	-8.428571
C	190	salg0205	UL	400.000000	11.000000	-11.000000
C	191	salg0305	BS	100.000000	11.000000	.000000
C	192	salg0405	UL	200.000000	11.000000	-11.000000
C	193	salg0505	UL	1000.000000	11.000000	-11.000000
C	194	salg0605	BS	50.000000	11.000000	.000000
C	195	salg0106	UL	200.000000	9.000000	-7.285714
C	196	salg0206	UL	300.000000	9.000000	-9.000000
C	197	salg0306	UL	400.000000	9.000000	-9.000000
C	198	salg0406	LL	.000000	9.000000	-9.500000
C	199	salg0506	UL	300.000000	9.000000	-9.000000
C	200	salg0606	UL	500.000000	9.000000	-9.000000
C	201	salg0107	LL	.000000	3.000000	1.285714
C	202	salg0207	UL	150.000000	3.000000	-2.625000
C	203	salg0307	UL	100.000000	3.000000	-2.125000

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 C    204  salg0407  UL    100.000000      3.000000     -3.000000
 C    205  salg0507  LL       .000000      3.000000     -3.000000
 C    206  salg0607  BS     50.000000      3.000000       .000000

Problem Statistics
Matrix MASKIN
Objective MAXOBJ
RHS RHS00001
Problem has     80 rows and    126 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     47 iterations
Objective function value is  93715.17857

N MAXOBJ    93715.17857  499729541.0      .000000             TBEG0101 UL
BS     1   -93715.17857  93715.18554      .000000

L TBEG0101  1152.000000  58291992.18     8.571429             prod0102 LL
UL     2        .000000 -7308632.324    -8.571429             salg0102 UL

L TBEG0102   437.714286  1339226.074      .000000             salg0107 LL
BS     3    330.285714   437.714294      .000000             lage0104 LL

L TBEG0103   406.000000  5623317.382      .000000             salg0307 UL
BS     4    746.000000 -1311606.567      .000000             TBEG0203 UL

L TBEG0104   152.657143  15744302.97      .000000             salg0104 UL
BS     5    231.342857   152.657150      .000000             lage0104 LL

L TBEG0105    43.825000  19492801.51      .000000             salg0105 UL
BS     6    340.175000 -7497170.898      .000000             salg0107 LL

L TBEG0201  1105.000000  4686864.257      .000000             salg0307 UL
BS     7    431.000000 -1873198.730      .000000             lage0206 LL

L TBEG0202   370.000000   370.000000      .000000             lage0104 LL
BS     8    398.000000 -5622541.503      .000000             lage0206 LL

L TBEG0203   384.000000  1312396.606      .625000             lage0103 UL
UL     9        .000000 -6184818.359     -.625000             lage0103 LL

L TBEG0204   123.000000   123.000000      .000000             lage0104 LL
BS    10    261.000000 -5247927.246      .000000             lage0304 LL

L TBEG0205    38.675000  262441.1865      .000000             TBEG0203 UL
BS    11    345.325000    38.674999      .000000             lage0307 LL

L TBEG0301    80.000000  1874383.666      .000000             lage0206 LL
BS    12   1456.000000    80.000000      .000000             prod0302 LL

L TBEG0302   240.000000  5623151.367      .000000             lage0206 LL
BS    13    528.000000   240.000000      .000000             prod0302 LL

L TBEG0303      .000000      .000000      .000000             prod0302 LL
BS    14   1152.000000 -7497214.843      .000000             lage0303 LL

L TBEG0304      .000000      .000000   200.000000             prod0301 LL
UL    15        .000000 -7497214.843  -200.000000             salg0301 UL

L TBEG0305      .000000      .000000      .000000             lage0203 LL
BS    16    384.000000 -1499442.993      .000000             lage0303 LL

L TBEG0401   420.000000   420.000000      .000000             lage0307 LL
BS    17   1116.000000 -6559642.578      .000000             lage0402 LL

L TBEG0402   230.000000  2811685.546      .000000             lage0304 LL
BS    18    154.000000   230.000000      .000000             prod0406 LL
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L TBEG0403   420.000000  7497634.765      .000000             lage0303 LL
BS    19    732.000000 -7496794.921      .000000             lage0403 LL

L TBEG0404    82.000000  5248132.324      .000000             lage0304 LL
BS    20    302.000000 -7497132.812      .000000             lage0405 LL

L TBEG0405    19.000000    19.000000      .000000             lage0307 LL
BS    21    365.000000 -7497195.800      .000000             lage0405 LL

L TBEG0501   510.000000   510.000000      .000000             lage0406 LL
BS    22    642.000000 -6559552.734      .000000             lage0502 LL

L TBEG0502   230.000000   230.000000      .000000             lage0406 LL
BS    23    154.000000 -5622681.152      .000000             lage0506 LL

L TBEG0503   540.000000  7497754.882      .000000             lage0403 LL
BS    24    612.000000 -1873763.671      .000000             lage0501 LL

L TBEG0504   128.000000  7497342.773      .000000             lage0405 LL
BS    25    256.000000 -5247922.363      .000000             lage0504 LL

L TBEG0505    66.000000  7497280.761      .000000             lage0405 LL
BS    26    318.000000    66.000000      .000000

L TBEG0601   770.000000  6560833.007      .000000             lage0502 LL
BS    27    766.000000   770.000000      .000000             prod0607 LL

L TBEG0602   600.000000  5623511.230      .000000             lage0506 LL
BS    28    168.000000   600.000000      .000000

L TBEG0603   110.000000  1874413.696      .000000             lage0501 LL
BS    29    658.000000   110.000000      .000000

L TBEG0604    68.500000  5248118.652      .000000             lage0504 LL
BS    30    315.500000    68.500000      .000000             prod0605 LL

L TBEG0605      .000000      .000000   800.000000             prod0603 LL
UL    31        .000000 -749721.4355  -800.000000             salg0603 UL

E VBAA0101      .000000  4685759.277    -4.785714             lage0601 LL
EQ    32        .000000 -4685759.277     4.785714             lage0601 UL

E VBAA0102      .000000  4685759.277    -6.500000             lage0602 LL
EQ    33        .000000 -4685759.277     6.500000             lage0602 UL

E VBAA0103      .000000  4685759.277     -.500000             lage0603 LL
EQ    34        .000000 -4685759.277      .500000             lage0603 UL

E VBAA0104      .000000  4685759.277     -.500000             lage0604 LL
EQ    35        .000000 -4685759.277      .500000             lage0604 UL

E VBAA0105      .000000  4685759.277    -3.071429             lage0605 LL
EQ    36        .000000 -4685759.277     3.071429             lage0605 UL

E VBAA0106      .000000  4685759.277    -2.214286             lage0606 LL
EQ    37        .000000 -4685759.277     2.214286             lage0606 UL

E VBAA0107      .000000      .000000    -4.785714             prod0107 LL
EQ    38        .000000 -4685759.277     4.785714             lage0607 UL

E VBAB0201      .000000  4685759.277     -.625000             lage0601 LL
EQ    39        .000000 -4685759.277      .625000             lage0601 UL

E VBAB0202      .000000  4685759.277     -.500000             lage0602 LL
EQ    40        .000000 -4685759.277      .500000             lage0602 UL

E VBAB0203      .000000  4685759.277    -1.000000             lage0603 LL
EQ    41        .000000 -1640015.747     1.000000             lage0103 UL
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E VBAB0204       .000000      .000000     -.500000             prod0204 LL
EQ    42         .000000 -4685759.277      .500000             lage0604 UL

E VBAB0205       .000000  4685759.277     -.500000             lage0605 UL
EQ    43         .000000 -4685759.277      .500000             lage0605 LL

E VBAB0206       .000000  4685759.277     -.500000             lage0606 UL
EQ    44         .000000 -4685759.277      .500000             lage0606 LL

E VBAB0207       .000000  4685759.277     -.875000             lage0607 LL
EQ    45         .000000 -2186687.500      .875000             lage0103 UL

E VBAB0301       .000000  4685759.277   -10.500000             lage0601 UL
EQ    46         .000000 -4685759.277    10.500000             lage0601 LL

E VBAB0302       .000000  4685759.277    -6.500000             lage0602 UL
EQ    47         .000000 -4685759.277     6.500000             lage0602 LL

E VBAB0303       .000000      .000000     -.500000             prod0303 LL
EQ    48         .000000 -4685759.277      .500000             lage0603 UL

E VBAB0304       .000000      .000000    -1.000000             prod0204 LL
EQ    49         .000000 -4685759.277     1.000000             lage0604 UL

E VBAB0305       .000000  4685759.277   -11.500000             lage0605 UL
EQ    50         .000000 -4685759.277    11.500000             lage0605 LL

E VBAB0306       .000000  4685759.277     -.500000             lage0606 UL
EQ    51         .000000 -4685759.277      .500000             lage0606 LL

E VBAB0307       .000000      .000000    -1.375000             lage0207 UL
EQ    52         .000000 -4685759.277     1.375000             lage0607 LL

E VBAB0401       .000000  4685759.277     -.500000             lage0601 UL
EQ    53         .000000 -4685759.277      .500000             lage0601 LL

E VBAB0402       .000000  4685759.277     -.500000             lage0602 UL
EQ    54         .000000 -4685759.277      .500000             lage0602 LL

E VBAB0403       .000000  4685759.277     -.500000             lage0603 UL
EQ    55         .000000 -4685759.277      .500000             lage0603 LL

E VBAB0404       .000000  4685759.277     -.500000             lage0604 UL
EQ    56         .000000 -4685759.277      .500000             lage0604 LL

E VBAB0405       .000000  4685759.277     -.500000             lage0605 UL
EQ    57         .000000 -4685759.277      .500000             lage0605 LL

E VBAB0406       .000000  4685759.277      .000000             lage0406 LL
EQ    58         .000000 -4685759.277      .000000             prod0406 LL

E VBAB0407       .000000  4685759.277     -.500000             lage0607 UL
EQ    59         .000000 -4685759.277      .500000             lage0607 LL

E VBAB0501       .000000      .000000     -.500000             prod0501 LL
EQ    60         .000000 -4685759.277      .500000             lage0601 UL

E VBAB0502       .000000  4685759.277     -.500000             lage0602 LL
EQ    61         .000000 -4685759.277      .500000             lage0602 UL

E VBAB0503       .000000  4685759.277     -.500000             lage0603 LL
EQ    62         .000000 -4685759.277      .500000             lage0603 UL

E VBAB0504       .000000  4685759.277     -.500000             lage0604 UL
EQ    63         .000000 -4685759.277      .500000             lage0604 LL

E VBAB0505       .000000  4685759.277     -.500000             lage0605 LL
EQ    64         .000000 -4685759.277      .500000             lage0605 UL
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E VBAB0506       .000000  4685759.277     -.500000             lage0606 UL
EQ    65         .000000 -4685759.277      .500000             lage0606 LL

E VBAB0507       .000000  4685759.277     -.500000             lage0607 LL
EQ    66         .000000 -4685759.277      .500000             lage0607 UL

E VBAC0601     50.000000  4685809.082     -.500000             lage0601 UL
EQ    67         .000000 -4685708.984      .500000             lage0601 LL

E VBAC0602     50.000000  4685809.082     -.500000             lage0602 LL
EQ    68         .000000 -4685708.984      .500000             lage0602 UL

E VBAC0603     50.000000  4685809.082    -8.500000             salg0603 UL
EQ    69         .000000 -4685708.984     8.500000             salg0603 LL

E VBAC0604     50.000000  4685809.082     -.500000             lage0604 LL
EQ    70         .000000 -4685708.984      .500000             lage0604 UL

E VBAC0605     50.000000  4685809.082   -11.500000             lage0605 LL
EQ    71         .000000 -4685708.984    11.500000             salg0605 LL

E VBAC0606     50.000000  4685809.082     -.500000             lage0606 LL
EQ    72         .000000 -4685708.984      .500000             lage0606 UL

E VBAC0607     50.000000  937201.7578    -3.500000             salg0607 UL
EQ    73         .000000 -4685708.984     3.500000             salg0607 LL

E BALA  01       .000000  4685759.277      .500000             lage0601 UL
EQ    74         .000000 -4685759.277     -.500000             lage0601 LL

E BALA  02       .000000  4685759.277      .500000             lage0602 UL
EQ    75         .000000 -4685759.277     -.500000             lage0602 LL

E BALA  03       .000000  4685759.277      .500000             lage0603 UL
EQ    76         .000000 -4685759.277     -.500000             lage0603 LL

E BALA  04       .000000  4685759.277      .500000             lage0604 UL
EQ    77         .000000 -4685759.277     -.500000             lage0604 LL

E BALA  05       .000000  4685759.277      .500000             lage0605 UL
EQ    78         .000000 -4685759.277     -.500000             lage0605 LL

E BALA  06       .000000  4685759.277      .500000             lage0606 UL
EQ    79         .000000 -4685759.277     -.500000             lage0606 LL

E BALA  07       .000000  4685759.277      .500000             lage0607 UL
EQ    80         .000000 -4685759.277     -.500000             lage0607 LL

C prod0101    500.000000   500.000000 -535515.2832  535515.2832 salg0101 UL
BS    81         .000000   500.000000 -436779.6386 -436779.6386 lage0101 LL

C prod0201    700.000000   700.000000 -436779.6386  436779.6386 lage0101 LL
BS    82         .000000   700.000000 -9.37152E+34 -9.37152E+34

C prod0301       .000000      .000000      .000000      .000000 prod0302 LL
BS    83         .000000      .000000 -9.37152E+34 -9.37152E+34

C prod0401    200.000000   200.000000 -937151.7578  937151.7578 salg0401 UL
BS    84         .000000   200.000000 -46857.59277 -46857.59277 lage0401 LL

C prod0501       .000000      .000000 -46857.59277  46857.59277 lage0401 LL
BS    85         .000000      .000000 -46857.59277 -46857.59277 lage0501 LL

C prod0601    550.000000   550.000000 -46857.59277  46857.59277 lage0501 LL
BS    86         .000000   550.000000 -9.37152E+34 -9.37152E+34

C prod0102    888.571429   888.571411 -168687.3046  168687.3046 salg0107 LL
BS    87         .000000   888.571411 -749721.4355 -749721.4355 salg0101 UL
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C prod0202   600.000000   600.000000 -515433.4960  515433.4960 lage0202 UL
BS     88       .000000   600.000000 -9.37152E+34 -9.37152E+34

C prod0302      .000000      .000000      .000000 -1.00000E+30 salg0302 LL
LL     89       .000000      .000000      .000000      .000000 prod0301 LL

C prod0402   300.000000   300.000000 -562291.0644  562291.0644 salg0402 UL
BS     90       .000000   300.000000 -46857.59277 -46857.59277 lage0402 LL

C prod0502   100.000000   100.000000 -46857.59277  46857.59277 lage0402 LL
BS     91       .000000   100.000000 -46857.59277 -46857.59277 lage0502 LL

C prod0602   550.000000   550.000000 -46857.59277  46857.59277 lage0502 LL
BS     92       .000000   550.000000 -9.37152E+34 -9.37152E+34

C prod0103   382.500000   382.500000 -265526.3427  265526.3427 salg0307 UL
BS     93       .000000   382.500000 -46857.59277 -46857.59277 TBEG0203 UL

C prod0203   117.500000   117.500000 -46857.59277  46857.59277 TBEG0203 UL
BS     94       .000000   117.500000 -265526.3427 -265526.3427 salg0307 UL

C prod0303      .000000      .000000 -93715.18554  93715.18554 lage0203 LL
BS     95       .000000      .000000 -46857.59277 -46857.59277 lage0303 LL

C prod0403   400.000000   400.000000 -46857.59277  46857.59277 lage0303 LL
BS     96       .000000   400.000000 -46857.59277 -46857.59277 lage0403 LL

C prod0503   600.000000   600.000000 -46857.59277  46857.59277 lage0403 LL
BS     97       .000000   600.000000 -9.37152E+34 -9.37152E+34

C prod0603      .000000      .000000 -543548.0468  543548.0468 prod0605 LL
BS     98       .000000      .000000 -9.37152E+34 -9.37152E+34

C prod0104   300.000000   300.000000 -374860.7177  374860.7177 salg0104 UL
BS     99       .000000   300.000000 -46857.59277 -46857.59277 lage0104 LL

C prod0204      .000000      .000000 -46857.59277  46857.59277 lage0104 LL
BS    100       .000000      .000000 -93715.18554 -93715.18554 lage0304 LL

C prod0304      .000000      .000000   -13.500000 -1.00000E+30 lage0204 UL
LL    101       .000000      .000000    13.500000    13.500000 prod0301 LL

C prod0404   500.000000   500.000000 -93715.18554  93715.18554 lage0304 LL
BS    102       .000000   500.000000 -46857.59277 -46857.59277 lage0404 LL

C prod0504   100.000000   100.000000 -46857.59277  46857.59277 lage0404 LL
BS    103       .000000   100.000000 -46857.59277 -46857.59277 lage0504 LL

C prod0604   350.000000   350.000000 -46857.59277  46857.59277 lage0504 LL
BS    104       .000000   350.000000 -9.37152E+34 -9.37152E+34

C prod0105   800.000000   800.000000 -789885.1074  789885.1074 salg0105 UL
BS    105       .000000   800.000000 -287839.4531 -287839.4531 lage0105 LL

C prod0205   500.000000   500.000000 -287839.4531  287839.4531 lage0105 LL
BS    106       .000000   500.000000 -9.37152E+34 -9.37152E+34

C prod0305      .000000      .000000    -9.000000 -1.00000E+30 salg0301 UL
LL    107       .000000      .000000     9.000000     9.000000 prod0301 LL

C prod0405   200.000000   200.000000 -1030867.065  1030867.065 salg0405 UL
BS    108       .000000   200.000000 -46857.59277 -46857.59277 lage0405 LL

C prod0505  1100.000000  1100.000000 -46857.59277  46857.59277 lage0405 LL
BS    109       .000000  1100.000000 -9.37152E+34 -9.37152E+34

C prod0605      .000000      .000000   -29.000000 -1.00000E+30 salg0603 UL
LL    110       .000000      .000000    29.000000    29.000000 prod0603 LL
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C prod0106   200.000000   200.000000 -682781.9824  682781.9824 salg0106 UL
BS    111       .000000   200.000000 -207512.1582 -207512.1582 lage0106 LL

C prod0206   300.000000   300.000000 -207512.1582  207512.1582 lage0106 LL
BS    112       .000000   300.000000 -46857.59277 -46857.59277 lage0206 LL

C prod0306   400.000000   400.000000 -46857.59277  46857.59277 lage0206 LL
BS    113       .000000   400.000000 -93715.18554 -93715.18554 lage0306 LL

C prod0406      .000000      .000000     -.500000 -1.00000E+30 VBAB0406 LL
LL    114       .000000      .000000      .500000      .500000 VBAB0406 UL

C prod0506   300.000000   300.000000      .000000      .000000 lage0406 LL
BS    115       .000000   300.000000 -46857.59277 -46857.59277 lage0506 LL

C prod0606   550.000000   550.000000 -46857.59277  46857.59277 lage0506 LL
BS    116       .000000   550.000000 -9.37152E+34 -9.37152E+34

C prod0107      .000000      .000000 -9.37152E+34  9.37152E+34
BS    117       .000000      .000000 -120490.9423 -120490.9423 salg0107 LL

C prod0207   250.000000   250.000000 -199144.7509  199144.7509 salg0307 UL
BS    118       .000000   250.000000 -128858.3740 -128858.3740 lage0307 LL

C prod0307      .000000      .000000   -15.125000 -1.00000E+30 lage0207 UL
LL    119       .000000      .000000    15.125000    15.125000 prod0301 LL

C prod0407   100.000000   100.000000 -128858.3740  128858.3740 lage0307 LL
BS    120       .000000   100.000000 -46857.59277 -46857.59277 lage0407 LL

C prod0507   100.000000   100.000000 -46857.59277  46857.59277 lage0407 LL
BS    121       .000000   100.000000 -9.37152E+34 -9.37152E+34

C prod0607      .000000      .000000   -37.000000 -1.00000E+30 salg0603 UL
LL    122       .000000      .000000    37.000000    37.000000 prod0603 LL

C lage0101      .000000      .000000    -4.660714 -1.00000E+30 lage0103 UL
LL    123      -.500000      .000000     4.660714     4.160714 lage0103 LL

C lage0201   100.000000   100.000000     9.375000    -9.875000 salg0301 LL
UL    124      -.500000   100.000000    -9.375000  1.00000E+30 lage0103 UL

C lage0301      .000000      .000000   -10.500000 -1.00000E+30 salg0301 UL
LL    125      -.500000      .000000    10.500000    10.000000 salg0301 LL

C lage0401      .000000      .000000     -.500000 -1.00000E+30 prod0401 LL
LL    126      -.500000      .000000      .500000      .000000 prod0501 LL

C lage0501      .000000      .000000     -.500000 -1.00000E+30 prod0501 LL
LL    127      -.500000      .000000      .500000      .000000 prod0601 LL

C lage0601    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS    128      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lage0102      .000000      .000000    -6.500000 -1.00000E+30 salg0102 UL
LL    129      -.500000      .000000     6.500000     6.000000 prod0202 LL

C lage0202   100.000000   100.000000     5.500000    -6.000000 salg0302 LL
UL    130      -.500000   100.000000    -5.500000  1.00000E+30 salg0302 UL

C lage0302      .000000      .000000    -6.500000 -1.00000E+30 salg0302 UL
LL    131      -.500000      .000000     6.500000     6.000000 salg0302 LL

C lage0402      .000000      .000000     -.500000 -1.00000E+30 prod0402 LL
LL    132      -.500000      .000000      .500000      .000000 prod0502 LL

C lage0502      .000000      .000000     -.500000 -1.00000E+30 prod0502 LL
LL    133      -.500000      .000000      .500000      .000000 prod0602 LL
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C lage0602    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   134      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lage0103    82.500000    82.500000 -265526.3427  265525.8300 salg0307 UL
BS   135      -.500000    82.500000 -46857.59277 -46858.09082 TBEG0203 UL

C lage0203      .000000      .000000    -1.000000 -1.00000E+30 lage0103 LL
LL   136      -.500000      .000000     1.000000      .500000 prod0303 LL

C lage0303      .000000      .000000     -.500000 -1.00000E+30 prod0303 LL
LL   137      -.500000      .000000      .500000      .000000 prod0403 LL

C lage0403      .000000      .000000     -.500000 -1.00000E+30 prod0403 LL
LL   138      -.500000      .000000      .500000      .000000 prod0503 LL

C lage0503   100.000000   100.000000     7.500000    -8.000000 salg0603 LL
UL   139      -.500000   100.000000    -7.500000  1.00000E+30 salg0603 UL

C lage0603    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   140      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lage0104      .000000      .000000     -.500000 -1.00000E+30 prod0104 LL
LL   141      -.500000      .000000      .500000      .000000 prod0204 LL

C lage0204      .000000      .000000 -1265154.907  1265154.418 prod0304 LL
BS   142      -.500000      .000000 -93715.18554 -93715.68359 lage0304 LL

C lage0304      .000000      .000000    -1.000000 -1.00000E+30 prod0204 LL
LL   143      -.500000      .000000     1.000000      .500000 lage0204 UL

C lage0404      .000000      .000000     -.500000 -1.00000E+30 prod0404 LL
LL   144      -.500000      .000000      .500000      .000000 prod0504 LL

C lage0504      .000000      .000000     -.500000 -1.00000E+30 prod0504 LL
LL   145      -.500000      .000000      .500000      .000000 prod0604 LL

C lage0604    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   146      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lage0105      .000000      .000000    -3.071429 -1.00000E+30 salg0102 UL
LL   147      -.500000      .000000     3.071429     2.571429 prod0205 LL

C lage0205   100.000000   100.000000    10.500000   -11.000000 salg0305 LL
UL   148      -.500000   100.000000   -10.500000  1.00000E+30 salg0305 UL

C lage0305      .000000      .000000   -11.500000 -1.00000E+30 salg0305 UL
LL   149      -.500000      .000000    11.500000    11.000000 salg0305 LL

C lage0405      .000000      .000000     -.500000 -1.00000E+30 prod0405 LL
LL   150      -.500000      .000000      .500000      .000000 prod0505 LL

C lage0505   100.000000   100.000000    10.500000   -11.000000 salg0605 LL
UL   151      -.500000   100.000000   -10.500000  1.00000E+30 salg0605 UL

C lage0605    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   152      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lage0106      .000000      .000000    -2.214286 -1.00000E+30 prod0106 LL
LL   153      -.500000      .000000     2.214286     1.714286 prod0206 LL

C lage0206      .000000      .000000     -.500000 -1.00000E+30 prod0206 LL
LL   154      -.500000      .000000      .500000      .000000 prod0306 LL

C lage0306      .000000      .000000    -1.000000 -1.00000E+30 VBAB0406 LL
LL   155      -.500000      .000000     1.000000      .500000 VBAB0406 UL

C lage0406      .000000      .000000      .000000 -1.00000E+30 VBAB0406 UL
LL   156      -.500000      .000000      .000000     -.500000 VBAB0406 LL
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C lage0506      .000000      .000000     -.500000 -1.00000E+30 TBEG0602 UL
LL   157      -.500000      .000000      .500000      .000000 TBEG0502 UL

C lage0606    50.000000    50.000000      .000000     -.500000 lage0406 LL
BS   158      -.500000    50.000000 -46857.59277 -46858.09082 prod0406 LL

C lage0107      .000000      .000000    -4.410714 -1.00000E+30 prod0107 LL
LL   159      -.500000      .000000     4.410714     3.910714 lage0103 LL

C lage0207   100.000000   100.000000 -199144.7509  199144.2504 salg0307 UL
BS   160      -.500000   100.000000 -128858.3740 -128858.8745 lage0307 LL

C lage0307      .000000      .000000    -1.375000 -1.00000E+30 lage0207 LL
LL   161      -.500000      .000000     1.375000      .875000 lage0207 UL

C lage0407      .000000      .000000     -.500000 -1.00000E+30 prod0407 LL
LL   162      -.500000      .000000      .500000      .000000 prod0507 LL

C lage0507   100.000000   100.000000     2.500000    -3.000000 salg0607 LL
UL   163      -.500000   100.000000    -2.500000  1.00000E+30 salg0607 UL

C lage0607    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   164      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C salg0101   500.000000   500.000000     5.714286     4.285714 salg0102 UL
UL   165     10.000000   500.000000    -5.714286  1.00000E+30 prod0102 LL

C salg0201   600.000000   600.000000     9.875000      .125000 lage0103 LL
UL   166     10.000000   600.000000    -9.875000  1.00000E+30 lage0103 UL

C salg0301   100.000000   100.000000      .000000    10.000000 prod0302 LL
BS   167     10.000000   100.000000 -9.37152E+34 -9.37152E+34

C salg0401   200.000000   200.000000    10.000000      .000000 prod0401 LL
UL   168     10.000000   200.000000   -10.000000  1.00000E+30 TBEG0402 UL

C salg0501      .000000      .000000    10.000000 -1.00000E+30 prod0501 LL
LL   169     10.000000      .000000   -10.000000      .000000 TBEG0501 UL

C salg0601   500.000000   500.000000    10.000000      .000000 prod0601 LL
UL   170     10.000000   500.000000   -10.000000  1.00000E+30 TBEG0601 UL

C salg0102   888.571429   888.571411 -168687.3046  168693.3105 salg0107 LL
BS   171      6.000000   888.571411 -749721.4355 -749715.4296 salg0101 UL

C salg0202   500.000000   500.000000     6.000000      .000000 prod0202 LL
UL   172      6.000000   500.000000    -6.000000  1.00000E+30 TBEG0201 UL

C salg0302   100.000000   100.000000 -515433.4960  515439.5019 lage0202 UL
BS   173      6.000000   100.000000      .000000     6.000000 prod0302 LL

C salg0402   300.000000   300.000000     6.000000      .000000 prod0402 LL
UL   174      6.000000   300.000000    -6.000000  1.00000E+30 TBEG0402 UL

C salg0502   100.000000   100.000000     6.000000      .000000 prod0502 LL
UL   175      6.000000   100.000000    -6.000000  1.00000E+30 TBEG0502 UL

C salg0602   500.000000   500.000000     6.000000      .000000 prod0602 LL
UL   176      6.000000   500.000000    -6.000000  1.00000E+30 TBEG0602 UL

C salg0103   300.000000   300.000000     8.000000      .000000 prod0103 LL
UL   177      8.000000   300.000000    -8.000000  1.00000E+30 TBEG0103 UL

C salg0203   200.000000   200.000000     7.500000      .500000 lage0103 LL
UL   178      8.000000   200.000000    -7.500000  1.00000E+30 lage0103 UL

C salg0303      .000000      .000000     8.000000 -1.00000E+30 prod0303 LL
LL   179      8.000000      .000000    -8.000000      .000000 TBEG0303 UL
```

```
C salg0403   400.000000   400.000000     8.000000      .000000 prod0403 LL
UL   180       8.000000   400.000000    -8.000000  1.00000E+30 TBEG0403 UL

C salg0503   500.000000   500.000000     8.000000      .000000 prod0503 LL
UL   181       8.000000   500.000000    -8.000000  1.00000E+30 TBEG0503 UL

C salg0603    50.000000    50.000000 -543548.0468  543556.0546 prod0605 LL
BS   182       8.000000    50.000000 -9.37152E+34 -9.37152E+34

C salg0104   300.000000   300.000000     4.000000      .000000 prod0104 LL
UL   183       4.000000   300.000000    -4.000000  1.00000E+30 TBEG0102 UL

C salg0204      .000000      .000000     4.000000 -1.00000E+30 prod0204 LL
LL   184       4.000000      .000000    -4.000000      .000000 TBEG0202 UL

C salg0304      .000000      .000000     3.500000 -1.00000E+30 prod0204 LL
LL   185       4.000000      .000000    -3.500000      .500000 lage0204 UL

C salg0404   500.000000   500.000000     4.000000      .000000 prod0404 LL
UL   186       4.000000   500.000000    -4.000000  1.00000E+30 TBEG0402 UL

C salg0504   100.000000   100.000000     4.000000      .000000 prod0504 LL
UL   187       4.000000   100.000000    -4.000000  1.00000E+30 TBEG0502 UL

C salg0604   300.000000   300.000000     4.000000      .000000 prod0604 LL
UL   188       4.000000   300.000000    -4.000000  1.00000E+30 TBEG0602 UL

C salg0105   800.000000   800.000000     8.428572     2.571429 salg0102 UL
UL   189      11.000000   800.000000    -8.428572  1.00000E+30 salg0102 LL

C salg0205   400.000000   400.000000    11.000000      .000000 prod0205 LL
UL   190      11.000000   400.000000   -11.000000  1.00000E+30 TBEG0201 UL

C salg0305   100.000000   100.000000 -984009.3750  984020.3125 lage0205 UL
BS   191      11.000000   100.000000 -843436.6210 -843425.5859 prod0305 LL

C salg0405   200.000000   200.000000    11.000000      .000000 prod0405 LL
UL   192      11.000000   200.000000   -11.000000  1.00000E+30 TBEG0404 UL

C salg0505  1000.000000  1000.000000    11.000000      .000000 prod0505 LL
UL   193      11.000000  1000.000000   -11.000000  1.00000E+30 TBEG0501 UL

C salg0605    50.000000    50.000000 -984009.3750  984020.3125 lage0505 UL
BS   194      11.000000    50.000000 -2717740.478 -2717729.492 prod0605 LL

C salg0106   200.000000   200.000000     7.285714     1.714286 prod0106 LL
UL   195       9.000000   200.000000    -7.285714  1.00000E+30 TBEG0102 UL

C salg0206   300.000000   300.000000     9.000000      .000000 prod0206 LL
UL   196       9.000000   300.000000    -9.000000  1.00000E+30 TBEG0202 UL

C salg0306   400.000000   400.000000     9.000000      .000000 prod0306 LL
UL   197       9.000000   400.000000    -9.000000  1.00000E+30 TBEG0302 UL

C salg0406      .000000      .000000     9.500000 -1.00000E+30 VBAB0406 UL
LL   198       9.000000      .000000    -9.500000     -.500000 VBAB0406 LL

C salg0506   300.000000   300.000000     9.000000      .000000 prod0506 LL
UL   199       9.000000   300.000000    -9.000000  1.00000E+30 TBEG0502 UL

C salg0606   500.000000   500.000000     9.000000      .000000 prod0606 LL
UL   200       9.000000   500.000000    -9.000000  1.00000E+30 TBEG0602 UL

C salg0107      .000000      .000000    -1.285714 -1.00000E+30 prod0107 LL
LL   201       3.000000      .000000     1.285714     4.285714 TBEG0103 UL

C salg0207   150.000000   150.000000     2.625000      .375000 lage0103 LL
UL   202       3.000000   150.000000    -2.625000  1.00000E+30 lage0103 UL
```



```
C salg0307   100.000000   100.000000     2.125000      .875000 lage0207 LL
UL   203       3.000000   100.000000    -2.125000  1.00000E+30 lage0207 UL

C salg0407   100.000000   100.000000     3.000000      .000000 prod0407 LL
UL   204       3.000000   100.000000    -3.000000  1.00000E+30 TBEG0403 UL

C salg0507      .000000      .000000     3.000000 -1.00000E+30 prod0507 LL
LL   205       3.000000      .000000    -3.000000      .000000 TBEG0503 UL

C salg0607    50.000000    50.000000 -234287.9394  234290.9423 lage0507 UL
BS   206       3.000000    50.000000 -3467461.914 -3467458.984 prod0607 LL

!
! Tabell som viser kriav til lagerbeholdning av produkt (i)
! ved slutten av juni.
!
!  PROD      PROD      PROD     PROD      PROD     PROD     PROD
!   1         2         3        4         5        6        7
    0  ,      0   ,     0  ,     0  ,      0  ,     0 ,      0   ! Januar
    0  ,      0   ,     0  ,     0  ,      0  ,     0 ,      0   ! Februar
    0  ,      0   ,     0  ,     0  ,      0  ,     0 ,      0   ! Mars
    0  ,      0   ,     0  ,     0  ,      0  ,     0 ,      0   ! April
    0  ,      0   ,     0  ,     0  ,      0  ,     0 ,      0   ! Mai
   50  ,     50   ,    50  ,    50  ,     50  ,    50 ,     50   ! Juni




!
! Tabell som viser tidsforbuk av maskin (m) ved produksjon
! av produkt (i). (timer/enhet)
!
! PROD   PROD    PROD     PROD   PROD    PROD    PROD
!  1       2       3        4      5       6       7
  0.5  ,  0.7  ,       ,       ,  0.3  ,  0.2  ,  0.5    ! Grinding
  0.1  ,  0.2  ,       ,  0.3  ,       ,  0.6  ,         ! Vertical drilling
  0.2  ,       ,  0.8  ,       ,       ,       ,  0.6    ! Horizontal drilling
  0.05 ,  0.03 ,       ,  0.07 ,  0.1  ,       ,  0.08   ! Boring
       ,       ,  0.01 ,       ,  0.05 ,       ,  0.05   ! Planing




!
! Tabell som viser antall maskiner av type (m) som vedlikeholdes
! i periode (t).
!
! Maskin   Maskin   Maskin   Maskin   Maskin
!   1        2        3        4        5
    1   ,    0   ,    0   ,    0   ,    0     ! Januar
    0   ,    0   ,    2   ,    0   ,    0     ! Februar
    0   ,    0   ,    0   ,    1   ,    0     ! Mars
    0   ,    1   ,    0   ,    0   ,    0     ! April
    1   ,    1   ,    0   ,    0   ,    0     ! Mai
    0   ,    0   ,    1   ,    0   ,    1     ! Juni
************************************************
*                                              *
*                                              *
*      Oppgave 3 og 4 i Williams               *
*                                              *
*      Loest av:                               *
*      Lasse Johansen (lajohans@online.no)     *
*                                              *
*      Foelgende filer kommer fortloepende:    *

        facplan.con
        facplan.dim
        facplan.end
```

```
        facplan.lst
        facplan.mar
        facplan.mas
        facplan.mat
        facplan.mod
        facplan.nr3
        facplan.nr4
        facplan.pro
        facplan.prt
        facplan.rrt
        facplan.sts
        facplan.tim
        facplan.who

*                                                *
*                                                *
**************************************************

! Tabell facplan.con
! Lagerkostnader,               Maxlager
        0.5     ,               100
! IMAX     MMAX    PMAX,           IIMAX,          IOP
   6,          5,           7,              5,          0
! Tabell facplan.end. Sluttlager for hvert produkt p
!             produkter
50      ,50     ,50     ,50     ,50     ,50     ,50


XPRESS Modeller Log for problem: facplan
RESTORE
INPUT

!
TABLES
   TAB1(PMAX)
   TAB2(IMAX)
   TAB3(MMAX)
!
IF IOP.eq.0
!
!Dette under frem til ELSE gjelder for problem 12.3
!
PRINT
!M lfunksjonsverdi, profitt i pund
MAXOBJ
 93890.17857
!
ASSIGN TAB1(p=1:PMAX)=prod(1,p)
PRINT
!Mengde produsert i periode 1
    TAB1
  500.000000
  888.571429
  382.500000
  300.000000
  800.000000
  200.000000
     .000000
!
ASSIGN TAB1(p=1:PMAX)=sold(1,p)
PRINT
!Mengde solgt i periode 1
   TAB1
  500.000000
  888.571429
  300.000000
  300.000000
  800.000000
  200.000000
```



```
     .000000
!
ASSIGN TAB1(p=1:PMAX)=stock(1,p)
PRINT
!Mengde lagret i periode 1
  TAB1
     .000000
     .000000
   82.500000
     .000000
     .000000
     .000000
     .000000
!
ASSIGN TAB1(p=1:PMAX)=dj(prod(1,p))
PRINT
!Reduserte kostnader for alle produkter i periode 1
   TAB1
     .000000
-8.88178E-16
     .000000
     .000000
-4.44089E-16
-2.22045E-16
     .000000
!
ASSIGN TAB2(i=1:IMAX)=dual(TIMECON(1,i))
PRINT
!Skyggepriser for kapasiteten p  "grinderen" i alle perioder
  TAB2
    8.571429
     .000000
     .000000
     .000000
     .000000
     .000000
!
QUIT
! Tabell facplan.mar
!                  produkter
500   , 1000 ,  300 ,  300 ,  800 ,      200 ,   100
600   ,  500 ,  200 ,      ,  400 ,      300 ,   150
300   ,  600 ,    ,      ,  500 ,  400 , 100      !  perioder
200   ,  300 ,  400 ,  500 ,  200 ,          ,   100
      ,  100 ,  500 ,  100 , 1000 ,      300 ,
500   ,  500 ,  100 ,  300 , 1100 , 500  ,  60


 ! Tabell facplan.mas
!        maskiner
4 ,    2 ,    3 ,    1 ,  1
4 ,    2 ,    3 ,    1 ,  1
4 ,    2 ,    3 ,    1 ,  1     !    perioder
4 ,    2 ,    3 ,    1 ,  1
4 ,    2 ,    3 ,    1 ,  1
4 ,    2 ,    3 ,    1 ,  1

NAME          FACPLAN
ROWS
 N  MAXOBJ
 E  STOC0101
 E  STOC0102
 E  STOC0103
 E  STOC0104
 E  STOC0105
 E  STOC0106
 E  STOC0107
 E  STOC0201
 E  STOC0202
```

```
 E  STOC0203
 E  STOC0204
 E  STOC0205
 E  STOC0206
 E  STOC0207
 E  STOC0301
 E  STOC0302
 E  STOC0303
 E  STOC0304
 E  STOC0305
 E  STOC0306
 E  STOC0307
 E  STOC0401
 E  STOC0402
 E  STOC0403
 E  STOC0404
 E  STOC0405
 E  STOC0406
 E  STOC0407
 E  STOC0501
 E  STOC0502
 E  STOC0503
 E  STOC0504
 E  STOC0505
 E  STOC0506
 E  STOC0507
 E  STOC0601
 E  STOC0602
 E  STOC0603
 E  STOC0604
 E  STOC0605
 E  STOC0606
 E  STOC0607
 L  TIME0101
 L  TIME0102
 L  TIME0103
 L  TIME0104
 L  TIME0105
 L  TIME0106
 L  TIME0201
 L  TIME0202
 L  TIME0203
 L  TIME0204
 L  TIME0205
 L  TIME0206
 L  TIME0301
 L  TIME0302
 L  TIME0303
 L  TIME0304
 L  TIME0305
 L  TIME0306
 L  TIME0401
 L  TIME0402
 L  TIME0403
 L  TIME0404
 L  TIME0405
 L  TIME0406
 L  TIME0501
 L  TIME0502
 L  TIME0503
 L  TIME0504
 L  TIME0505
 L  TIME0506
COLUMNS
    sold0101  MAXOBJ       10.000000   STOC0101     -1.000000
    sold0201  MAXOBJ       10.000000   STOC0201     -1.000000
    sold0301  MAXOBJ       10.000000   STOC0301     -1.000000
    sold0401  MAXOBJ       10.000000   STOC0401     -1.000000
    sold0501  MAXOBJ       10.000000   STOC0501     -1.000000
```



```
    sold0601  MAXOBJ       10.000000   STOC0601     -1.000000
    sold0102  MAXOBJ        6.000000   STOC0102     -1.000000
    sold0202  MAXOBJ        6.000000   STOC0202     -1.000000
    sold0302  MAXOBJ        6.000000   STOC0302     -1.000000
    sold0402  MAXOBJ        6.000000   STOC0402     -1.000000
    sold0502  MAXOBJ        6.000000   STOC0502     -1.000000
    sold0602  MAXOBJ        6.000000   STOC0602     -1.000000
    sold0103  MAXOBJ        8.000000   STOC0103     -1.000000
    sold0203  MAXOBJ        8.000000   STOC0203     -1.000000
    sold0303  MAXOBJ        8.000000   STOC0303     -1.000000
    sold0403  MAXOBJ        8.000000   STOC0403     -1.000000
    sold0503  MAXOBJ        8.000000   STOC0503     -1.000000
    sold0603  MAXOBJ        8.000000   STOC0603     -1.000000
    sold0104  MAXOBJ        4.000000   STOC0104     -1.000000
    sold0204  MAXOBJ        4.000000   STOC0204     -1.000000
    sold0304  MAXOBJ        4.000000   STOC0304     -1.000000
    sold0404  MAXOBJ        4.000000   STOC0404     -1.000000
    sold0504  MAXOBJ        4.000000   STOC0504     -1.000000
    sold0604  MAXOBJ        4.000000   STOC0604     -1.000000
    sold0105  MAXOBJ       11.000000   STOC0105     -1.000000
    sold0205  MAXOBJ       11.000000   STOC0205     -1.000000
    sold0305  MAXOBJ       11.000000   STOC0305     -1.000000
    sold0405  MAXOBJ       11.000000   STOC0405     -1.000000
    sold0505  MAXOBJ       11.000000   STOC0505     -1.000000
    sold0605  MAXOBJ       11.000000   STOC0605     -1.000000
    sold0106  MAXOBJ        9.000000   STOC0106     -1.000000
    sold0206  MAXOBJ        9.000000   STOC0206     -1.000000
    sold0306  MAXOBJ        9.000000   STOC0306     -1.000000
    sold0406  MAXOBJ        9.000000   STOC0406     -1.000000
    sold0506  MAXOBJ        9.000000   STOC0506     -1.000000
    sold0606  MAXOBJ        9.000000   STOC0606     -1.000000
    sold0107  MAXOBJ        3.000000   STOC0107     -1.000000
    sold0207  MAXOBJ        3.000000   STOC0207     -1.000000
    sold0307  MAXOBJ        3.000000   STOC0307     -1.000000
    sold0407  MAXOBJ        3.000000   STOC0407     -1.000000
    sold0507  MAXOBJ        3.000000   STOC0507     -1.000000
    sold0607  MAXOBJ        3.000000   STOC0607     -1.000000
    prod0101  STOC0101      1.000000   TIME0101       .500000
    prod0101  TIME0201       .100000   TIME0301       .200000
    prod0101  TIME0401       .050000
    prod0201  STOC0201      1.000000   TIME0102       .500000
    prod0201  TIME0202       .100000   TIME0302       .200000
    prod0201  TIME0402       .050000
    prod0301  STOC0301      1.000000   TIME0103       .500000
    prod0301  TIME0203       .100000   TIME0303       .200000
    prod0301  TIME0403       .050000
    prod0401  STOC0401      1.000000   TIME0104       .500000
    prod0401  TIME0204       .100000   TIME0304       .200000
    prod0401  TIME0404       .050000
    prod0501  STOC0501      1.000000   TIME0105       .500000
    prod0501  TIME0205       .100000   TIME0305       .200000
    prod0501  TIME0405       .050000
    prod0601  STOC0601      1.000000   TIME0106       .500000
    prod0601  TIME0206       .100000   TIME0306       .200000
    prod0601  TIME0406       .050000
    prod0102  STOC0102      1.000000   TIME0101       .700000
    prod0102  TIME0201       .200000   TIME0401       .030000
    prod0202  STOC0202      1.000000   TIME0102       .700000
    prod0202  TIME0202       .200000   TIME0402       .030000
    prod0302  STOC0302      1.000000   TIME0103       .700000
    prod0302  TIME0203       .200000   TIME0403       .030000
    prod0402  STOC0402      1.000000   TIME0104       .700000
    prod0402  TIME0204       .200000   TIME0404       .030000
    prod0502  STOC0502      1.000000   TIME0105       .700000
    prod0502  TIME0205       .200000   TIME0405       .030000
    prod0602  STOC0602      1.000000   TIME0106       .700000
    prod0602  TIME0206       .200000   TIME0406       .030000
    prod0103  STOC0103      1.000000   TIME0301       .800000
    prod0103  TIME0501       .010000
```

```
    prod0203  STOC0203      1.000000   TIME0302       .800000
    prod0203  TIME0502       .010000
    prod0303  STOC0303      1.000000   TIME0303       .800000
    prod0303  TIME0503       .010000
    prod0403  STOC0403      1.000000   TIME0304       .800000
    prod0403  TIME0504       .010000
    prod0503  STOC0503      1.000000   TIME0305       .800000
    prod0503  TIME0505       .010000
    prod0603  STOC0603      1.000000   TIME0306       .800000
    prod0603  TIME0506       .010000
    prod0104  STOC0104      1.000000   TIME0201       .300000
    prod0104  TIME0401       .070000
    prod0204  STOC0204      1.000000   TIME0202       .300000
    prod0204  TIME0402       .070000
    prod0304  STOC0304      1.000000   TIME0203       .300000
    prod0304  TIME0403       .070000
    prod0404  STOC0404      1.000000   TIME0204       .300000
    prod0404  TIME0404       .070000
    prod0504  STOC0504      1.000000   TIME0205       .300000
    prod0504  TIME0405       .070000
    prod0604  STOC0604      1.000000   TIME0206       .300000
    prod0604  TIME0406       .070000
    prod0105  STOC0105      1.000000   TIME0101       .300000
    prod0105  TIME0401       .100000   TIME0501       .050000
    prod0205  STOC0205      1.000000   TIME0102       .300000
    prod0205  TIME0402       .100000   TIME0502       .050000
    prod0305  STOC0305      1.000000   TIME0103       .300000
    prod0305  TIME0403       .100000   TIME0503       .050000
    prod0405  STOC0405      1.000000   TIME0104       .300000
    prod0405  TIME0404       .100000   TIME0504       .050000
    prod0505  STOC0505      1.000000   TIME0105       .300000
    prod0505  TIME0405       .100000   TIME0505       .050000
    prod0605  STOC0605      1.000000   TIME0106       .300000
    prod0605  TIME0406       .100000   TIME0506       .050000
    prod0106  STOC0106      1.000000   TIME0101       .200000
    prod0106  TIME0201       .600000
    prod0206  STOC0206      1.000000   TIME0102       .200000
    prod0206  TIME0202       .600000
    prod0306  STOC0306      1.000000   TIME0103       .200000
    prod0306  TIME0203       .600000
    prod0406  STOC0406      1.000000   TIME0104       .200000
    prod0406  TIME0204       .600000
    prod0506  STOC0506      1.000000   TIME0105       .200000
    prod0506  TIME0205       .600000
    prod0606  STOC0606      1.000000   TIME0106       .200000
    prod0606  TIME0206       .600000
    prod0107  STOC0107      1.000000   TIME0101       .500000
    prod0107  TIME0301       .600000   TIME0401       .080000
    prod0107  TIME0501       .050000
    prod0207  STOC0207      1.000000   TIME0102       .500000
    prod0207  TIME0302       .600000   TIME0402       .080000
    prod0207  TIME0502       .050000
    prod0307  STOC0307      1.000000   TIME0103       .500000
    prod0307  TIME0303       .600000   TIME0403       .080000
    prod0307  TIME0503       .050000
    prod0407  STOC0407      1.000000   TIME0104       .500000
    prod0407  TIME0304       .600000   TIME0404       .080000
    prod0407  TIME0504       .050000
    prod0507  STOC0507      1.000000   TIME0105       .500000
    prod0507  TIME0305       .600000   TIME0405       .080000
    prod0507  TIME0505       .050000
    prod0607  STOC0607      1.000000   TIME0106       .500000
    prod0607  TIME0306       .600000   TIME0406       .080000
    prod0607  TIME0506       .050000
    stoc0101  MAXOBJ        -.500000   STOC0101     -1.000000
    stoc0101  STOC0201      1.000000
    stoc0201  MAXOBJ        -.500000   STOC0201     -1.000000
    stoc0201  STOC0301      1.000000
    stoc0301  MAXOBJ        -.500000   STOC0301     -1.000000
```



```
    stoc0301  STOC0401      1.000000
    stoc0401  MAXOBJ        -.500000   STOC0401     -1.000000
    stoc0401  STOC0501      1.000000
    stoc0501  MAXOBJ        -.500000   STOC0501     -1.000000
    stoc0501  STOC0601      1.000000
    stoc0102  MAXOBJ        -.500000   STOC0102     -1.000000
    stoc0102  STOC0202      1.000000
    stoc0202  MAXOBJ        -.500000   STOC0202     -1.000000
    stoc0202  STOC0302      1.000000
    stoc0302  MAXOBJ        -.500000   STOC0302     -1.000000
    stoc0302  STOC0402      1.000000
    stoc0402  MAXOBJ        -.500000   STOC0402     -1.000000
    stoc0402  STOC0502      1.000000
    stoc0502  MAXOBJ        -.500000   STOC0502     -1.000000
    stoc0502  STOC0602      1.000000
    stoc0103  MAXOBJ        -.500000   STOC0103     -1.000000
    stoc0103  STOC0203      1.000000
    stoc0203  MAXOBJ        -.500000   STOC0203     -1.000000
    stoc0203  STOC0303      1.000000
    stoc0303  MAXOBJ        -.500000   STOC0303     -1.000000
    stoc0303  STOC0403      1.000000
    stoc0403  MAXOBJ        -.500000   STOC0403     -1.000000
    stoc0403  STOC0503      1.000000
    stoc0503  MAXOBJ        -.500000   STOC0503     -1.000000
    stoc0503  STOC0603      1.000000
    stoc0104  MAXOBJ        -.500000   STOC0104     -1.000000
    stoc0104  STOC0204      1.000000
    stoc0204  MAXOBJ        -.500000   STOC0204     -1.000000
    stoc0204  STOC0304      1.000000
    stoc0304  MAXOBJ        -.500000   STOC0304     -1.000000
    stoc0304  STOC0404      1.000000
    stoc0404  MAXOBJ        -.500000   STOC0404     -1.000000
    stoc0404  STOC0504      1.000000
    stoc0504  MAXOBJ        -.500000   STOC0504     -1.000000
    stoc0504  STOC0604      1.000000
    stoc0105  MAXOBJ        -.500000   STOC0105     -1.000000
    stoc0105  STOC0205      1.000000
    stoc0205  MAXOBJ        -.500000   STOC0205     -1.000000
    stoc0205  STOC0305      1.000000
    stoc0305  MAXOBJ        -.500000   STOC0305     -1.000000
    stoc0305  STOC0405      1.000000
    stoc0405  MAXOBJ        -.500000   STOC0405     -1.000000
    stoc0405  STOC0505      1.000000
    stoc0505  MAXOBJ        -.500000   STOC0505     -1.000000
    stoc0505  STOC0605      1.000000
    stoc0106  MAXOBJ        -.500000   STOC0106     -1.000000
    stoc0106  STOC0206      1.000000
    stoc0206  MAXOBJ        -.500000   STOC0206     -1.000000
    stoc0206  STOC0306      1.000000
    stoc0306  MAXOBJ        -.500000   STOC0306     -1.000000
    stoc0306  STOC0406      1.000000
    stoc0406  MAXOBJ        -.500000   STOC0406     -1.000000
    stoc0406  STOC0506      1.000000
    stoc0506  MAXOBJ        -.500000   STOC0506     -1.000000
    stoc0506  STOC0606      1.000000
    stoc0107  MAXOBJ        -.500000   STOC0107     -1.000000
    stoc0107  STOC0207      1.000000
    stoc0207  MAXOBJ        -.500000   STOC0207     -1.000000
    stoc0207  STOC0307      1.000000
    stoc0307  MAXOBJ        -.500000   STOC0307     -1.000000
    stoc0307  STOC0407      1.000000
    stoc0407  MAXOBJ        -.500000   STOC0407     -1.000000
    stoc0407  STOC0507      1.000000
    stoc0507  MAXOBJ        -.500000   STOC0507     -1.000000
    stoc0507  STOC0607      1.000000
RHS
    RHS00001  MAXOBJ      175.000000   STOC0601     50.000000
    RHS00001  STOC0602     50.000000   STOC0603     50.000000
    RHS00001  STOC0604     50.000000   STOC0605     50.000000
```

```
    RHS00001  STOC0606     50.000000   STOC0607     50.000000
    RHS00001  TIME0101   1152.000000   TIME0102   1536.000000
    RHS00001  TIME0103   1536.000000   TIME0104   1536.000000
    RHS00001  TIME0105   1152.000000   TIME0106   1536.000000
    RHS00001  TIME0201    768.000000   TIME0202    768.000000
    RHS00001  TIME0203    768.000000   TIME0204    384.000000
    RHS00001  TIME0205    384.000000   TIME0206    768.000000
    RHS00001  TIME0301   1152.000000   TIME0302    384.000000
    RHS00001  TIME0303   1152.000000   TIME0304   1152.000000
    RHS00001  TIME0305   1152.000000   TIME0306    768.000000
    RHS00001  TIME0401    384.000000   TIME0402    384.000000
    RHS00001  TIME0404    384.000000   TIME0405    384.000000
    RHS00001  TIME0406    384.000000   TIME0501    384.000000
    RHS00001  TIME0502    384.000000   TIME0503    384.000000
    RHS00001  TIME0504    384.000000   TIME0505    384.000000
BOUNDS
 UP BOUND001  sold0101    500.000000
 UP BOUND001  sold0201    600.000000
 UP BOUND001  sold0301    300.000000
 UP BOUND001  sold0401    200.000000
 FX BOUND001  sold0501       .000000
 UP BOUND001  sold0601    500.000000
 UP BOUND001  sold0102   1000.000000
 UP BOUND001  sold0202    500.000000
 UP BOUND001  sold0302    600.000000
 UP BOUND001  sold0402    300.000000
 UP BOUND001  sold0502    100.000000
 UP BOUND001  sold0602    500.000000
 UP BOUND001  sold0103    300.000000
 UP BOUND001  sold0203    200.000000
 FX BOUND001  sold0303       .000000
 UP BOUND001  sold0403    400.000000
 UP BOUND001  sold0503    500.000000
 UP BOUND001  sold0603    100.000000
 UP BOUND001  sold0104    300.000000
 FX BOUND001  sold0204       .000000
 FX BOUND001  sold0304       .000000
 UP BOUND001  sold0404    500.000000
 UP BOUND001  sold0504    100.000000
 UP BOUND001  sold0604    300.000000
 UP BOUND001  sold0105    800.000000
 UP BOUND001  sold0205    400.000000
 UP BOUND001  sold0305    500.000000
 UP BOUND001  sold0405    200.000000
 UP BOUND001  sold0505   1000.000000
 UP BOUND001  sold0605   1100.000000
 UP BOUND001  sold0106    200.000000
 UP BOUND001  sold0206    300.000000
 UP BOUND001  sold0306    400.000000
 FX BOUND001  sold0406       .000000
 UP BOUND001  sold0506    300.000000
 UP BOUND001  sold0606    500.000000
 UP BOUND001  sold0107    100.000000
 UP BOUND001  sold0207    150.000000
 UP BOUND001  sold0307    100.000000
 UP BOUND001  sold0407    100.000000
 FX BOUND001  sold0507       .000000
 UP BOUND001  sold0607     60.000000
 UP BOUND001  stoc0101    100.000000
 UP BOUND001  stoc0201    100.000000
 UP BOUND001  stoc0301    100.000000
 UP BOUND001  stoc0401    100.000000
 UP BOUND001  stoc0501    100.000000
 UP BOUND001  stoc0102    100.000000
 UP BOUND001  stoc0202    100.000000
 UP BOUND001  stoc0302    100.000000
 UP BOUND001  stoc0402    100.000000
 UP BOUND001  stoc0502    100.000000
 UP BOUND001  stoc0103    100.000000
```



```
 UP BOUND001  stoc0203    100.000000
 UP BOUND001  stoc0303    100.000000
 UP BOUND001  stoc0403    100.000000
 UP BOUND001  stoc0503    100.000000
 UP BOUND001  stoc0104    100.000000
 UP BOUND001  stoc0204    100.000000
 UP BOUND001  stoc0304    100.000000
 UP BOUND001  stoc0404    100.000000
 UP BOUND001  stoc0504    100.000000
 UP BOUND001  stoc0105    100.000000
 UP BOUND001  stoc0205    100.000000
 UP BOUND001  stoc0305    100.000000
 UP BOUND001  stoc0405    100.000000
 UP BOUND001  stoc0505    100.000000
 UP BOUND001  stoc0106    100.000000
 UP BOUND001  stoc0206    100.000000
 UP BOUND001  stoc0306    100.000000
 UP BOUND001  stoc0406    100.000000
 UP BOUND001  stoc0506    100.000000
 UP BOUND001  stoc0107    100.000000
 UP BOUND001  stoc0207    100.000000
 UP BOUND001  stoc0307    100.000000
 UP BOUND001  stoc0407    100.000000
 UP BOUND001  stoc0507    100.000000
ENDATA
MODEL FACPLAN
!
TABLES
!
 DIMM(5)
!
DISKDATA
!
 DIMM(1)= facplan.dim
!
LET IMAX = DIMM(1)   !  Tidsperiode definert i 12.3
LET MMAX = DIMM(2)   !  Maskin
LET PMAX = DIMM(3)   !  Produkt
LET IIMAX= DIMM(4)   !  Tidsperiode definert i 12.3
LET IOP  = DIMM(5)   !  Indikator som angir hvorvidt 12.3(0) eller 12.4(1)
!
TABLES
!
 PROFIT(PMAX)
 TIME(MMAX,PMAX)    !   Tid hver maskin bruker p  hvert produkt
 MARKLIM(IMAX,PMAX) !   Markedsettersp°rsel
 MASTOT(IMAX,MMAX)  !   Totalt antall maskiner
 WHOUR(3)           !   Matrise med data knyttet til arbeidstimer
 NR3DOW(IMAX,MMAX)  !   Antall maskiner nede i 12.3
 NR4DOW(MMAX)       !   Antall maskiner nede i 12.4
 STSTOCK(PMAX)      !   Startlager i periode 1
 ENDSTOCK(PMAX)     !   Sluttlager i siste periode
 CONST(2)           !   1: Lagerrente, 2: Maxlager
!
DISKDATA
!
 PROFIT(1)= facplan.pro
 TIME(1,1)= facplan.tim
 MARKLIM(1,1)= facplan.mar
 MASTOT(1,1)= facplan.mas
 WHOUR(1)=facplan.who
 NR3DOW(1,1)=facplan.nr3
 NR4DOW(1)=facplan.nr4
 STSTOCK(1)=facplan.sts
 ENDSTOCK(1)=facplan.end
 CONST(1)=facplan.con
!
LET TOTHOUR=WHOUR(1)* WHOUR(2)* WHOUR(3) ! Tot antall arbeidstimer per mnd.
!
```

```
IF IOP.eq.1
   LET IMAX=IIMAX
ENDIF
!
VARIABLES
!
 madow(i=1:IMAX,m=1:MMAX|IOP.eq.1)       !   Maskiner nede. Kun i 12.4
 sold(i=1:IMAX,p=1:PMAX)
 prod(i=1:IMAX,p=1:PMAX)
 stock(i=1:IMAX-1,p=1:PMAX)              !   Lager i slutten av periode
!
CONSTRAINTS
!
 MAXOBJ:                                &
        SUM(i=1:IMAX,p=1:PMAX)PROFIT(p)*sold(i,p) &           ! Inntekt
              -SUM(i=1:IMAX-1,p=1:PMAX)CONST(1)*stock(i,p)& !
        -SUM(p=1:PMAX|IOP.eq.0) CONST(1)*ENDSTOCK(p)&         ! Lagerrente
              +SUM(p=1:PMAX)CONST(1)*STSTOCK(p) $           !
!
 STOCK(i=1:IMAX,p=1:PMAX):      &                             !
        SUM(|i.ne.1)stock(i-1,p) &                            !
             +prod(i,p) &                                   !
             -sold(i,p) &                                   ! Lagerrestriks.
             -SUM(|i.ne.IMAX)stock(i,p)= &                  !
             -SUM(|i.eq.1)STSTOCK(p) &                      !
             +SUM(|i.eq.IMAX)ENDSTOCK(p)                    !
!
IF IOP.eq.0
 TIMECON(m=1:MMAX,i=1:IMAX):            &                       !
        SUM(p=1:PMAX) TIME(m,p)*prod(i,p)&                    ! Tidsrestriks.
         < TOTHOUR*MASTOT(i,m)-TOTHOUR*NR3DOW(i,m)            ! 12.3
ELSE
 TIMECON(m=1:MMAX,i=1:IMAX):            &                       !
        SUM(p=1:PMAX) TIME(m,p)*prod(i,p)&                    ! Tidsrestriks.
         < TOTHOUR*MASTOT(i,m) -TOTHOUR*madow(i,m)            ! 12.4
 !
  MAIN(m=1:MMAX):       &                                           ! Maskinbalanse
              SUM(i=1:IIMAX)madow(i,m)=NR4DOW(m)            ! 12.4
ENDIF
!
BOUNDS
!
     madow(i=1:IMAX,m=1:MMAX) .UI. min(MASTOT(i,m),NR4DOW(m))
 sold(i=1:IMAX,p=1:PMAX) < MARKLIM(i,p)
 stock(i=1:IMAX-1,p=1:PMAX) < CONST(2)
!
GENERATE

!
TABLES
   TAB1(PMAX)
   TAB2(IMAX)
   TAB3(MMAX)
!
IF IOP.eq.0
!
!Dette under frem til ELSE gjelder for problem 12.3
!
PRINT
!M lfunksjonsverdi, profitt i pund
MAXOBJ
!
ASSIGN TAB1(p=1:PMAX)=prod(1,p)
PRINT
!Mengde produsert i periode 1
    TAB1
!
ASSIGN TAB1(p=1:PMAX)=sold(1,p)
PRINT
```



```
!Mengde solgt i periode 1
   TAB1
!
ASSIGN TAB1(p=1:PMAX)=stock(1,p)
PRINT
!Mengde lagret i periode 1
  TAB1
!
ASSIGN TAB1(p=1:PMAX)=dj(prod(1,p))
PRINT
!Reduserte kostnader for alle produkter i periode 1
   TAB1
!
ASSIGN TAB2(i=1:IMAX)=dual(TIMECON(1,i))
PRINT
!Skyggepriser for kapasiteten p  "grinderen" i alle perioder
  TAB2
!
QUIT
!
ELSE
!
PRINT
!M lfunksjonsverdi, profitt i pund
MAXOBJ
!
ASSIGN TAB3(m=1:MMAX)=madow(2,m)
PRINT
!Antall maskiner ute av drift i periode 2
  TAB3
!
QUIT
!
ENDIF


!  Tabell facplan.nr3
!       maskiner(nede)
1,      0,       0,     0,      0
0,      0,       2,     0,      0
0,      0,       0,     1,      0     !  perioder
0,      1,       0,     0,      0
1,      1,       0,     0,      0
0,      0,       1,     0,      1

!  Tabell facplan.nr4, maskiner nede 12.4
! grinder  ,    ver.drills,    hor.drills,     borer,   planer
       2   ,            2  ,            3  ,       1  ,         1


! Tabell facplan.pro
!               produkter
10,     6,      8,      4,      11,     9,      3






Problem Statistics
Matrix FACPLAN
Objective MAXOBJ
RHS RHS00001
Problem has     73 rows and    119 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     26 iterations
Objective function value is  93715.17857
```

Rows Section

	Number	Row	At	Value	Slack Value	Dual Value	RHS
N	1	MAXOBJ	BS	93890.17857	-93715.17857	.000000	175.000000
E	2	STOC0101	EQ	.000000	.000000	-4.285714	.000000
E	3	STOC0102	EQ	.000000	.000000	-6.000000	.000000
E	4	STOC0103	EQ	.000000	.000000	.000000	.000000
E	5	STOC0104	EQ	.000000	.000000	.000000	.000000
E	6	STOC0105	EQ	.000000	.000000	-2.571429	.000000
E	7	STOC0106	EQ	.000000	.000000	-1.714286	.000000
E	8	STOC0107	EQ	.000000	.000000	-4.285714	.000000
E	9	STOC0201	EQ	.000000	.000000	-.125000	.000000
E	10	STOC0202	EQ	.000000	.000000	.000000	.000000
E	11	STOC0203	EQ	.000000	.000000	-.500000	.000000
E	12	STOC0204	EQ	.000000	.000000	1.000000	.000000
E	13	STOC0205	EQ	.000000	.000000	.000000	.000000
E	14	STOC0206	EQ	.000000	.000000	.000000	.000000
E	15	STOC0207	EQ	.000000	.000000	-.375000	.000000
E	16	STOC0301	EQ	.000000	.000000	-10.000000	.000000
E	17	STOC0302	EQ	.000000	.000000	-6.000000	.000000
E	18	STOC0303	EQ	.000000	.000000	.000000	.000000
E	19	STOC0304	EQ	.000000	.000000	.500000	.000000
E	20	STOC0305	EQ	.000000	.000000	-11.000000	.000000
E	21	STOC0306	EQ	.000000	.000000	.000000	.000000
E	22	STOC0307	EQ	.000000	.000000	-3.000000	.000000
E	23	STOC0401	EQ	.000000	.000000	.000000	.000000
E	24	STOC0402	EQ	.000000	.000000	.000000	.000000
E	25	STOC0403	EQ	.000000	.000000	.000000	.000000
E	26	STOC0404	EQ	.000000	.000000	.000000	.000000
E	27	STOC0405	EQ	.000000	.000000	.000000	.000000
E	28	STOC0406	EQ	.000000	.000000	.500000	.000000
E	29	STOC0407	EQ	.000000	.000000	.000000	.000000
E	30	STOC0501	EQ	.000000	.000000	.000000	.000000
E	31	STOC0502	EQ	.000000	.000000	.000000	.000000
E	32	STOC0503	EQ	.000000	.000000	.000000	.000000
E	33	STOC0504	EQ	.000000	.000000	.000000	.000000
E	34	STOC0505	EQ	.000000	.000000	.000000	.000000
E	35	STOC0506	EQ	.000000	.000000	.000000	.000000
E	36	STOC0507	EQ	.000000	.000000	.000000	.000000
E	37	STOC0601	EQ	50.000000	.000000	.000000	50.000000
E	38	STOC0602	EQ	50.000000	.000000	.000000	50.000000
E	39	STOC0603	EQ	50.000000	.000000	-8.000000	50.000000
E	40	STOC0604	EQ	50.000000	.000000	.000000	50.000000
E	41	STOC0605	EQ	50.000000	.000000	-11.000000	50.000000
E	42	STOC0606	EQ	50.000000	.000000	.000000	50.000000
E	43	STOC0607	EQ	50.000000	.000000	-3.000000	50.000000
L	44	TIME0101	UL	1152.000000	.000000	8.571429	1152.000000
L	45	TIME0102	BS	1105.000000	431.000000	.000000	1536.000000
L	46	TIME0103	BS	80.000000	1456.000000	.000000	1536.000000
L	47	TIME0104	BS	420.000000	1116.000000	.000000	1536.000000
L	48	TIME0105	BS	510.000000	642.000000	.000000	1152.000000
L	49	TIME0106	BS	770.000000	766.000000	.000000	1536.000000
L	50	TIME0201	BS	437.714286	330.285714	.000000	768.000000
L	51	TIME0202	BS	370.000000	398.000000	.000000	768.000000
L	52	TIME0203	BS	240.000000	528.000000	.000000	768.000000
L	53	TIME0204	BS	230.000000	154.000000	.000000	384.000000
L	54	TIME0205	BS	230.000000	154.000000	.000000	384.000000
L	55	TIME0206	BS	600.000000	168.000000	.000000	768.000000
L	56	TIME0301	BS	406.000000	746.000000	.000000	1152.000000
L	57	TIME0302	UL	384.000000	.000000	.625000	384.000000
L	58	TIME0303	BS	.000000	1152.000000	.000000	1152.000000
L	59	TIME0304	BS	420.000000	732.000000	.000000	1152.000000
L	60	TIME0305	BS	540.000000	612.000000	.000000	1152.000000
L	61	TIME0306	BS	110.000000	658.000000	.000000	768.000000
L	62	TIME0401	BS	152.657143	231.342857	.000000	384.000000
L	63	TIME0402	BS	123.000000	261.000000	.000000	384.000000
L	64	TIME0403	UL	.000000	.000000	200.000000	.000000
L	65	TIME0404	BS	82.000000	302.000000	.000000	384.000000
L	66	TIME0405	BS	128.000000	256.000000	.000000	384.000000

L	67	TIME0406	BS	68.500000	315.500000	.000000	384.000000
L	68	TIME0501	BS	43.825000	340.175000	.000000	384.000000
L	69	TIME0502	BS	38.675000	345.325000	.000000	384.000000
L	70	TIME0503	BS	.000000	384.000000	.000000	384.000000
L	71	TIME0504	BS	19.000000	365.000000	.000000	384.000000
L	72	TIME0505	BS	66.000000	318.000000	.000000	384.000000
L	73	TIME0506	UL	.000000	.000000	800.000000	.000000

Columns Section

	Number	Column	At	Value	Input Cost	Reduced Cost
C	74	sold0101	UL	500.000000	10.000000	-5.714286
C	75	sold0201	UL	600.000000	10.000000	-9.875000
C	76	sold0301	BS	100.000000	10.000000	.000000
C	77	sold0401	UL	200.000000	10.000000	-10.000000
C	78	sold0501	LL	.000000	10.000000	-10.000000
C	79	sold0601	UL	500.000000	10.000000	-10.000000
C	80	sold0102	BS	888.571429	6.000000	.000000
C	81	sold0202	UL	500.000000	6.000000	-6.000000
C	82	sold0302	BS	100.000000	6.000000	.000000
C	83	sold0402	UL	300.000000	6.000000	-6.000000
C	84	sold0502	UL	100.000000	6.000000	-6.000000
C	85	sold0602	UL	500.000000	6.000000	-6.000000
C	86	sold0103	UL	300.000000	8.000000	-8.000000
C	87	sold0203	UL	200.000000	8.000000	-7.500000
C	88	sold0303	LL	.000000	8.000000	-8.000000
C	89	sold0403	UL	400.000000	8.000000	-8.000000
C	90	sold0503	UL	500.000000	8.000000	-8.000000
C	91	sold0603	BS	50.000000	8.000000	.000000
C	92	sold0104	UL	300.000000	4.000000	-4.000000
C	93	sold0204	LL	.000000	4.000000	-5.000000
C	94	sold0304	LL	.000000	4.000000	-4.500000
C	95	sold0404	UL	500.000000	4.000000	-4.000000
C	96	sold0504	UL	100.000000	4.000000	-4.000000
C	97	sold0604	UL	300.000000	4.000000	-4.000000
C	98	sold0105	UL	800.000000	11.000000	-8.428571
C	99	sold0205	UL	400.000000	11.000000	-11.000000
C	100	sold0305	BS	100.000000	11.000000	.000000
C	101	sold0405	UL	200.000000	11.000000	-11.000000
C	102	sold0505	UL	1000.000000	11.000000	-11.000000
C	103	sold0605	BS	50.000000	11.000000	.000000
C	104	sold0106	UL	200.000000	9.000000	-7.285714
C	105	sold0206	UL	300.000000	9.000000	-9.000000
C	106	sold0306	UL	400.000000	9.000000	-9.000000
C	107	sold0406	LL	.000000	9.000000	-9.500000
C	108	sold0506	UL	300.000000	9.000000	-9.000000
C	109	sold0606	UL	500.000000	9.000000	-9.000000
C	110	sold0107	LL	.000000	3.000000	1.285714
C	111	sold0207	UL	150.000000	3.000000	-2.625000
C	112	sold0307	BS	100.000000	3.000000	.000000
C	113	sold0407	UL	100.000000	3.000000	-3.000000
C	114	sold0507	LL	.000000	3.000000	-3.000000
C	115	sold0607	BS	50.000000	3.000000	.000000
C	116	prod0101	BS	500.000000	.000000	.000000
C	117	prod0201	BS	700.000000	.000000	.000000
C	118	prod0301	BS	.000000	.000000	.000000
C	119	prod0401	BS	200.000000	.000000	.000000
C	120	prod0501	BS	.000000	.000000	.000000
C	121	prod0601	BS	550.000000	.000000	.000000
C	122	prod0102	BS	888.571429	.000000	.000000
C	123	prod0202	BS	600.000000	.000000	.000000
C	124	prod0302	LL	.000000	.000000	.000000
C	125	prod0402	BS	300.000000	.000000	.000000
C	126	prod0502	BS	100.000000	.000000	.000000
C	127	prod0602	BS	550.000000	.000000	.000000
C	128	prod0103	BS	382.500000	.000000	.000000
C	129	prod0203	BS	117.500000	.000000	.000000
C	130	prod0303	BS	.000000	.000000	.000000
C	131	prod0403	BS	400.000000	.000000	.000000
C	132	prod0503	BS	600.000000	.000000	.000000

```
  C    133  prod0603  BS       .000000        .000000        .000000
  C    134  prod0104  BS    300.000000        .000000        .000000
  C    135  prod0204  LL       .000000        .000000       1.000000
  C    136  prod0304  LL       .000000        .000000      14.500000
  C    137  prod0404  BS    500.000000        .000000        .000000
  C    138  prod0504  BS    100.000000        .000000        .000000
  C    139  prod0604  BS    350.000000        .000000        .000000
  C    140  prod0105  BS    800.000000        .000000        .000000
  C    141  prod0205  BS    500.000000        .000000        .000000
  C    142  prod0305  LL       .000000        .000000       9.000000
  C    143  prod0405  BS    200.000000        .000000        .000000
  C    144  prod0505  BS   1100.000000        .000000        .000000
  C    145  prod0605  LL       .000000        .000000      29.000000
  C    146  prod0106  BS    200.000000        .000000        .000000
  C    147  prod0206  BS    300.000000        .000000        .000000
  C    148  prod0306  BS    400.000000        .000000        .000000
  C    149  prod0406  LL       .000000        .000000        .500000
  C    150  prod0506  BS    300.000000        .000000        .000000
  C    151  prod0606  BS    550.000000        .000000        .000000
  C    152  prod0107  BS       .000000        .000000        .000000
  C    153  prod0207  BS    250.000000        .000000        .000000
  C    154  prod0307  LL       .000000        .000000      13.000000
  C    155  prod0407  BS    100.000000        .000000        .000000
  C    156  prod0507  BS    100.000000        .000000        .000000
  C    157  prod0607  LL       .000000        .000000      37.000000
  C    158  stoc0101  LL       .000000       -.500000       4.660714
  C    159  stoc0201  UL    100.000000       -.500000      -9.375000
  C    160  stoc0301  LL       .000000       -.500000      10.500000
  C    161  stoc0401  LL       .000000       -.500000        .500000
  C    162  stoc0501  LL       .000000       -.500000        .500000
  C    163  stoc0102  LL       .000000       -.500000       6.500000
  C    164  stoc0202  UL    100.000000       -.500000      -5.500000
  C    165  stoc0302  LL       .000000       -.500000       6.500000
  C    166  stoc0402  LL       .000000       -.500000        .500000
  C    167  stoc0502  LL       .000000       -.500000        .500000
  C    168  stoc0103  BS     82.500000       -.500000        .000000
  C    169  stoc0203  LL       .000000       -.500000       1.000000
  C    170  stoc0303  LL       .000000       -.500000        .500000
  C    171  stoc0403  LL       .000000       -.500000        .500000
  C    172  stoc0503  UL    100.000000       -.500000      -7.500000
  C    173  stoc0104  LL       .000000       -.500000       1.500000
  C    174  stoc0204  BS       .000000       -.500000        .000000
  C    175  stoc0304  BS       .000000       -.500000        .000000
  C    176  stoc0404  LL       .000000       -.500000        .500000
  C    177  stoc0504  LL       .000000       -.500000        .500000
  C    178  stoc0105  LL       .000000       -.500000       3.071429
  C    179  stoc0205  UL    100.000000       -.500000     -10.500000
  C    180  stoc0305  LL       .000000       -.500000      11.500000
  C    181  stoc0405  LL       .000000       -.500000        .500000
  C    182  stoc0505  UL    100.000000       -.500000     -10.500000
  C    183  stoc0106  LL       .000000       -.500000       2.214286
  C    184  stoc0206  LL       .000000       -.500000        .500000
  C    185  stoc0306  LL       .000000       -.500000       1.000000
  C    186  stoc0406  BS       .000000       -.500000        .000000
  C    187  stoc0506  LL       .000000       -.500000        .500000
  C    188  stoc0107  LL       .000000       -.500000       4.410714
  C    189  stoc0207  UL    100.000000       -.500000      -2.125000
  C    190  stoc0307  LL       .000000       -.500000       3.500000
  C    191  stoc0407  LL       .000000       -.500000        .500000
  C    192  stoc0507  UL    100.000000       -.500000      -2.500000

Problem Statistics
Matrix FACPLAN
Objective MAXOBJ
RHS RHS00001
Problem has     73 rows and    119 structural columns

Solution Statistics
Maximisation performed
```



```
Optimal solution found after     26 iterations
Objective function value is  93715.17857

N MAXOBJ    93890.17857  499729687.5      .000000             TIME0101 UL
BS     1   -93715.17857  93890.18554      .000000

E STOC0101      .000000  14619567.87    -4.285714             sold0102 UL
EQ     2        .000000 -116581677.2     4.285714             sold0102 LL

E STOC0102      .000000  10442548.82    -6.000000             sold0102 UL
EQ     3        .000000 -83272626.95     6.000000             sold0102 LL

E STOC0103      .000000  35846054.68      .000000             prod0103 LL
EQ     4        .000000 -87389404.29      .000000             TIME0301 UL

E STOC0104      .000000  28114553.22      .000000             prod0104 LL
EQ     5        .000000 -103175952.1      .000000             TIME0201 UL

E STOC0105      .000000  24365944.82    -2.571429             sold0102 UL
EQ     6        .000000 -194302795.4     2.571429             prod0102 LL

E STOC0106      .000000  18743035.88    -1.714286             prod0106 LL
EQ     7        .000000 -57018291.01     1.714286             TIME0201 UL

E STOC0107      .000000      .000000    -4.285714             prod0107 LL
EQ     8        .000000 -116519201.6     4.285714             TIME0301 UL

E STOC0201      .000000  6560062.988     -.125000             stoc0103 UL
EQ     9        .000000 -30926008.30      .125000             stoc0103 LL

E STOC0202      .000000  56229106.44      .000000             prod0202 LL
EQ    10        .000000 -57701772.46      .000000             TIME0102 UL

E STOC0203      .000000  1640015.747     -.500000             stoc0103 UL
EQ    11        .000000 -7731502.929      .500000             stoc0103 LL

E STOC0204      .000000  9371518.554     1.000000             stoc0204 UL
EQ    12        .000000      .000000    -1.000000             stoc0204 LL

E STOC0205      .000000  46857587.89      .000000             prod0205 LL
EQ    13        .000000 -134637463.3      .000000             TIME0102 UL

E STOC0206      .000000  28114553.22      .000000             prod0206 LL
EQ    14        .000000 -62164399.41      .000000             TIME0202 UL

E STOC0207      .000000  2186687.500     -.375000             stoc0103 UL
EQ    15        .000000 -10308669.43      .375000             stoc0103 LL

E STOC0301      .000000  9371518.554   -10.000000             sold0301 LL
EQ    16        .000000 -18743035.88    10.000000             sold0301 UL

E STOC0302      .000000  9371518.554    -6.000000             sold0302 LL
EQ    17        .000000 -46857587.89     6.000000             sold0302 UL

E STOC0303      .000000      .000000      .000000             prod0303 LL
EQ    18        .000000 -134949853.5      .000000             TIME0303 UL

E STOC0304      .000000  9371518.554      .500000             stoc0304 UL
EQ    19        .000000      .000000     -.500000             stoc0304 LL

E STOC0305      .000000  9371518.554   -11.000000             sold0305 LL
EQ    20        .000000 -37486071.77    11.000000             sold0305 UL

E STOC0306      .000000  37486071.77      .000000             prod0306 LL
EQ    21        .000000 -82469355.46      .000000             TIME0203 UL

E STOC0307      .000000      .000000    -3.000000             sold0307 UL
EQ    22        .000000 -9371518.554     3.000000             sold0307 LL
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E STOC0401       .000000  18743035.88       .000000             prod0401 LL
EQ    23         .000000 -144321374.5       .000000             TIME0204 UL

E STOC0402       .000000  28114553.22       .000000             prod0402 LL
EQ    24         .000000 -72160688.47       .000000             TIME0204 UL

E STOC0403       .000000  37486071.77       .000000             prod0403 LL
EQ    25         .000000 -85749394.53       .000000             TIME0304 UL

E STOC0404       .000000  46857587.89       .000000             prod0404 LL
EQ    26         .000000 -48107124.02       .000000             TIME0204 UL

E STOC0405       .000000  18743035.88       .000000             prod0405 LL
EQ    27         .000000 -283019824.2       .000000             TIME0404 UL

E STOC0406       .000000  9371518.554       .500000             stoc0406 UL
EQ    28         .000000      .000000     -.500000             stoc0406 LL

E STOC0407       .000000  9371518.554       .000000             prod0407 LL
EQ    29         .000000 -114332519.5       .000000             TIME0304 UL

E STOC0501       .000000      .000000       .000000             prod0501 LL
EQ    30         .000000 -120330285.6       .000000             TIME0105 UL

E STOC0502       .000000  9371518.554       .000000             prod0502 LL
EQ    31         .000000 -72160688.47       .000000             TIME0205 UL

E STOC0503       .000000  56229106.44       .000000             prod0503 LL
EQ    32         .000000 -71692109.37       .000000             TIME0305 UL

E STOC0504       .000000  9371518.554       .000000             prod0504 LL
EQ    33         .000000 -48107124.02       .000000             TIME0205 UL

E STOC0505       .000000  103086694.3       .000000             prod0505 LL
EQ    34         .000000 -200550476.0       .000000             TIME0105 UL

E STOC0506       .000000  28114553.22       .000000             prod0506 LL
EQ    35         .000000 -24053562.01       .000000             TIME0205 UL

E STOC0507       .000000  9371518.554       .000000             prod0507 LL
EQ    36         .000000 -95589482.42       .000000             TIME0305 UL

E STOC0601     50.000000  51543398.43       .000000             prod0601 LL
EQ    37         .000000 -143571594.2       .000000             TIME0106 UL

E STOC0602     50.000000  51543398.43       .000000             prod0602 LL
EQ    38         .000000 -78720703.12       .000000             TIME0206 UL

E STOC0603     50.000000  4685809.082     -8.000000             sold0603 UL
EQ    39         .000000 -4685708.984      8.000000             sold0603 LL

E STOC0604     50.000000  32800361.32       .000000             prod0604 LL
EQ    40         .000000 -52480444.33       .000000             TIME0206 UL

E STOC0605     50.000000  98400986.32    -11.000000             sold0605 UL
EQ    41         .000000 -4685708.984     11.000000             sold0605 LL

E STOC0606     50.000000  51543398.43       .000000             prod0606 LL
EQ    42         .000000 -26240200.19       .000000             TIME0206 UL

E STOC0607     50.000000  937201.7578     -3.000000             sold0607 UL
EQ    43         .000000 -4685708.984      3.000000             sold0607 LL

L TIME0101   1152.000000  58291992.18      8.571429             sold0102 LL
UL    44         .000000 -7308632.324     -8.571429             sold0102 UL

L TIME0102   1105.000000  4686864.257       .000000             stoc0207 UL
BS    45      431.000000 -1873198.730       .000000             stoc0206 LL
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L TIME0103     80.000000  1874383.666       .000000             stoc0206 LL
BS    46    1456.000000    80.000000       .000000             prod0302 LL

L TIME0104    420.000000  4686179.199       .000000             sold0407 UL
BS    47    1116.000000 -6559642.578       .000000             stoc0402 LL

L TIME0105    510.000000  6560572.753       .000000             stoc0402 LL
BS    48     642.000000 -6559552.734       .000000             stoc0502 LL

L TIME0106    770.000000  6560833.007       .000000             stoc0502 LL
BS    49     766.000000   770.000000       .000000             prod0607 LL

L TIME0201    437.714286  1339226.074       .000000             sold0107 LL
BS    50     330.285714 -5086958.007       .000000             stoc0106 LL

L TIME0202    370.000000  5623281.250       .000000             stoc0106 LL
BS    51     398.000000 -5622541.503       .000000             stoc0206 LL

L TIME0203    240.000000  5623151.367       .000000             stoc0206 LL
BS    52     528.000000   240.000000       .000000             prod0302 LL

L TIME0204    230.000000  2811685.546       .000000             prod0204 LL
BS    53     154.000000 -5622681.152       .000000             prod0406 LL

L TIME0205    230.000000  5623141.113       .000000             prod0406 LL
BS    54     154.000000 -5622681.152       .000000             stoc0506 LL

L TIME0206    600.000000  5623511.230       .000000             stoc0506 LL
BS    55     168.000000   600.000000       .000000

L TIME0301    406.000000  5623317.382       .000000             stoc0207 UL
BS    56     746.000000 -1311606.567       .000000             TIME0302 UL

L TIME0302    384.000000  1312396.606       .625000             stoc0103 UL
UL    57         .000000 -6184818.359     -.625000             stoc0103 LL

L TIME0303       .000000      .000000       .000000             prod0302 LL
BS    58    1152.000000 -7497214.843       .000000             stoc0303 LL

L TIME0304    420.000000  7497634.765       .000000             stoc0303 LL
BS    59     732.000000 -7496794.921       .000000             stoc0403 LL

L TIME0305    540.000000  7497754.882       .000000             stoc0403 LL
BS    60     612.000000 -1873763.671       .000000             stoc0501 LL

L TIME0306    110.000000  1874413.696       .000000             stoc0501 LL
BS    61     658.000000   110.000000       .000000

L TIME0401    152.657143  15744302.97       .000000             sold0104 UL
BS    62     231.342857 -5247897.949       .000000             stoc0104 LL

L TIME0402    123.000000  5997895.019       .000000             stoc0207 UL
BS    63     261.000000 -5247927.246       .000000             prod0204 LL

L TIME0403       .000000      .000000    200.000000             prod0301 LL
UL    64         .000000 -7497214.843   -200.000000             sold0301 UL

L TIME0404     82.000000  5248132.324       .000000             prod0204 LL
BS    65     302.000000 -7497132.812       .000000             stoc0405 LL

L TIME0405    128.000000  7497342.773       .000000             stoc0405 LL
BS    66     256.000000 -5247922.363       .000000             stoc0504 LL

L TIME0406     68.500000  5248118.652       .000000             stoc0504 LL
BS    67     315.500000    68.500000       .000000             prod0605 LL

L TIME0501     43.825000  19492801.51       .000000             sold0105 UL
BS    68     340.175000 -7497170.898       .000000             sold0107 LL
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L TIME0502    38.675000  262441.1865       .000000              TIME0302 UL
BS     69    345.325000 -374822.0214       .000000              stoc0101 LL

L TIME0503      .000000      .000000       .000000              stoc0203 LL
BS     70    384.000000 -1499442.993       .000000              stoc0303 LL

L TIME0504    19.000000  1499461.914       .000000              stoc0303 LL
BS     71    365.000000 -7497195.800       .000000              stoc0405 LL

L TIME0505    66.000000  7497280.761       .000000              stoc0405 LL
BS     72    318.000000    66.000000       .000000

L TIME0506      .000000      .000000    800.000000              prod0603 LL
UL     73       .000000 -749721.4355   -800.000000              sold0603 UL

C sold0101   500.000000   500.000000      5.714286     4.285714 sold0102 UL
UL     74     10.000000   500.000000     -5.714286  1.00000E+30 sold0102 LL

C sold0201   600.000000   600.000000      9.875000      .125000 stoc0103 LL
UL     75     10.000000   600.000000     -9.875000  1.00000E+30 stoc0103 UL

C sold0301   100.000000   100.000000       .000000    10.000000 prod0302 LL
BS     76     10.000000   100.000000 -9.37152E+34 -9.37152E+34

C sold0401   200.000000   200.000000     10.000000      .000000 prod0401 LL
UL     77     10.000000   200.000000    -10.000000  1.00000E+30 TIME0204 UL

C sold0501      .000000      .000000     10.000000 -1.00000E+30 prod0501 LL
LL     78     10.000000      .000000    -10.000000      .000000 TIME0105 UL

C sold0601   500.000000   500.000000     10.000000      .000000 prod0601 LL
UL     79     10.000000   500.000000    -10.000000  1.00000E+30 TIME0106 UL

C sold0102   888.571429   888.571411 -168687.3046  168693.3105 sold0107 LL
BS     80      6.000000   888.571411 -749721.4355 -749715.4296 sold0101 UL

C sold0202   500.000000   500.000000      6.000000      .000000 prod0202 LL
UL     81      6.000000   500.000000     -6.000000  1.00000E+30 TIME0102 UL

C sold0302   100.000000   100.000000 -515433.4960  515439.5019 stoc0202 UL
BS     82      6.000000   100.000000       .000000     6.000000 prod0302 LL

C sold0402   300.000000   300.000000      6.000000      .000000 prod0402 LL
UL     83      6.000000   300.000000     -6.000000  1.00000E+30 TIME0204 UL

C sold0502   100.000000   100.000000      6.000000      .000000 prod0502 LL
UL     84      6.000000   100.000000     -6.000000  1.00000E+30 TIME0205 UL

C sold0602   500.000000   500.000000      6.000000      .000000 prod0602 LL
UL     85      6.000000   500.000000     -6.000000  1.00000E+30 TIME0206 UL

C sold0103   300.000000   300.000000      8.000000      .000000 prod0103 LL
UL     86      8.000000   300.000000     -8.000000  1.00000E+30 TIME0301 UL

C sold0203   200.000000   200.000000      7.500000      .500000 stoc0103 LL
UL     87      8.000000   200.000000     -7.500000  1.00000E+30 stoc0103 UL

C sold0303      .000000      .000000      8.000000 -1.00000E+30 prod0303 LL
LL     88      8.000000      .000000     -8.000000      .000000 TIME0303 UL

C sold0403   400.000000   400.000000      8.000000      .000000 prod0403 LL
UL     89      8.000000   400.000000     -8.000000  1.00000E+30 TIME0304 UL

C sold0503   500.000000   500.000000      8.000000      .000000 prod0503 LL
UL     90      8.000000   500.000000     -8.000000  1.00000E+30 TIME0305 UL

C sold0603    50.000000    50.000000 -543548.0468  543556.0546 prod0605 LL
BS     91      8.000000    50.000000 -9.37152E+34 -9.37152E+34
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C sold0104   300.000000   300.000000      4.000000      .000000 prod0104 LL
UL     92      4.000000   300.000000     -4.000000  1.00000E+30 TIME0201 UL

C sold0204      .000000      .000000      5.000000 -1.00000E+30 stoc0204 UL
LL     93      4.000000      .000000     -5.000000    -1.000000 stoc0204 LL

C sold0304      .000000      .000000      4.500000 -1.00000E+30 stoc0304 UL
LL     94      4.000000      .000000     -4.500000     -.500000 stoc0304 LL

C sold0404   500.000000   500.000000      4.000000      .000000 prod0404 LL
UL     95      4.000000   500.000000     -4.000000  1.00000E+30 TIME0204 UL

C sold0504   100.000000   100.000000      4.000000      .000000 prod0504 LL
UL     96      4.000000   100.000000     -4.000000  1.00000E+30 TIME0205 UL

C sold0604   300.000000   300.000000      4.000000      .000000 prod0604 LL
UL     97      4.000000   300.000000     -4.000000  1.00000E+30 TIME0206 UL

C sold0105   800.000000   800.000000      8.428572     2.571429 sold0102 UL
UL     98     11.000000   800.000000     -8.428572  1.00000E+30 prod0102 LL

C sold0205   400.000000   400.000000     11.000000      .000000 prod0205 LL
UL     99     11.000000   400.000000    -11.000000  1.00000E+30 TIME0102 UL

C sold0305   100.000000   100.000000 -984009.3750  984020.3125 stoc0205 UL
BS    100     11.000000   100.000000 -843436.6210 -843425.5859 prod0305 LL

C sold0405   200.000000   200.000000     11.000000      .000000 prod0405 LL
UL    101     11.000000   200.000000    -11.000000  1.00000E+30 TIME0404 UL

C sold0505  1000.000000  1000.000000     11.000000      .000000 prod0505 LL
UL    102     11.000000  1000.000000    -11.000000  1.00000E+30 TIME0105 UL

C sold0605    50.000000    50.000000 -984009.3750  984020.3125 stoc0505 UL
BS    103     11.000000    50.000000 -2717740.478 -2717729.492 prod0605 LL

C sold0106   200.000000   200.000000      7.285714     1.714286 prod0106 LL
UL    104      9.000000   200.000000     -7.285714  1.00000E+30 TIME0201 UL

C sold0206   300.000000   300.000000      9.000000      .000000 prod0206 LL
UL    105      9.000000   300.000000     -9.000000  1.00000E+30 TIME0202 UL

C sold0306   400.000000   400.000000      9.000000      .000000 prod0306 LL
UL    106      9.000000   400.000000     -9.000000  1.00000E+30 TIME0203 UL

C sold0406      .000000      .000000      9.500000 -1.00000E+30 stoc0406 UL
LL    107      9.000000      .000000     -9.500000     -.500000 stoc0406 LL

C sold0506   300.000000   300.000000      9.000000      .000000 prod0506 LL
UL    108      9.000000   300.000000     -9.000000  1.00000E+30 TIME0205 UL

C sold0606   500.000000   500.000000      9.000000      .000000 prod0606 LL
UL    109      9.000000   500.000000     -9.000000  1.00000E+30 TIME0206 UL

C sold0107      .000000      .000000     -1.285714 -1.00000E+30 prod0107 LL
LL    110      3.000000      .000000      1.285714     4.285714 TIME0301 UL

C sold0207   150.000000   150.000000      2.625000      .375000 stoc0103 LL
UL    111      3.000000   150.000000     -2.625000  1.00000E+30 stoc0103 UL

C sold0307   100.000000   100.000000 -199144.7509  199147.7416 stoc0207 UL
BS    112      3.000000   100.000000 -1218297.485 -1218294.433 prod0307 LL

C sold0407   100.000000   100.000000      3.000000      .000000 prod0407 LL
UL    113      3.000000   100.000000     -3.000000  1.00000E+30 TIME0304 UL

C sold0507      .000000      .000000      3.000000 -1.00000E+30 prod0507 LL
LL    114      3.000000      .000000     -3.000000      .000000 TIME0305 UL
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C sold0607    50.000000    50.000000 -234287.9394  234290.9423 stoc0507 UL
BS   115       3.000000    50.000000 -3467461.914 -3467458.984 prod0607 LL

C prod0101   500.000000   500.000000 -535515.2832  535515.2832 sold0101 UL
BS   116        .000000   500.000000 -436779.6386 -436779.6386 stoc0101 LL

C prod0201   700.000000   700.000000 -436779.6386  436779.6386 stoc0101 LL
BS   117        .000000   700.000000 -9.37152E+34 -9.37152E+34

C prod0301      .000000      .000000      .000000      .000000 prod0302 LL
BS   118        .000000      .000000 -9.37152E+34 -9.37152E+34

C prod0401   200.000000   200.000000 -937151.7578  937151.7578 sold0401 UL
BS   119        .000000   200.000000 -46857.59277 -46857.59277 stoc0401 LL

C prod0501      .000000      .000000 -46857.59277  46857.59277 stoc0401 LL
BS   120        .000000      .000000 -46857.59277 -46857.59277 stoc0501 LL

C prod0601   550.000000   550.000000 -46857.59277  46857.59277 stoc0501 LL
BS   121        .000000   550.000000 -9.37152E+34 -9.37152E+34

C prod0102   888.571429   888.571411 -168687.3046  168687.3046 sold0107 LL
BS   122        .000000   888.571411 -749721.4355 -749721.4355 sold0101 UL

C prod0202   600.000000   600.000000 -515433.4960  515433.4960 stoc0202 UL
BS   123        .000000   600.000000 -9.37152E+34 -9.37152E+34

C prod0302      .000000      .000000      .000000 -1.00000E+30 sold0302 LL
LL   124        .000000      .000000      .000000      .000000 prod0301 LL

C prod0402   300.000000   300.000000 -562291.0644  562291.0644 sold0402 UL
BS   125        .000000   300.000000 -46857.59277 -46857.59277 stoc0402 LL

C prod0502   100.000000   100.000000 -46857.59277  46857.59277 stoc0402 LL
BS   126        .000000   100.000000 -46857.59277 -46857.59277 stoc0502 LL

C prod0602   550.000000   550.000000 -46857.59277  46857.59277 stoc0502 LL
BS   127        .000000   550.000000 -9.37152E+34 -9.37152E+34

C prod0103   382.500000   382.500000 -265526.3427  265526.3427 stoc0207 UL
BS   128        .000000   382.500000 -46857.59277 -46857.59277 TIME0302 UL

C prod0203   117.500000   117.500000 -46857.59277  46857.59277 TIME0302 UL
BS   129        .000000   117.500000 -265526.3427 -265526.3427 stoc0207 UL

C prod0303      .000000      .000000 -93715.18554  93715.18554 stoc0203 LL
BS   130        .000000      .000000 -46857.59277 -46857.59277 stoc0303 LL

C prod0403   400.000000   400.000000 -46857.59277  46857.59277 stoc0303 LL
BS   131        .000000   400.000000 -46857.59277 -46857.59277 stoc0403 LL

C prod0503   600.000000   600.000000 -46857.59277  46857.59277 stoc0403 LL
BS   132        .000000   600.000000 -9.37152E+34 -9.37152E+34

C prod0603      .000000      .000000 -543548.0468  543548.0468 prod0605 LL
BS   133        .000000      .000000 -9.37152E+34 -9.37152E+34

C prod0104   300.000000   300.000000 -374860.7177  374860.7177 sold0104 UL
BS   134        .000000   300.000000 -140572.7661 -140572.7661 stoc0104 LL

C prod0204      .000000      .000000    -1.000000 -1.00000E+30 stoc0204 LL
LL   135        .000000      .000000     1.000000     1.000000 stoc0204 UL

C prod0304      .000000      .000000   -14.500000 -1.00000E+30 stoc0304 LL
LL   136        .000000      .000000    14.500000    14.500000 prod0301 LL

C prod0404   500.000000   500.000000 -93715.18554  93715.18554 prod0204 LL
BS   137        .000000   500.000000 -46857.59277 -46857.59277 stoc0404 LL
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C prod0504   100.000000   100.000000 -46857.59277  46857.59277 stoc0404 LL
BS   138        .000000   100.000000 -46857.59277 -46857.59277 stoc0504 LL

C prod0604   350.000000   350.000000 -46857.59277  46857.59277 stoc0504 LL
BS   139        .000000   350.000000 -9.37152E+34 -9.37152E+34

C prod0105   800.000000   800.000000 -789885.1074  789885.1074 sold0105 UL
BS   140        .000000   800.000000 -287839.4531 -287839.4531 stoc0105 LL

C prod0205   500.000000   500.000000 -287839.4531  287839.4531 stoc0105 LL
BS   141        .000000   500.000000 -9.37152E+34 -9.37152E+34

C prod0305      .000000      .000000    -9.000000 -1.00000E+30 sold0301 UL
LL   142        .000000      .000000     9.000000     9.000000 prod0301 LL

C prod0405   200.000000   200.000000 -1030867.065  1030867.065 sold0405 UL
BS   143        .000000   200.000000 -46857.59277 -46857.59277 stoc0405 LL

C prod0505  1100.000000  1100.000000 -46857.59277  46857.59277 stoc0405 LL
BS   144        .000000  1100.000000 -9.37152E+34 -9.37152E+34

C prod0605      .000000      .000000   -29.000000 -1.00000E+30 sold0603 UL
LL   145        .000000      .000000    29.000000    29.000000 prod0603 LL

C prod0106   200.000000   200.000000 -682781.9824  682781.9824 sold0106 UL
BS   146        .000000   200.000000 -207512.1582 -207512.1582 stoc0106 LL

C prod0206   300.000000   300.000000 -207512.1582  207512.1582 stoc0106 LL
BS   147        .000000   300.000000 -46857.59277 -46857.59277 stoc0206 LL

C prod0306   400.000000   400.000000 -46857.59277  46857.59277 stoc0206 LL
BS   148        .000000   400.000000 -93715.18554 -93715.18554 stoc0306 LL

C prod0406      .000000      .000000     -.500000 -1.00000E+30 stoc0406 LL
LL   149        .000000      .000000      .500000      .500000 stoc0406 UL

C prod0506   300.000000   300.000000 -46857.59277  46857.59277 prod0406 LL
BS   150        .000000   300.000000 -46857.59277 -46857.59277 stoc0506 LL

C prod0606   550.000000   550.000000 -46857.59277  46857.59277 stoc0506 LL
BS   151        .000000   550.000000 -9.37152E+34 -9.37152E+34

C prod0107      .000000      .000000 -9.37152E+34  9.37152E+34
BS   152        .000000      .000000 -120490.9423 -120490.9423 sold0107 LL

C prod0207   250.000000   250.000000 -199144.7509  199144.7509 stoc0207 UL
BS   153        .000000   250.000000 -9.37152E+34 -9.37152E+34

C prod0307      .000000      .000000   -13.000000 -1.00000E+30 sold0307 LL
LL   154        .000000      .000000    13.000000    13.000000 sold0307 UL

C prod0407   100.000000   100.000000 -281145.5322  281145.5322 sold0407 UL
BS   155        .000000   100.000000 -46857.59277 -46857.59277 stoc0407 LL

C prod0507   100.000000   100.000000 -46857.59277  46857.59277 stoc0407 LL
BS   156        .000000   100.000000 -9.37152E+34 -9.37152E+34

C prod0607      .000000      .000000   -37.000000 -1.00000E+30 sold0603 UL
LL   157        .000000      .000000    37.000000    37.000000 prod0603 LL

C stoc0101      .000000      .000000    -4.660714 -1.00000E+30 stoc0103 UL
LL   158       -.500000      .000000     4.660714     4.160714 stoc0103 LL

C stoc0201   100.000000   100.000000     9.375000    -9.875000 sold0301 LL
UL   159       -.500000   100.000000    -9.375000  1.00000E+30 stoc0103 UL

C stoc0301      .000000      .000000   -10.500000 -1.00000E+30 sold0301 UL
LL   160       -.500000      .000000    10.500000    10.000000 sold0301 LL
```

```
C stoc0401      .000000      .000000     -.500000 -1.00000E+30 prod0401 LL
LL   161      -.500000      .000000      .500000      .000000 prod0501 LL

C stoc0501      .000000      .000000     -.500000 -1.00000E+30 prod0501 LL
LL   162      -.500000      .000000      .500000      .000000 prod0601 LL

C stoc0102      .000000      .000000    -6.500000 -1.00000E+30 sold0102 UL
LL   163      -.500000      .000000     6.500000     6.000000 prod0202 LL

C stoc0202   100.000000   100.000000     5.500000    -6.000000 sold0302 LL
UL   164      -.500000   100.000000    -5.500000  1.00000E+30 sold0302 UL

C stoc0302      .000000      .000000    -6.500000 -1.00000E+30 sold0302 UL
LL   165      -.500000      .000000     6.500000     6.000000 sold0302 LL

C stoc0402      .000000      .000000     -.500000 -1.00000E+30 prod0402 LL
LL   166      -.500000      .000000      .500000      .000000 prod0502 LL

C stoc0502      .000000      .000000     -.500000 -1.00000E+30 prod0502 LL
LL   167      -.500000      .000000      .500000      .000000 prod0602 LL

C stoc0103    82.500000    82.500000 -265526.3427  265525.8300 stoc0207 UL
BS   168      -.500000    82.500000 -46857.59277 -46858.09082 TIME0302 UL

C stoc0203      .000000      .000000    -1.000000 -1.00000E+30 stoc0103 LL
LL   169      -.500000      .000000     1.000000      .500000 prod0303 LL

C stoc0303      .000000      .000000     -.500000 -1.00000E+30 prod0303 LL
LL   170      -.500000      .000000      .500000      .000000 prod0403 LL

C stoc0403      .000000      .000000     -.500000 -1.00000E+30 prod0403 LL
LL   171      -.500000      .000000      .500000      .000000 prod0503 LL

C stoc0503   100.000000   100.000000     7.500000    -8.000000 sold0603 LL
UL   172      -.500000   100.000000    -7.500000  1.00000E+30 sold0603 UL

C stoc0104      .000000      .000000    -1.500000 -1.00000E+30 stoc0204 LL
LL   173      -.500000      .000000     1.500000     1.000000 stoc0204 UL

C stoc0204      .000000      .000000 -9.37152E+34  9.37152E+34
BS   174      -.500000      .000000 -93715.18554 -93715.68359 prod0204 LL

C stoc0304      .000000      .000000 -9.37152E+34  9.37152E+34
BS   175      -.500000      .000000 -93715.18554 -93715.68359 prod0204 LL

C stoc0404      .000000      .000000     -.500000 -1.00000E+30 prod0404 LL
LL   176      -.500000      .000000      .500000      .000000 prod0504 LL

C stoc0504      .000000      .000000     -.500000 -1.00000E+30 prod0504 LL
LL   177      -.500000      .000000      .500000      .000000 prod0604 LL

C stoc0105      .000000      .000000    -3.071429 -1.00000E+30 sold0102 UL
LL   178      -.500000      .000000     3.071429     2.571429 prod0205 LL

C stoc0205   100.000000   100.000000    10.500000   -11.000000 sold0305 LL
UL   179      -.500000   100.000000   -10.500000  1.00000E+30 sold0305 UL

C stoc0305      .000000      .000000   -11.500000 -1.00000E+30 sold0305 UL
LL   180      -.500000      .000000    11.500000    11.000000 sold0305 LL

C stoc0405      .000000      .000000     -.500000 -1.00000E+30 prod0405 LL
LL   181      -.500000      .000000      .500000      .000000 prod0505 LL

C stoc0505   100.000000   100.000000    10.500000   -11.000000 sold0605 LL
UL   182      -.500000   100.000000   -10.500000  1.00000E+30 sold0605 UL

C stoc0106      .000000      .000000    -2.214286 -1.00000E+30 prod0106 LL
LL   183      -.500000      .000000     2.214286     1.714286 prod0206 LL
```



```
C stoc0206      .000000      .000000     -.500000 -1.00000E+30 prod0206 LL
LL   184      -.500000      .000000      .500000      .000000 prod0306 LL

C stoc0306      .000000      .000000    -1.000000 -1.00000E+30 stoc0406 LL
LL   185      -.500000      .000000     1.000000      .500000 stoc0406 UL

C stoc0406      .000000      .000000 -9.37152E+34  9.37152E+34
BS   186      -.500000      .000000 -46857.59277 -46858.09082 prod0406 LL

C stoc0506      .000000      .000000     -.500000 -1.00000E+30 TIME0206 UL
LL   187      -.500000      .000000      .500000      .000000 TIME0205 UL

C stoc0107      .000000      .000000    -4.410714 -1.00000E+30 prod0107 LL
LL   188      -.500000      .000000     4.410714     3.910714 stoc0103 LL

C stoc0207   100.000000   100.000000     2.125000    -2.625000 sold0307 LL
UL   189      -.500000   100.000000    -2.125000  1.00000E+30 sold0307 UL

C stoc0307      .000000      .000000    -3.500000 -1.00000E+30 sold0307 UL
LL   190      -.500000      .000000     3.500000     3.000000 sold0307 LL

C stoc0407      .000000      .000000     -.500000 -1.00000E+30 prod0407 LL
LL   191      -.500000      .000000      .500000      .000000 prod0507 LL

C stoc0507   100.000000   100.000000     2.500000    -3.000000 sold0607 LL
UL   192      -.500000   100.000000    -2.500000  1.00000E+30 sold0607 UL

! Tabell facplan.sts. Startlager for hvert produkt p
!            produkter
0       ,0      ,0      ,0      ,0      ,0      ,0


!Tabell facplan.tim
!              produkter
0.5  ,  0.7 ,       ,          ,    0.3 ,  0.2 ,  0.5
0.1  ,  0.2 ,       ,   0.3 ,       ,    0.6 ,
0.2  ,      ,  0.8 ,          ,     ,       ,    0.6    !   maskiner
0.05 ,  0.03,        ,   0.07,    0.1 ,       ,    0.08
     ,     ,  0.01,            ,    0.05,            ,    0.05

! Tabell facplan.who
!  dager/periode, timer/skift ,  skift/dag
     24,            8,             2
*************************************************
*                                               *
*                                               *
*       Oppgave 7 i Williams                    *
*                                               *
*       Loest av:                               *
*       Nikolai S. Aasen(nsaa@stud.ntnu.no)     *
*                                               *
*       Foelgende filer kommer fortloepende:    *

        ov127.dim
        ov127.ind
        ov127.lst
        ov127.mat
        ov127.mod
        ov127.mou
        ov127.pqr
        ov127.prt
        ov127.qua
        ov127.roy
        ov127.ska
        ov127rest.ore
*                                               *
*                                               *
*************************************************
```

```
!
!filen ov127.dim for skalarene TMAX, IMAX og MMAX
!
!
!
        5,      &       ! max # aar
        4,      &       ! max # gruver i omraade
        3               ! max # gruver aapne i hvilket som helst aar
!
!
!
!
!
!
        XPRESS Modeller Log for problem: ov127
RESTORE
INPUT
!
! Problemet loese ved foielgende kall
! mp-model ov127
! >INPUT
! mp-opt ov127
! >INPUT
! >MAXIMIZE     finner kont.loesning
! >GLOBAL       finner heltallsloesning vha Branch & Bound algoritmen
! >FPRINT       Skriver ut loesningsfilen ov127.prt
! >PRINT        Skriver loesningen ut paa skjermen
! >QUIT
!
! Rapport
! kalles etter at mp-opt har maksimert
! mp-model ov127
! >RESTORE
! >INPUT
! >QUIT
!
!
! Beregner profitten for aa skrive den ut med print
!
ASSIGN

profitt = - SUM(i=1:IMAX, t=1:TMAX) RDIS(i,t)*open(i,t) + SUM(t=1:TMAX) IDISC(t)*quan(t)
!
!
PRINT
!
!   Gruve stenges hvis = 0, (tid oeker mot hoyre ->, og gruver nedover)
!
open
    1.000000,    1.000000,    1.000000,    1.000000,    1.000000
    1.000000,    1.000000,    1.000000,    1.000000,    1.000000
    1.000000,    1.000000,    1.000000,    1.000000,    1.000000
    1.000000,    1.000000,    1.000000,    1.000000,     .000000
!
!   Hver gruve skal produsere foelgende i mill tonn (gruve nr. ned, aar ->)
!
out
    2.000000,     .000000,    1.950000,     .125000,    2.000000
 4.44089E-16,    2.500000,     .000000,    2.500000,    2.166667
    1.300000,    1.300000,    1.300000,     .000000,    1.300000
    2.450000,    2.200000,     .000000,    3.000000,     .000000
!
!   Maximum profitt blir da (millioner pund £)
!
profitt
  146.861974
!
!
! Denne produksjonen medforer derfor at det hvert aar blir produsert
```



```
! foelgende mengder med riktig blandet mengde gruvemateriell(i millioner tonn)
!
quan
    5.750000
    6.000000
    3.250000
    5.625000
    5.466667
!
!
!




QUIT
NAME          OV127
ROWS
 N  MAXOBJ
 L  MAXO0101
 L  MAXO0102
 L  MAXO0103
 L  MAXO0104
 L  MAXO0105
 L  MAXO0201
 L  MAXO0202
 L  MAXO0203
 L  MAXO0204
 L  MAXO0205
 L  MAXO0301
 L  MAXO0302
 L  MAXO0303
 L  MAXO0304
 L  MAXO0305
 L  MAXO0401
 L  MAXO0402
 L  MAXO0403
 L  MAXO0404
 L  MAXO0405
 L  MAWORK01
 L  MAWORK02
 L  MAWORK03
 L  MAWORK04
 L  MAWORK05
 L  LUAR0101
 L  LUAR0102
 L  LUAR0103
 L  LUAR0104
 L  LUAR0105
 L  LUAR0201
 L  LUAR0202
 L  LUAR0203
 L  LUAR0204
 L  LUAR0205
 L  LUAR0301
 L  LUAR0302
 L  LUAR0303
 L  LUAR0304
 L  LUAR0305
 L  LUAR0401
 L  LUAR0402
 L  LUAR0403
 L  LUAR0404
 L  LUAR0405
 L  TID 0101
 L  TID 0102
 L  TID 0103
 L  TID 0104
```

```
 L  TID 0201
 L  TID 0202
 L  TID 0203
 L  TID 0204
 L  TID 0301
 L  TID 0302
 L  TID 0303
 L  TID 0304
 L  TID 0401
 L  TID 0402
 L  TID 0403
 L  TID 0404
 E  KVAL  01
 E  KVAL  02
 E  KVAL  03
 E  KVAL  04
 E  KVAL  05
 E  LIKV  01
 E  LIKV  02
 E  LIKV  03
 E  LIKV  04
 E  LIKV  05
COLUMNS
    work0101  MAXO0101     -2.000000   MAWORK01      1.000000
    work0101  LUAR0101      1.000000
    work0201  MAXO0201     -2.500000   MAWORK01      1.000000
    work0201  LUAR0201      1.000000
    work0301  MAXO0301     -1.300000   MAWORK01      1.000000
    work0301  LUAR0301      1.000000
    work0401  MAXO0401     -3.000000   MAWORK01      1.000000
    work0401  LUAR0401      1.000000
    work0102  MAXO0102     -2.000000   MAWORK02      1.000000
    work0102  LUAR0102      1.000000
    work0202  MAXO0202     -2.500000   MAWORK02      1.000000
    work0202  LUAR0202      1.000000
    work0302  MAXO0302     -1.300000   MAWORK02      1.000000
    work0302  LUAR0302      1.000000
    work0402  MAXO0402     -3.000000   MAWORK02      1.000000
    work0402  LUAR0402      1.000000
    work0103  MAXO0103     -2.000000   MAWORK03      1.000000
    work0103  LUAR0103      1.000000
    work0203  MAXO0203     -2.500000   MAWORK03      1.000000
    work0203  LUAR0203      1.000000
    work0303  MAXO0303     -1.300000   MAWORK03      1.000000
    work0303  LUAR0303      1.000000
    work0403  MAXO0403     -3.000000   MAWORK03      1.000000
    work0403  LUAR0403      1.000000
    work0104  MAXO0104     -2.000000   MAWORK04      1.000000
    work0104  LUAR0104      1.000000
    work0204  MAXO0204     -2.500000   MAWORK04      1.000000
    work0204  LUAR0204      1.000000
    work0304  MAXO0304     -1.300000   MAWORK04      1.000000
    work0304  LUAR0304      1.000000
    work0404  MAXO0404     -3.000000   MAWORK04      1.000000
    work0404  LUAR0404      1.000000
    work0105  MAXO0105     -2.000000   MAWORK05      1.000000
    work0105  LUAR0105      1.000000
    work0205  MAXO0205     -2.500000   MAWORK05      1.000000
    work0205  LUAR0205      1.000000
    work0305  MAXO0305     -1.300000   MAWORK05      1.000000
    work0305  LUAR0305      1.000000
    work0405  MAXO0405     -3.000000   MAWORK05      1.000000
    work0405  LUAR0405      1.000000
    open0101  MAXOBJ       -5.000000   LUAR0101     -1.000000
    open0101  TID 0101     -1.000000
    open0201  MAXOBJ       -4.000000   LUAR0201     -1.000000
    open0201  TID 0201     -1.000000
    open0301  MAXOBJ       -4.000000   LUAR0301     -1.000000
    open0301  TID 0301     -1.000000
```



```
    open0401  MAXOBJ       -5.000000   LUAR0401     -1.000000
    open0401  TID 0401     -1.000000
    open0102  MAXOBJ       -4.545455   LUAR0102     -1.000000
    open0102  TID 0101      1.000000   TID 0102     -1.000000
    open0202  MAXOBJ       -3.636364   LUAR0202     -1.000000
    open0202  TID 0201      1.000000   TID 0202     -1.000000
    open0302  MAXOBJ       -3.636364   LUAR0302     -1.000000
    open0302  TID 0301      1.000000   TID 0302     -1.000000
    open0402  MAXOBJ       -4.545455   LUAR0402     -1.000000
    open0402  TID 0401      1.000000   TID 0402     -1.000000
    open0103  MAXOBJ       -4.132231   LUAR0103     -1.000000
    open0103  TID 0102      1.000000   TID 0103     -1.000000
    open0203  MAXOBJ       -3.305785   LUAR0203     -1.000000
    open0203  TID 0202      1.000000   TID 0203     -1.000000
    open0303  MAXOBJ       -3.305785   LUAR0303     -1.000000
    open0303  TID 0302      1.000000   TID 0303     -1.000000
    open0403  MAXOBJ       -4.132231   LUAR0403     -1.000000
    open0403  TID 0402      1.000000   TID 0403     -1.000000
    open0104  MAXOBJ       -3.756574   LUAR0104     -1.000000
    open0104  TID 0103      1.000000   TID 0104     -1.000000
    open0204  MAXOBJ       -3.005259   LUAR0204     -1.000000
    open0204  TID 0203      1.000000   TID 0204     -1.000000
    open0304  MAXOBJ       -3.005259   LUAR0304     -1.000000
    open0304  TID 0303      1.000000   TID 0304     -1.000000
    open0404  MAXOBJ       -3.756574   LUAR0404     -1.000000
    open0404  TID 0403      1.000000   TID 0404     -1.000000
    open0105  MAXOBJ       -3.415067   LUAR0105     -1.000000
    open0105  TID 0104      1.000000
    open0205  MAXOBJ       -2.732054   LUAR0205     -1.000000
    open0205  TID 0204      1.000000
    open0305  MAXOBJ       -2.732054   LUAR0305     -1.000000
    open0305  TID 0304      1.000000
    open0405  MAXOBJ       -3.415067   LUAR0405     -1.000000
    open0405  TID 0404      1.000000
    out 0101  MAXO0101      1.000000   KVAL  01      1.000000
    out 0101  LIKV  01      1.000000
    out 0201  MAXO0201      1.000000   KVAL  01       .700000
    out 0201  LIKV  01      1.000000
    out 0301  MAXO0301      1.000000   KVAL  01      1.500000
    out 0301  LIKV  01      1.000000
    out 0401  MAXO0401      1.000000   KVAL  01       .500000
    out 0401  LIKV  01      1.000000
    out 0102  MAXO0102      1.000000   KVAL  02      1.000000
    out 0102  LIKV  02      1.000000
    out 0202  MAXO0202      1.000000   KVAL  02       .700000
    out 0202  LIKV  02      1.000000
    out 0302  MAXO0302      1.000000   KVAL  02      1.500000
    out 0302  LIKV  02      1.000000
    out 0402  MAXO0402      1.000000   KVAL  02       .500000
    out 0402  LIKV  02      1.000000
    out 0103  MAXO0103      1.000000   KVAL  03      1.000000
    out 0103  LIKV  03      1.000000
    out 0203  MAXO0203      1.000000   KVAL  03       .700000
    out 0203  LIKV  03      1.000000
    out 0303  MAXO0303      1.000000   KVAL  03      1.500000
    out 0303  LIKV  03      1.000000
    out 0403  MAXO0403      1.000000   KVAL  03       .500000
    out 0403  LIKV  03      1.000000
    out 0104  MAXO0104      1.000000   KVAL  04      1.000000
    out 0104  LIKV  04      1.000000
    out 0204  MAXO0204      1.000000   KVAL  04       .700000
    out 0204  LIKV  04      1.000000
    out 0304  MAXO0304      1.000000   KVAL  04      1.500000
    out 0304  LIKV  04      1.000000
    out 0404  MAXO0404      1.000000   KVAL  04       .500000
    out 0404  LIKV  04      1.000000
    out 0105  MAXO0105      1.000000   KVAL  05      1.000000
    out 0105  LIKV  05      1.000000
    out 0205  MAXO0205      1.000000   KVAL  05       .700000
```

```
    out 0205  LIKV  05      1.000000
    out 0305  MAXO0305      1.000000   KVAL  05      1.500000
    out 0305  LIKV  05      1.000000
    out 0405  MAXO0405      1.000000   KVAL  05       .500000
    out 0405  LIKV  05      1.000000
    quan  01  MAXOBJ       10.000000   KVAL  01      -.900000
    quan  01  LIKV  01     -1.000000
    quan  02  MAXOBJ        9.090909   KVAL  02      -.800000
    quan  02  LIKV  02     -1.000000
    quan  03  MAXOBJ        8.264463   KVAL  03     -1.200000
    quan  03  LIKV  03     -1.000000
    quan  04  MAXOBJ        7.513148   KVAL  04      -.600000
    quan  04  LIKV  04     -1.000000
    quan  05  MAXOBJ        6.830135   KVAL  05     -1.000000
    quan  05  LIKV  05     -1.000000
RHS
    RHS00001  MAWORK01      3.000000   MAWORK02      3.000000
    RHS00001  MAWORK03      3.000000   MAWORK04      3.000000
    RHS00001  MAWORK05      3.000000
BOUNDS
 BV BOUND001  work0101
 BV BOUND001  work0201
 BV BOUND001  work0301
 BV BOUND001  work0401
 BV BOUND001  work0102
 BV BOUND001  work0202
 BV BOUND001  work0302
 BV BOUND001  work0402
 BV BOUND001  work0103
 BV BOUND001  work0203
 BV BOUND001  work0303
 BV BOUND001  work0403
 BV BOUND001  work0104
 BV BOUND001  work0204
 BV BOUND001  work0304
 BV BOUND001  work0404
 BV BOUND001  work0105
 BV BOUND001  work0205
 BV BOUND001  work0305
 BV BOUND001  work0405
 BV BOUND001  open0101
 BV BOUND001  open0201
 BV BOUND001  open0301
 BV BOUND001  open0401
 BV BOUND001  open0102
 BV BOUND001  open0202
 BV BOUND001  open0302
 BV BOUND001  open0402
 BV BOUND001  open0103
 BV BOUND001  open0203
 BV BOUND001  open0303
 BV BOUND001  open0403
 BV BOUND001  open0104
 BV BOUND001  open0204
 BV BOUND001  open0304
 BV BOUND001  open0404
 BV BOUND001  open0105
 BV BOUND001  open0205
 BV BOUND001  open0305
 BV BOUND001  open0405
ENDATA
!
! Fil ov127.mod
!
!
!
!      gir modellen et navn
!
MODEL OV127
```



```
!
!
!
!
!
!
TABLES
!
        DIMM(3)         ! dimension or max # indeks
        SKAL(2)         ! Skalardata
!
!
DISKDATA
!
        DIMM = ov127.dim
        SKAL = ov127.ska
!
!
LET TMAX = DIMM(1)      ! max # aar
LET IMAX = DIMM(2)      ! max # miner (=4 i denne oppgaven)
LET MMAX = DIMM(3)      ! max # miner (=3        ""       )
!
LET DISK = SKAL(1)      ! diskonteringsrate (=10%   ""    )
LET INCO = SKAL(2)      ! salgspris (10 £ pund   ""       )
!
TABLES
!
MOUT(IMAX)              ! max output fra gruve i
!
QUAL(IMAX)              ! kvalitet paa aare fra gruve i
!
PQREQ(TMAX)             ! Kvalitet krevet i aar t
!
ROY(IMAX)               ! betalt royalitet for aa holde gruve i aapen
!
!beregnes under assign
!
RDIS(IMAX,TMAX)         ! Royalitet ROY diskontert med diskonteringsfaktor DISK
!
IDISC(TMAX)             ! Inntekt INCO diskontert med diskonteringsfaktor DISK
!
!
! Leser tabell fra fil
!
DISKDATA
!
        MOUT(1) = ov127.mou
!
        QUAL(1) = ov127.qua
!
        PQREQ(1)= ov127.pqr
!
        ROY(1)  = ov127.roy
!
!
ASSIGN
!
RDIS(i=1:IMAX, t=1:TMAX) = disc(DISK, t)*ROY(i)        ! diskontert royalities
!
IDISC(t=1:TMAX) = disc(DISK, t)*INCO                   ! diskontert inntekt
!
!
!
!
!
VARIABLES
!
!
!
```

```
work(i=1:IMAX, t=1:TMAX)        ! =1 hvis gruve i arbeides i aar t, 0 ellers
!
open(i=1:IMAX, t=1:TMAX)        ! =1 hvis gruve i aapen i aar t, 0 ellers
!
out(i=1:IMAX, t=1:TMAX)         ! Hvor mye som produseres i aar t fra gruve i
!
quan(t=1:TMAX)                  ! produsert blandet aare pr. aar
!
!
!
!
!
CONSTRAINTS
!
! Total profitt er inntektene(diskontert) fra aa selge blandete aarematerialet
! minus de diskonterte royalitetene fra de aapne gruvene
MAXOBJ:                                                 &
        - SUM(i=1:IMAX, t=1:TMAX) RDIS(i,t)*open(i,t)   &
        + SUM(t=1:TMAX) IDISC(t)*quan(t)                $
!
!
!
! Hvis det ikke arbeides i gruve(i) i aar t ,
! kan det ikke prod noe dette aaret
!
MAXO(i=1:IMAX, t=1:TMAX):                               &
        out(i,t) - MOUT(i)*work(i,t) < 0
!
!
!Hvor mange gruver kan vaere aapne samtidig
!
MAWORK(t=1:TMAX):                                       &
        SUM(i=1:IMAX) work(i,t) < MMAX
!
!
! Er gruven LUkket, kan man heller ikke ARbeide i den
!
LUAR(i=1:IMAX, t=1:TMAX):                               &
        work(i,t) - open(i,t) < 0
!
!
! Stenges gruven, tvinger denne restriksjonen gruven aa forbli
! stengt permanent
!
TID(i=1:IMAX, t=1:(TMAX-1)):                            &
        open(i,t+1)-open(i,t) < 0
!
!
! Hver mines kvalitet blandet ut skal vaere lik
! etterspurt blandeforhold
!
KVAL(t=1:TMAX):                                         &
        SUM(i=1:IMAX) QUAL(i)*out(i,t)                  &
        - PQREQ(t)*quan(t) = 0
!
!
! Ant tonn produsert i gruve pr aar er lik quan
!
LIKV(t=1:TMAX):                                         &
        SUM(i=1:IMAX)out(i,t)-quan(t) = 0
!
!
!
!
!
BOUNDS
!
!Om det skal arbeides eller ei i gruven er en binaervar
!
```



```
 work(i=1:IMAX, t=1:TMAX) .BV.
!
!
!
!Om gruven skalapnes eller ei, er en binaervar
!
 open(i=1:IMAX, t=1:TMAX) .BV.
!
!
GENERATE
!
! Problemet loese ved foielgende kall
! mp-model ov127
! >INPUT
! mp-opt ov127
! >INPUT
! >MAXIMIZE     finner kont.loesning
! >GLOBAL       finner heltallsloesning vha Branch & Bound algoritmen
! >FPRINT       Skriver ut loesningsfilen ov127.prt
! >PRINT        Skriver loesningen ut paa skjermen
! >QUIT
!
! Rapport
! kalles etter at mp-opt har maksimert
! mp-model ov127
! >RESTORE
! >INPUT
! >QUIT
!
!
! Beregner profitten for aa skrive den ut med print
!
ASSIGN

profitt = - SUM(i=1:IMAX, t=1:TMAX) RDIS(i,t)*open(i,t) + SUM(t=1:TMAX) IDISC(t)*quan(t)
!
!
PRINT
!
!   Gruve stenges hvis = 0, (tid oeker mot hoyre ->, og gruver nedover)
!
open
!
!   Hver gruve skal produsere foelgende i mill tonn (gruve nr. ned, aar ->)
!
out
!
!   Maximum profitt blir da (millioner pund £)
!
profitt
!
!
! Denne produksjonen medforer derfor at det hvert aar blir produsert
! foelgende mengder med riktig blandet mengde gruvemateriell(i millioner tonn)
!
quan
!
!
!




!
! filen ov127.mou for konstant MOUT(i)
!
! Max output fra hver mine i 10^6 tonn
!
```

```
!
!
        2       ,&      ! Gruve 1
        2.5     ,&      ! Gruve 2
        1.3     ,&      ! Gruve 3
        3               ! Gruve 4

!
! filen ov127.pqr for konstantene PQREQ(t)
!
! Kvalitet krevet paa ferdigblandet masse for aar i
!
!
!
        0.9     ,&      ! aar 1
        0.8     ,&      ! aar 2
        1.2     ,&      ! aar 3
        0.6     ,&      ! aar 4
        1.0             ! aar 5

!
Problem Statistics
Matrix OV127
Objective MAXOBJ
RHS RHS00001
Problem has     72 rows and     65 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after      1 iterations
Objective function value is   146.861977


Rows Section
   Number     Row     At      Value      Slack Value   Dual Value        RHS
 N      1  MAXOBJ     BS    146.861977   -146.861977      .000000       .000000
 L      2  MAXO0101   UL       .000000       .000000     9.895833       .000000
 L      3  MAXO0102   UL       .000000       .000000    15.151515       .000000
 L      4  MAXO0103   UL      -.050000       .050000     4.958678       .000000
 L      5  MAXO0104   BS     -1.875000      1.875000      .000000       .000000
 L      6  MAXO0105   UL       .000000       .000000     6.830135       .000000
 L      7  MAXO0201   UL       .000000       .000000    10.208333       .000000
 L      8  MAXO0202   UL       .000000       .000000     6.060606       .000000
 L      9  MAXO0203   BS     -2.500000      2.500000      .000000       .000000
 L     10  MAXO0204   UL       .000000       .000000     5.634861       .000000
 L     11  MAXO0205   UL      -.333333       .333333     1.260948       .000000
 L     12  MAXO0301   UL       .000000       .000000     9.375000       .000000
 L     13  MAXO0302   UL       .000000       .000000    30.303030       .000000
 L     14  MAXO0303   UL       .000000       .000000    13.223141       .000000
 L     15  MAXO0304   BS       .000000       .000000      .000000       .000000
 L     16  MAXO0305   UL       .000000       .000000    16.112113       .000000
 L     17  MAXO0401   UL      -.550000       .550000    10.416667       .000000
 L     18  MAXO0402   BS      -.800000       .800000      .000000       .000000
 L     19  MAXO0403   BS       .000000       .000000      .000000       .000000
 L     20  MAXO0404   UL       .000000       .000000     9.391435       .000000
 L     21  MAXO0405   BS       .000000       .000000      .000000       .000000
 L     22  MAWORK01   UL      3.000000       .000000    25.520833      3.000000
 L     23  MAWORK02   UL      3.000000       .000000    30.303030      3.000000
 L     24  MAWORK03   BS      3.000000       .000000      .000000      3.000000
 L     25  MAWORK04   UL      3.000000       .000000      .000000      3.000000
 L     26  MAWORK05   BS      3.000000       .000000      .000000      3.000000
 L     27  LUAR0101   BS       .000000       .000000      .000000       .000000
 L     28  LUAR0102   BS     -1.000000      1.000000      .000000       .000000
 L     29  LUAR0103   UL       .000000       .000000     9.669422       .000000
 L     30  LUAR0104   BS       .000000       .000000      .000000       .000000
 L     31  LUAR0105   UL       .000000       .000000    13.660270       .000000
 L     32  LUAR0201   BS     -1.000000      1.000000      .000000       .000000
 L     33  LUAR0202   BS       .000000       .000000      .000000       .000000
 L     34  LUAR0203   UL       .000000       .000000      .000000       .000000
```



```
 L     35  LUAR0204  UL       .000000       .000000     14.087152       .000000
 L     36  LUAR0205  UL       .000000       .000000      2.732054       .000000
 L     37  LUAR0301  BS       .000000       .000000       .000000       .000000
 L     38  LUAR0302  BS       .000000       .000000       .000000       .000000
 L     39  LUAR0303  UL       .000000       .000000     17.190083       .000000
 L     40  LUAR0304  BS     -1.000000      1.000000       .000000       .000000
 L     41  LUAR0305  UL       .000000       .000000     20.945747       .000000
 L     42  LUAR0401  BS       .000000       .000000       .000000       .000000
 L     43  LUAR0402  BS       .000000       .000000       .000000       .000000
 L     44  LUAR0403  BS     -1.000000      1.000000       .000000       .000000
 L     45  LUAR0404  UL       .000000       .000000     28.174305       .000000
 L     46  LUAR0405  BS       .000000       .000000       .000000       .000000
 L     47  TID 0101  UL       .000000       .000000      5.000000       .000000
 L     48  TID 0102  UL       .000000       .000000      9.545455       .000000
 L     49  TID 0103  UL       .000000       .000000      4.008264       .000000
 L     50  TID 0104  UL       .000000       .000000      7.764838       .000000
 L     51  TID 0201  UL       .000000       .000000      4.000000       .000000
 L     52  TID 0202  UL       .000000       .000000      7.636364       .000000
 L     53  TID 0203  UL       .000000       .000000     10.942149       .000000
 L     54  TID 0204  BS       .000000       .000000       .000000       .000000
 L     55  TID 0301  UL       .000000       .000000     10.247934       .000000
 L     56  TID 0302  UL       .000000       .000000     13.884298       .000000
 L     57  TID 0303  BS       .000000       .000000       .000000       .000000
 L     58  TID 0304  UL       .000000       .000000     18.213693       .000000
 L     59  TID 0401  UL       .000000       .000000     15.740045       .000000
 L     60  TID 0402  UL       .000000       .000000     20.285500       .000000
 L     61  TID 0403  UL       .000000       .000000     24.417731       .000000
 L     62  TID 0404  BS     -1.000000      1.000000       .000000       .000000
 E     63  KVAL  01  EQ       .000000       .000000      1.041667       .000000
 E     64  KVAL  02  EQ       .000000       .000000    -30.303030       .000000
 E     65  KVAL  03  EQ       .000000       .000000    -16.528926       .000000
 E     66  KVAL  04  EQ       .000000       .000000     18.782870       .000000
 E     67  KVAL  05  EQ       .000000       .000000    -18.563957       .000000
 E     68  LIKV  01  EQ       .000000       .000000    -10.937500       .000000
 E     69  LIKV  02  EQ       .000000       .000000     15.151515       .000000
 E     70  LIKV  03  EQ       .000000       .000000     11.570248       .000000
 E     71  LIKV  04  EQ       .000000       .000000    -18.782870       .000000
 E     72  LIKV  05  EQ       .000000       .000000     11.733822       .000000

Columns Section
   Number   Column   At      Value      Input Cost   Reduced Cost
 C     73  work0101  LL      1.000000       .000000      5.729167
 C     74  work0201  BS       .000000       .000000       .000000
 C     75  work0301  LL      1.000000       .000000     13.333333
 C     76  work0401  BS      1.000000       .000000     -5.729167
 C     77  work0102  BS       .000000       .000000       .000000
 C     78  work0202  LL      1.000000       .000000     15.151515
 C     79  work0302  LL      1.000000       .000000     -9.090909
 C     80  work0402  LL      1.000000       .000000     30.303030
 C     81  work0103  BS      1.000000       .000000      -.247934
 C     82  work0203  BS      1.000000       .000000       .000000
 C     83  work0303  BS      1.000000       .000000       .000000
 C     84  work0403  LL       .000000       .000000       .000000
 C     85  work0104  BS      1.000000       .000000       .000000
 C     86  work0204  BS      1.000000       .000000       .000000
 C     87  work0304  LL       .000000       .000000       .000000
 C     88  work0404  BS      1.000000       .000000       .000000
 C     89  work0105  BS      1.000000       .000000       .000000
 C     90  work0205  BS      1.000000       .000000      -.420316
 C     91  work0305  BS      1.000000       .000000       .000000
 C     92  work0405  LL       .000000       .000000       .000000
 C     93  open0101  BS      1.000000     -5.000000       .000000
 C     94  open0201  BS      1.000000     -4.000000       .000000
 C     95  open0301  UL      1.000000     -4.000000     -6.247934
 C     96  open0401  UL      1.000000     -5.000000    -10.740045
 C     97  open0102  BS      1.000000     -4.545455       .000000
 C     98  open0202  BS      1.000000     -3.636364       .000000
 C     99  open0302  BS      1.000000     -3.636364       .000000
 C    100  open0402  BS      1.000000     -4.545455       .000000
```

```
 C    101  open0103  BS      1.000000     -4.132231       .000000
 C    102  open0203  BS      1.000000     -3.305785       .000000
 C    103  open0303  BS      1.000000     -3.305785       .000000
 C    104  open0403  BS      1.000000     -4.132231       .000000
 C    105  open0104  BS      1.000000     -3.756574       .000000
 C    106  open0204  UL      1.000000     -3.005259      -.139744
 C    107  open0304  UL      1.000000     -3.005259    -15.208434
 C    108  open0404  BS      1.000000     -3.756574       .000000
 C    109  open0105  UL      1.000000     -3.415067     -2.480365
 C    110  open0205  BS      1.000000     -2.732054       .000000
 C    111  open0305  BS      1.000000     -2.732054       .000000
 C    112  open0405  LL       .000000     -3.415067      3.415067
 C    113  out 0101  BS      2.000000       .000000       .000000
 C    114  out 0201  BS       .000000       .000000       .000000
 C    115  out 0301  BS      1.300000       .000000       .000000
 C    116  out 0401  BS      2.450000       .000000       .000000
 C    117  out 0102  BS       .000000       .000000       .000000
 C    118  out 0202  BS      2.500000       .000000       .000000
 C    119  out 0302  BS      1.300000       .000000       .000000
 C    120  out 0402  BS      2.200000       .000000       .000000
 C    121  out 0103  BS      1.950000       .000000       .000000
 C    122  out 0203  BS       .000000       .000000       .000000
 C    123  out 0303  BS      1.300000       .000000       .000000
 C    124  out 0403  LL       .000000       .000000      3.305785
 C    125  out 0104  BS       .125000       .000000       .000000
 C    126  out 0204  BS      2.500000       .000000       .000000
 C    127  out 0304  LL       .000000       .000000      9.391435
 C    128  out 0404  BS      3.000000       .000000       .000000
 C    129  out 0105  BS      2.000000       .000000       .000000
 C    130  out 0205  BS      2.166667       .000000       .000000
 C    131  out 0305  BS      1.300000       .000000       .000000
 C    132  out 0405  LL       .000000       .000000      2.451843
 C    133  quan  01  BS      5.750000     10.000000       .000000
 C    134  quan  02  BS      6.000000      9.090909       .000000
 C    135  quan  03  BS      3.250000      8.264463       .000000
 C    136  quan  04  BS      5.625000      7.513148       .000000
 C    137  quan  05  BS      5.466667      6.830135       .000000
!
! filen ov127.qua for konstantene QUAL(i)
!
! kvalitet paa aare fra mine i
!
!
!
        1       ,&      ! Gruve 1
        0.7     ,&      ! Gruve 2
        1.5     ,&      ! Gruve 3
        0.5             ! Gruve 4
!!
! filen ov127.roy for Konstantene ROY(i)
!
! betalt royalitet for aa holde mine i aapen
!
!
!
        5       ,&      ! Gruve 1
        4       ,&      ! Gruve 2
        4       ,&      ! Gruve 3
        5               ! Gruve 4
!!
!filen ov127.ska for skalarene DISK og INCO
!
!
!
        0.10    ,&      ! diskonteringsrate i
        10              ! salgspris i  pund £
!
>GLOBAL
Branch Parent   Solution     Estimate  Infeas Active Entity    Value/Bound
```



```
     1     0   159.159004   129.953205     16      1      7       .432320U
     2     1   142.756554   132.459936      6      2      3       .757576L
     3     2   142.063913   126.620452      6      3      1       .657143L
     4     3   142.063913   127.845800      6      4      4       .685714L
     5     4   138.135341   137.396044      4      5     18       .866667L
     6     5   137.771068   137.765651      2      6      8       .166667U
     7     6   126.462158   125.133460      8      7     17       .975000L
     8     6   137.771068   137.769818      1      7     13       .062500U
     9     8   137.249321   137.248338      1      8     15       .042735U
 *** Solution found ***      Time:     0
    10     8   137.771068   137.771068      0      8
    11     9                 relaxation exceeds cutoff
    12     7   126.462158    relaxation exceeds cutoff
    13     9   137.249313    relaxation exceeds cutoff
    14     5                 relaxation exceeds cutoff
    15     1   157.571089   137.512854     15      4      4       .249747U
    16    15   145.375382   135.553069     12      5      8       .815385L
    17    16   145.375382   127.801431     12      6      6       .630769L
    18    17   139.780977   137.710302     10      7     18       .866667L
    19    18   139.416703   138.079910      8      8     17       .975000L
    20    19   139.361977   139.351880      2      9      3       .384615U
    21    20                 relaxation exceeds cutoff
    22    20   139.361977   139.360727      1      9     13       .062500U
    23    22   138.840230   138.839247      1     10     15       .042735U
 *** Solution found ***      Time:     0
    24    22   139.361977   139.361977      0     10
    25    23                 relaxation exceeds cutoff
    26    23   138.840225    relaxation exceeds cutoff
    27    18                 relaxation exceeds cutoff
    28    15   152.875382   143.061915     11      7      8       .815385L
    29    28   152.875382   135.310277     11      8      6       .630769L
    30    29   147.280977   145.219149      9      9     18       .866667L
    31    30   146.916703   145.588756      7     10     17       .975000L
    32    31   146.861977   146.860727      1     11     13       .062500U
    33    32   146.340230   146.339247      1     12     15       .042735U
 *** Solution found ***      Time:     0
    34    32   146.861977   146.861977      0     12
    35    33                 relaxation exceeds cutoff
    36     2   142.756546    relaxation exceeds cutoff
    37     3   142.063919    relaxation exceeds cutoff
    38     4   142.063919    relaxation exceeds cutoff
    39    16   145.375381    relaxation exceeds cutoff
    40    19   139.416702    relaxation exceeds cutoff
    41    17   145.375381    relaxation exceeds cutoff
    42    33   146.340225    relaxation exceeds cutoff
    43    30                 relaxation exceeds cutoff
    44    31                 relaxation exceeds cutoff
    45    28                 relaxation exceeds cutoff
    46    29                 relaxation exceeds cutoff
 *** Search completed ***    Time:     0

Foelgende filer er generert og skrevet:

sol.foa.unit.no% ls
#ov127rest.ore#  ov127.mat        ov127.prt        ov127.sol
ov127.dim        ov127.mod        ov127.qua        ov127.svm
ov127.ind        ov127.mou        ov127.roy        ov127rest.ore
ov127.lst        ov127.pqr        ov127.ska        ov127samle.ps
sol.foa.unit.no%

For aa generer denne postscriptfilen skrev jeg:

sol.foa.unit.no% a2ps -nP -8 -c ov127.dim ov127.ska ov127.mou ov127.qua ov127.pqr ov127.
roy ov127.mod ov127.lst ov127.prt ov127rest.ore > ov127samle.ps

sol.foa.unit.no%lp ov127samle.ps
*************************************************
*                                               *
*                                               *
```

```
*       Oppgave 8 i Williams                     *
*                                                *
*       Loest av:                                *
*       Trond Ma (trondma@imm.ntnu.no)           *
*                                                *
*       Foelgende filer kommer fortloepende:     *

        plan.ant
        plan.beh
        plan.dat
        plan.dim
        plan.mab
        plan.mod
        plan.pro
        plan.tid
        plan.val
        plan.ved
        plan3.lst
        plan3.prt
        plan3.rrt
        plan4.lst
        plan4.prt
        plan4.rrt

*                                                *
*                                                *
**************************************************

!       plan.ant
!
!       Antall maskiner av maskintype t
!
!       maskintype t
!       Her:    1: grinder
!               2: vert.drill
!               3: horiz drill
!               4: boer
!               5: planer
!
!
!       ANTMA(TMAX)
!       t=1  t=2  t=3  t=4 t=5
        4,   2,   3,   1,   1
!       plan.beh
!
!       BEH(NMAX,2) Oensket lagerbeholdning av produkt p i tidsperiode m
!
!       produkt.....
!       p    tidsperiode
             ! m
!        0,  1
        50,  6
!       plan.dat
!
!       Maksimal lagerkapasitet Lagerkostnad [NOK/time]    Prod.timer pr. mnd
!       MLKAP                   KLAG                       TPRM
        100,                    0.5,                       384

!       plan.dim
!
!       Max        Max          Max            Modell           Max
!       produkter  maskintyper  tidsperioder   12.3 (=1)        lagerkrav
!                                              & 12.4(=0)
!       PMAX       TMAX         MMAX           MOD              NMAX
        7,         5,           6,             0,               1

!       plan.mab
!
!       MABE(MMAX,PMAX) Markedsrestrisjoner for produkt p i tidsperiode m
```



```
!
!       produkt.....
!       p=1  p=2  p=3  p=4   p=5   p=6  p=7
                                             ! periode
        500, 1000,300, 300,  800,  200, 100     ! m=1
        600, 500, 200, 0.0,  400,  300, 150     ! m=2
        300, 600, 0.0, 0.0,  500,  400, 100     ! m=3
        200, 300, 400, 500,  200,  0.0, 100     ! m=4
        0.0, 100, 500, 100,  1000, 300, 0.0     ! m=5
        500, 500, 100, 300,  1100, 500,  60     ! m=6
! File plan.mod
!
! Obligatorisk dataoeving i fag 92033 Operasjonsanalyse 2
!
! Levert av Trond M. Andersen, fak. for marinteknikk
!
! *******************************************************
!
! Alle filer forbundet med denne oevingen er paa formen plan.*
!
! *******************************************************
!
MODEL PLAN
!
!
TABLES
!
DIMM(5)          ! Inneholder maksverdier for de tre indeksene samt angivelse
!                  av hvilke modell (12.3 & 12.4) som skal kjoeres
DATA(3)          ! Tabell som inneholder skalare data
!
!
DISKDATA
!
 DIMM(1) = plan.dim
 DATA(1) = plan.dat
!
! Setter nye navn paa maks-verdiene til indeksene
!
LET PMAX  = DIMM(1)     ! Maksimalt antall produkter p [-]
LET TMAX  = DIMM(2)     ! Maksimalt antall maskintyper t [-]
LET MMAX  = DIMM(3)     ! Maksimalt antall tidsperioder (mnd.) m [-]
LET MOD   = DIMM(4)     ! Kjoere modell 12.3 (MOD=1) ellers modell 12.4
LET NMAX  = DIMM(5)     ! Max antall spesifikke lagerkrav
LET MLKAP = DATA(1)     ! Maksimal lagerkapasitet for alle produkttype [-]
LET KLAG  = DATA(2)     ! Lagerkost. pr. enhet for alle produkttyp. [NOK/time]
LET TPRM  = DATA(3)     ! Timer produksjon per periode (mnd.) [timer/mnd.]
!
! Definerer tabeller for data som er indeksspesifiserte
!
! **************************************************************************
!
!  MOD = 1 dersom man oensker aa kjoere modell 12.3
!  MOD = 0 dersom man oensker aa kjoere modell 12.4
!
! **************************************************************************
!
TABLES
!
! Data som leses direkte fra andre filer
!
 PRO(PMAX)          ! Profitt ved aa produsere en enhet av produkt type p
                    ! = diff. mellom salgsinntekt og raavarekostad [NOK/enhet]
!
 TID(TMAX,PMAX)     ! Prosesseringstid for maskin t ved prosessering
                    ! av produkt p [timer]
!
 VED(MMAX,TMAX)     ! Antall maskiner av typen t nede for vedlikehold i
                    ! periode (mnd.) m [-]
```

```
!
 ANTMA(TMAX)      ! Antall maskiner av maskintype t
!
 MABE(MMAX,PMAX)  ! Markedsrestriksjoner for produkt p i tidsperiode m [-]
!
 BEH(NMAX,2)      ! Oensket lagerbeholdning av produkt p i tidsperiodene m [-]
!
! Leser inn verdier til tabellene
!
DISKDATA
!
 PRO(1)          = plan.pro
 TID(1,1)        = plan.tid
 VED(1,1)        = plan.ved
 ANTMA(1)        = plan.ant
 MABE(1,1)       = plan.mab
 BEH(1,1)        = plan.beh
!
!
! ***************************************************************************
!
! Definerer variable
!
VARIABLES
!
skvant(m=1:MMAX,p=1:PMAX)        ! Solgt kvantum av produkt p i peridoe m
!
lkvant(m=1:MMAX,p=1:PMAX)        ! Lagret kvantum av produkt p i periode m
!
pkvant(m=1:PMAX,p=1:PMAX)        ! Produsert kvantum av produkt p i perioden m
!
mvedl(m=1:MMAX,t=1:TMAX)         ! Antall maskiner av typen t nede for
                                 ! vedlikehold i perioden m
! ***************************************************************************
CONSTRAINTS
!
! Objektfunksjonen: maks. profitt, dvs. maks av produksjon*nettoverdi
! minus lagringskostnader
!
 MAXOBJ:                                                               &
 SUM(m=1:MMAX,p=1:PMAX) PRO(p) * skvant(m,p) -                         &
 SUM(m=1:MMAX,p=1:PMAX) KLAG * lkvant(m,p)                             $
!
! "Massebalanse": for hvert produkt p over hver periode p gjelder
! lagr.mengde(m-1,p) + prod.mengde(m,p) = solgt mengde(m,p) + lagr.mengde(m,p)
! Dette gjelder for alle perioder untatt en bestemt, hvor man skal tilfredst.
! en viss lagringsmengde, og den foerste, hvor lageret er tomt
!
 MAB0(p=1:PMAX):                                                     &
 pkvant(1,p) - skvant(1,p) - lkvant(1,p) = 0
!
 MABAL(p=1:PMAX,m=2:MMAX):                                             &
 lkvant(m-1,p) + pkvant(m,p) - skvant(m,p) - lkvant(m,p) = 0
!
! Prosesseringstid: det er ikke mer tilgjengelig prosesseringstid for hver
! maskintype t i tidsperioden m enn ant.maskiner i produksjon, (dvs. maks
! antall minus maskiner til vedlikehold) multiplisert med tidsforbruk
! for hver individuell maskin. Restriksjonen deles inn i tre deler hvor (1)
! gjelder for problem 12.3, og (2)/(3) for problem 12.4
!
! (1)
 PROSTID(t=1:TMAX,m=1:MMAX | MOD.eq.1):                                           &

 SUM(p=1:PMAX) TID(t,p) * pkvant(m,p)   <                              &
 TPRM*(ANTMA(t) - VED(m,t))
!
! (2)
 PROTID(t=1:TMAX,m=1:MMAX | MOD.eq.0):                                           &
```



```
 SUM(p=1:PMAX) TID(t,p) * pkvant(m,p)   <                                          &
 TPRM*ANTMA(t) - TPRM*mvedl(m,t)
!
! (3a): maskin 1
 MASK1( | MOD.eq.0):                                                               &
 SUM(m=1:MMAX) mvedl(m,1) = 2
! (3b): maskin 2-5
 MASK15(t=2:TMAX | MOD.eq.0):                                                      &
 SUM(m=1:MMAX) mvedl(m,t) = ANTMA(t)
!
! Paatvungen lagringsmengde ved periode m:
 TVUNGETL(n=1:NMAX,p=1:PMAX):                                                      &
 lkvant(BEH(n,2),p) = BEH(n,1)
!
!
! ***************************************************************************
BOUNDS
!
! Maksimal lagringsmengde for produkt p uansett periode m:
!
 lkvant(m=1:MMAX,p=1:PMAX) < MLKAP
!
! Markedsrestriksjoner: kan ikke selge mer av produkt p i periode m enn
! det markedet er villig til aa kjoepe:
!
 skvant(m=1:MMAX,p=1:PMAX) < MABE(m,p)
!
 mvedl(m=1:MMAX,t=1:2 | MOD .eq. 0) .UI. 2                                           &
!
 mvedl(m=1:MMAX,3 | MOD .eq. 0) .UI. 3                                             &
!
 mvedl(m=1:MMAX,t=4:TMAX | MOD .eq. 0) .UI. 1                                        &
!
GENERATE
!       plan.pro
!
!       Profitt ved aa produsere en enhet av produkt type p
!       PRO(p=1..PMAX)
!       p=1  p=2  p=3  p=4  p=5  p=6  p=7
        10,  6,   8,   4,   11,  9,   3
!       plan.tid
!
!       TID(TMAX,PMAX)  Prosesseringstid for maskin t ved prosessering
!                       av produkt t [timer]
!       maskintype.....
!       Her:    1: grinder
!               2: vert.drill
!               3: horiz drill
!               4: borer
!               5: planer
!
!       maskintype...........
!       p=1  p=2  p=3  p=4  p=5  p=6  p=7
!
        0.5, 0.7, 0.0, 0.0, 0.3, 0.2, 0.5 ! t=1
        0.1, 0.2, 0.0, 0.3, 0.0, 0.6, 0.0 ! t=2
        0.2, 0.0, 0.8, 0.0, 0.0, 0.0, 0.6 ! t=3
        .05, .03, 0.0, .07, 0.1, 0.0, .08 ! t=4
        0.0, 0.0, .01, 0.0, .05, 0.0, .05 ! t=5
!       plan.val
!
!       Kjoere modell 12.3 eller 12.4 ?
!       1 = mod12.3 : 0 = mod12.4
1

!       plan.ved
!
!       VED(MMAX,TMAX)  Antall maskiner av typen t nede for vedlikehold
!                       i periode (mnd.) m [-]
```

```
!
!       maskintype.....                 periode....
!       Her:    1: grinder               1: januar
!               2: vert.drill            2: februar
!               3: horiz drill           3: mars
!               4: boer                  4: april
!               5: planer                5: mai
!                                        6: juni
!
!
!       maskintype.....
!       t=1  t=2  t=3  t=4  t=5
                                 ! periode
        1.0, 0.0, 0.0, 0.0, 0.0  ! m=1

        0.0, 0.0, 2.0, 0.0, 0.0  ! m=2
        0.0, 0.0, 0.0, 1.0, 0.0  ! m=3
        0.0, 1.0, 0.0, 0.0, 0.0  ! m=4
        1.0, 1.0, 0.0, 0.0, 0.0  ! m=5
        0.0, 0.0, 1.0, 0.0, 1.0  ! m=6

XPRESS Modeller Log for problem: plan
RESTORE
?179(1):model save (SVM) file not found: plan.svm
INPUT
! File plan.mod
!
! Obligatorisk dataoeving i fag 92033 Operasjonsanalyse 2
!
! Levert av Trond M. Andersen, fak. for marinteknikk
!
! *******************************************************
!
! Alle filer forbundet med denne oevingen er paa formen plan.*
!
! *******************************************************
!
MODEL PLAN
!
!
TABLES
!
DIMM(5)          ! Inneholder maksverdier for de tre indeksene samt angivelse
!                  av hvilke modell (12.3 & 12.4) som skal kjoeres
DATA(3)          ! Tabell som inneholder skalare data
!
!
DISKDATA
!
 DIMM(1) = plan.dim
 DATA(1) = plan.dat
!
! Setter nye navn paa maks-verdiene til indeksene
!
LET PMAX  = DIMM(1)     ! Maksimalt antall produkter p [-]
LET TMAX  = DIMM(2)     ! Maksimalt antall maskintyper t [-]
LET MMAX  = DIMM(3)     ! Maksimalt antall tidsperioder (mnd.) m [-]
LET MOD   = DIMM(4)     ! Kjoere modell 12.3 (MOD=1) ellers modell 12.4
LET NMAX  = DIMM(5)     ! Max antall spesifikke lagerkrav
LET MLKAP = DATA(1)     ! Maksimal lagerkapasitet for alle produkttype [-]
LET KLAG  = DATA(2)     ! Lagerkost. pr. enhet for alle produkttyp. [NOK/time]
LET TPRM  = DATA(3)     ! Timer produksjon per periode (mnd.) [timer/mnd.]
!
! Definerer tabeller for data som er indeksspesifiserte
!
! ************************************************************************
!
!  MOD = 1 dersom man oensker aa kjoere modell 12.3
!  MOD = 0 dersom man oensker aa kjoere modell 12.4
```



```
!
! ***************************************************************************
!
TABLES
!
! Data som leses direkte fra andre filer
!
 PRO(PMAX)          ! Profitt ved aa produsere en enhet av produkt type p
                    ! = diff. mellom salgsinntekt og raavarekostad [NOK/enhet]
!
 TID(TMAX,PMAX)     ! Prosesseringstid for maskin t ved prosessering
                    ! av produkt p [timer]
!
 VED(MMAX,TMAX)     ! Antall maskiner av typen t nede for vedlikehold i
                    ! periode (mnd.) m [-]
!
 ANTMA(TMAX)        ! Antall maskiner av maskintype t
!
 MABE(MMAX,PMAX)    ! Markedsrestriksjoner for produkt p i tidsperiode m [-]
!
 BEH(NMAX,2)        ! Oensket lagerbeholdning av produkt p i tidsperiodene m [-]
!
! Leser inn verdier til tabellene
!
DISKDATA
!
 PRO(1)          = plan.pro
 TID(1,1)        = plan.tid
 VED(1,1)        = plan.ved
 ANTMA(1)        = plan.ant
 MABE(1,1)       = plan.mab
 BEH(1,1)        = plan.beh
!
!
! ****************************************************************************
!
! Definerer variable
!
VARIABLES
!
skvant(m=1:MMAX,p=1:PMAX)        ! Solgt kvantum av produkt p i peridoe m
!
lkvant(m=1:MMAX,p=1:PMAX)        ! Lagret kvantum av produkt p i periode m
!
pkvant(m=1:PMAX,p=1:PMAX)        ! Produsert kvantum av produkt p i perioden m
!
mvedl(m=1:MMAX,t=1:TMAX)         ! Antall maskiner av typen t nede for
                                 ! vedlikehold i perioden m
! ****************************************************************************
CONSTRAINTS
!
! Objektfunksjonen: maks. profitt, dvs. maks av produksjon*nettoverdi
! minus lagringskostnader
!
 MAXOBJ:                                                                   &
 SUM(m=1:MMAX,p=1:PMAX) PRO(p) * skvant(m,p) -                             &
 SUM(m=1:MMAX,p=1:PMAX) KLAG * lkvant(m,p)                                 $
!
! "Massebalanse": for hvert produkt p over hver periode p gjelder
! lagr.mengde(m-1,p) + prod.mengde(m,p) = solgt mengde(m,p) + lagr.mengde(m,p)
! Dette gjelder for alle perioder untatt en bestemt, hvor man skal tilfredst.
! en viss lagringsmengde, og den foerste, hvor lageret er tomt
!
 MAB0(p=1:PMAX):                                                          &
 pkvant(1,p) - skvant(1,p) - lkvant(1,p) = 0
!
 MABAL(p=1:PMAX,m=2:MMAX):                                                 &
 lkvant(m-1,p) + pkvant(m,p) - skvant(m,p) - lkvant(m,p) = 0
!
```

```
! Prosesseringstid: det er ikke mer tilgjengelig prosesseringstid for hver
! maskintype t i tidsperioden m enn ant.maskiner i produksjon, (dvs. maks
Problem Statistics
Matrix PLAN
Objective MAXOBJ
RHS RHS00001
Problem has     80 rows and    126 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     25 iterations
Objective function value is  93715.17857
```

Rows Section

	Number	Row	At	Value	Slack Value	Dual Value	RHS
N	1	MAXOBJ	BS	93715.17857	-93715.17857	.000000	.000000
E	2	MAB0 01	EQ	.000000	.000000	-4.285714	.000000
E	3	MAB0 02	EQ	.000000	.000000	-6.000000	.000000
E	4	MAB0 03	EQ	.000000	.000000	.000000	.000000
E	5	MAB0 04	EQ	.000000	.000000	.000000	.000000
E	6	MAB0 05	EQ	.000000	.000000	-2.571429	.000000
E	7	MAB0 06	EQ	.000000	.000000	-1.714286	.000000
E	8	MAB0 07	EQ	.000000	.000000	-4.285714	.000000
E	9	MABA0102	EQ	.000000	.000000	-.125000	.000000
E	10	MABA0103	EQ	.000000	.000000	-10.000000	.000000
E	11	MABA0104	EQ	.000000	.000000	.000000	.000000
E	12	MABA0105	EQ	.000000	.000000	.000000	.000000
E	13	MABA0106	EQ	.000000	.000000	.000000	.000000
E	14	MABA0202	EQ	.000000	.000000	.000000	.000000
E	15	MABA0203	EQ	.000000	.000000	-6.000000	.000000
E	16	MABA0204	EQ	.000000	.000000	.000000	.000000
E	17	MABA0205	EQ	.000000	.000000	.000000	.000000
E	18	MABA0206	EQ	.000000	.000000	.000000	.000000
E	19	MABA0302	EQ	.000000	.000000	-.500000	.000000
E	20	MABA0303	EQ	.000000	.000000	.000000	.000000
E	21	MABA0304	EQ	.000000	.000000	.000000	.000000
E	22	MABA0305	EQ	.000000	.000000	.000000	.000000
E	23	MABA0306	EQ	.000000	.000000	-8.000000	.000000
E	24	MABA0402	EQ	.000000	.000000	1.000000	.000000
E	25	MABA0403	EQ	.000000	.000000	.500000	.000000
E	26	MABA0404	EQ	.000000	.000000	.000000	.000000
E	27	MABA0405	EQ	.000000	.000000	.000000	.000000
E	28	MABA0406	EQ	.000000	.000000	.000000	.000000
E	29	MABA0502	EQ	.000000	.000000	.000000	.000000
E	30	MABA0503	EQ	.000000	.000000	-11.000000	.000000
E	31	MABA0504	EQ	.000000	.000000	.000000	.000000
E	32	MABA0505	EQ	.000000	.000000	.000000	.000000
E	33	MABA0506	EQ	.000000	.000000	-11.000000	.000000
E	34	MABA0602	EQ	.000000	.000000	.000000	.000000
E	35	MABA0603	EQ	.000000	.000000	.000000	.000000
E	36	MABA0604	EQ	.000000	.000000	.000000	.000000
E	37	MABA0605	EQ	.000000	.000000	.000000	.000000
E	38	MABA0606	EQ	.000000	.000000	.000000	.000000
E	39	MABA0702	EQ	.000000	.000000	-.375000	.000000
E	40	MABA0703	EQ	.000000	.000000	-3.000000	.000000
E	41	MABA0704	EQ	.000000	.000000	.000000	.000000
E	42	MABA0705	EQ	.000000	.000000	.000000	.000000
E	43	MABA0706	EQ	.000000	.000000	-3.000000	.000000
L	44	PROS0101	UL	1152.000000	.000000	8.571429	1152.000000
L	45	PROS0102	BS	1105.000000	431.000000	.000000	1536.000000
L	46	PROS0103	BS	80.000000	1456.000000	.000000	1536.000000
L	47	PROS0104	BS	420.000000	1116.000000	.000000	1536.000000
L	48	PROS0105	BS	510.000000	642.000000	.000000	1152.000000
L	49	PROS0106	BS	770.000000	766.000000	.000000	1536.000000
L	50	PROS0201	BS	437.714286	330.285714	.000000	768.000000
L	51	PROS0202	BS	370.000000	398.000000	.000000	768.000000
L	52	PROS0203	BS	240.000000	528.000000	.000000	768.000000
L	53	PROS0204	BS	230.000000	154.000000	.000000	384.000000

L	54	PROS0205	BS	230.000000	154.000000	.000000	384.000000
L	55	PROS0206	BS	600.000000	168.000000	.000000	768.000000
L	56	PROS0301	BS	406.000000	746.000000	.000000	1152.000000
L	57	PROS0302	UL	384.000000	.000000	.625000	384.000000
L	58	PROS0303	BS	.000000	1152.000000	.000000	1152.000000
L	59	PROS0304	BS	420.000000	732.000000	.000000	1152.000000
L	60	PROS0305	BS	540.000000	612.000000	.000000	1152.000000
L	61	PROS0306	BS	110.000000	658.000000	.000000	768.000000
L	62	PROS0401	BS	152.657143	231.342857	.000000	384.000000
L	63	PROS0402	BS	123.000000	261.000000	.000000	384.000000
L	64	PROS0403	UL	.000000	.000000	200.000000	.000000
L	65	PROS0404	BS	82.000000	302.000000	.000000	384.000000
L	66	PROS0405	BS	128.000000	256.000000	.000000	384.000000
L	67	PROS0406	BS	68.500000	315.500000	.000000	384.000000
L	68	PROS0501	BS	43.825000	340.175000	.000000	384.000000
L	69	PROS0502	BS	38.675000	345.325000	.000000	384.000000
L	70	PROS0503	BS	.000000	384.000000	.000000	384.000000
L	71	PROS0504	BS	19.000000	365.000000	.000000	384.000000
L	72	PROS0505	BS	66.000000	318.000000	.000000	384.000000
L	73	PROS0506	UL	.000000	.000000	800.000000	.000000
E	74	TVUN0101	EQ	50.000000	.000000	-.500000	50.000000
E	75	TVUN0102	EQ	50.000000	.000000	-.500000	50.000000
E	76	TVUN0103	EQ	50.000000	.000000	-8.500000	50.000000
E	77	TVUN0104	EQ	50.000000	.000000	-.500000	50.000000
E	78	TVUN0105	EQ	50.000000	.000000	-11.500000	50.000000
E	79	TVUN0106	EQ	50.000000	.000000	-.500000	50.000000
E	80	TVUN0107	EQ	50.000000	.000000	-3.500000	50.000000

Columns Section

	Number	Column	At	Value	Input Cost	Reduced Cost
C	81	skva0101	UL	500.000000	10.000000	-5.714286
C	82	skva0201	UL	600.000000	10.000000	-9.875000
C	83	skva0301	BS	100.000000	10.000000	.000000
C	84	skva0401	UL	200.000000	10.000000	-10.000000
C	85	skva0501	LL	.000000	10.000000	-10.000000
C	86	skva0601	UL	500.000000	10.000000	-10.000000
C	87	skva0102	BS	888.571429	6.000000	.000000
C	88	skva0202	UL	500.000000	6.000000	-6.000000
C	89	skva0302	BS	100.000000	6.000000	.000000
C	90	skva0402	UL	300.000000	6.000000	-6.000000
C	91	skva0502	UL	100.000000	6.000000	-6.000000
C	92	skva0602	UL	500.000000	6.000000	-6.000000
C	93	skva0103	UL	300.000000	8.000000	-8.000000
C	94	skva0203	UL	200.000000	8.000000	-7.500000
C	95	skva0303	LL	.000000	8.000000	-8.000000
C	96	skva0403	UL	400.000000	8.000000	-8.000000
C	97	skva0503	UL	500.000000	8.000000	-8.000000
C	98	skva0603	BS	50.000000	8.000000	.000000
C	99	skva0104	UL	300.000000	4.000000	-4.000000
C	100	skva0204	LL	.000000	4.000000	-5.000000
C	101	skva0304	LL	.000000	4.000000	-4.500000
C	102	skva0404	UL	500.000000	4.000000	-4.000000
C	103	skva0504	UL	100.000000	4.000000	-4.000000
C	104	skva0604	UL	300.000000	4.000000	-4.000000
C	105	skva0105	UL	800.000000	11.000000	-8.428571
C	106	skva0205	UL	400.000000	11.000000	-11.000000
C	107	skva0305	BS	100.000000	11.000000	.000000
C	108	skva0405	UL	200.000000	11.000000	-11.000000
C	109	skva0505	UL	1000.000000	11.000000	-11.000000
C	110	skva0605	BS	50.000000	11.000000	.000000
C	111	skva0106	UL	200.000000	9.000000	-7.285714
C	112	skva0206	UL	300.000000	9.000000	-9.000000
C	113	skva0306	UL	400.000000	9.000000	-9.000000
C	114	skva0406	LL	.000000	9.000000	-9.000000
C	115	skva0506	UL	300.000000	9.000000	-9.000000
C	116	skva0606	UL	500.000000	9.000000	-9.000000
C	117	skva0107	LL	.000000	3.000000	1.285714
C	118	skva0207	UL	150.000000	3.000000	-2.625000
C	119	skva0307	BS	100.000000	3.000000	.000000

```
 C     120  skva0407  UL    100.000000       3.000000      -3.000000
 C     121  skva0507  LL       .000000       3.000000      -3.000000
 C     122  skva0607  BS     50.000000       3.000000        .000000
 C     123  lkva0101  LL       .000000       -.500000       4.660714
 C     124  lkva0201  UL    100.000000       -.500000      -9.375000
 C     125  lkva0301  LL       .000000       -.500000      10.500000
 C     126  lkva0401  LL       .000000       -.500000        .500000
 C     127  lkva0501  LL       .000000       -.500000        .500000
 C     128  lkva0601  BS     50.000000       -.500000        .000000
 C     129  lkva0102  LL       .000000       -.500000       6.500000
 C     130  lkva0202  UL    100.000000       -.500000      -5.500000
 C     131  lkva0302  LL       .000000       -.500000       6.500000
 C     132  lkva0402  LL       .000000       -.500000        .500000
 C     133  lkva0502  LL       .000000       -.500000        .500000
 C     134  lkva0602  BS     50.000000       -.500000        .000000
 C     135  lkva0103  BS     82.500000       -.500000        .000000
 C     136  lkva0203  LL       .000000       -.500000       1.000000
 C     137  lkva0303  LL       .000000       -.500000        .500000
 C     138  lkva0403  LL       .000000       -.500000        .500000
 C     139  lkva0503  UL    100.000000       -.500000      -7.500000
 C     140  lkva0603  BS     50.000000       -.500000        .000000
 C     141  lkva0104  LL       .000000       -.500000       1.500000
 C     142  lkva0204  BS       .000000       -.500000        .000000
 C     143  lkva0304  BS       .000000       -.500000        .000000
 C     144  lkva0404  LL       .000000       -.500000        .500000
 C     145  lkva0504  LL       .000000       -.500000        .500000
 C     146  lkva0604  BS     50.000000       -.500000        .000000
 C     147  lkva0105  LL       .000000       -.500000       3.071429
 C     148  lkva0205  UL    100.000000       -.500000     -10.500000
 C     149  lkva0305  LL       .000000       -.500000      11.500000
 C     150  lkva0405  LL       .000000       -.500000        .500000
 C     151  lkva0505  UL    100.000000       -.500000     -10.500000
 C     152  lkva0605  BS     50.000000       -.500000        .000000
 C     153  lkva0106  LL       .000000       -.500000       2.214286
 C     154  lkva0206  LL       .000000       -.500000        .500000
 C     155  lkva0306  LL       .000000       -.500000        .500000
 C     156  lkva0406  LL       .000000       -.500000        .500000
 C     157  lkva0506  LL       .000000       -.500000        .500000
 C     158  lkva0606  BS     50.000000       -.500000        .000000
 C     159  lkva0107  LL       .000000       -.500000       4.410714
 C     160  lkva0207  UL    100.000000       -.500000      -2.125000
 C     161  lkva0307  LL       .000000       -.500000       3.500000
 C     162  lkva0407  LL       .000000       -.500000        .500000
 C     163  lkva0507  UL    100.000000       -.500000      -2.500000
 C     164  lkva0607  BS     50.000000       -.500000        .000000
 C     165  pkva0101  BS    500.000000        .000000        .000000
 C     166  pkva0201  BS    700.000000        .000000        .000000
 C     167  pkva0301  BS       .000000        .000000        .000000
 C     168  pkva0401  BS    200.000000        .000000        .000000
 C     169  pkva0501  BS       .000000        .000000        .000000
 C     170  pkva0601  BS    550.000000        .000000        .000000
 C     171  pkva0102  BS    888.571429        .000000        .000000
 C     172  pkva0202  BS    600.000000        .000000        .000000
 C     173  pkva0302  LL       .000000        .000000        .000000
 C     174  pkva0402  BS    300.000000        .000000        .000000
 C     175  pkva0502  BS    100.000000        .000000        .000000
 C     176  pkva0602  BS    550.000000        .000000        .000000
 C     177  pkva0103  BS    382.500000        .000000        .000000
 C     178  pkva0203  BS    117.500000        .000000        .000000
 C     179  pkva0303  BS       .000000        .000000        .000000
 C     180  pkva0403  BS    400.000000        .000000        .000000
 C     181  pkva0503  BS    600.000000        .000000        .000000
 C     182  pkva0603  BS       .000000        .000000        .000000
 C     183  pkva0104  BS    300.000000        .000000        .000000
 C     184  pkva0204  LL       .000000        .000000       1.000000
 C     185  pkva0304  LL       .000000        .000000      14.500000
 C     186  pkva0404  BS    500.000000        .000000        .000000
 C     187  pkva0504  BS    100.000000        .000000        .000000
 C     188  pkva0604  BS    350.000000        .000000        .000000
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 C     189  pkva0105  BS    800.000000        .000000        .000000
 C     190  pkva0205  BS    500.000000        .000000        .000000
 C     191  pkva0305  LL       .000000        .000000       9.000000
 C     192  pkva0405  BS    200.000000        .000000        .000000
 C     193  pkva0505  BS   1100.000000        .000000        .000000
 C     194  pkva0605  LL       .000000        .000000      29.000000
 C     195  pkva0106  BS    200.000000        .000000        .000000
 C     196  pkva0206  BS    300.000000        .000000        .000000
 C     197  pkva0306  BS    400.000000        .000000        .000000
 C     198  pkva0406  BS       .000000        .000000        .000000
 C     199  pkva0506  BS    300.000000        .000000        .000000
 C     200  pkva0606  BS    550.000000        .000000        .000000
 C     201  pkva0107  BS       .000000        .000000        .000000
 C     202  pkva0207  BS    250.000000        .000000        .000000
 C     203  pkva0307  LL       .000000        .000000      13.000000
 C     204  pkva0407  BS    100.000000        .000000        .000000
 C     205  pkva0507  BS    100.000000        .000000        .000000
 C     206  pkva0607  LL       .000000        .000000      37.000000

Problem Statistics
Matrix PLAN
Objective MAXOBJ
RHS RHS00001
Problem has     80 rows and    126 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     25 iterations
Objective function value is  93715.17857

N MAXOBJ    93715.17857  499729541.0      .000000              PROS0101 UL
BS     1   -93715.17857  93715.18554      .000000

E MAB0  01      .000000  14619567.87    -4.285714              skva0102 UL
EQ     2        .000000 -116581677.2     4.285714              skva0102 LL

E MAB0  02      .000000  10442548.82    -6.000000              skva0102 UL
EQ     3        .000000 -83272626.95     6.000000              skva0102 LL

E MAB0  03      .000000  35846054.68      .000000              pkva0103 LL
EQ     4        .000000 -87389404.29      .000000              PROS0301 UL

E MAB0  04      .000000  28114553.22      .000000              pkva0104 LL
EQ     5        .000000 -103175952.1      .000000              PROS0201 UL

E MAB0  05      .000000  24365944.82    -2.571429              skva0102 UL
EQ     6        .000000 -194302795.4     2.571429              pkva0102 LL

E MAB0  06      .000000  18743035.88    -1.714286              pkva0106 LL
EQ     7        .000000 -57018291.01     1.714286              PROS0201 UL

E MAB0  07      .000000      .000000    -4.285714              pkva0107 LL
EQ     8        .000000 -116519201.6     4.285714              PROS0301 UL

E MABA0102      .000000  6560062.988     -.125000              lkva0103 UL
EQ     9        .000000 -30926008.30      .125000              lkva0103 LL

E MABA0103      .000000  9371518.554   -10.000000              skva0301 LL
EQ    10        .000000 -18743035.88    10.000000              skva0301 UL

E MABA0104      .000000  18743035.88      .000000              pkva0401 LL
EQ    11        .000000 -144321374.5      .000000              PROS0204 UL

E MABA0105      .000000      .000000      .000000              pkva0501 LL
EQ    12        .000000 -120330285.6      .000000              PROS0105 UL

E MABA0106      .000000  51543344.72      .000000              pkva0601 LL
EQ    13        .000000 -143571643.0      .000000              PROS0106 UL
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E MABA0202       .000000  56229106.44       .000000               pkva0202 LL
EQ    14         .000000 -57701772.46       .000000               PROS0102 UL

E MABA0203       .000000  9371518.554     -6.000000               skva0302 LL
EQ    15         .000000 -46857587.89      6.000000               skva0302 UL

E MABA0204       .000000  28114553.22       .000000               pkva0402 LL
EQ    16         .000000 -72160688.47       .000000               PROS0204 UL

E MABA0205       .000000  9371518.554       .000000               pkva0502 LL
EQ    17         .000000 -72160688.47       .000000               PROS0205 UL

E MABA0206       .000000  51543344.72       .000000               pkva0602 LL
EQ    18         .000000 -78720751.95       .000000               PROS0206 UL

E MABA0302       .000000  1640015.747      -.500000               lkva0103 UL
EQ    19         .000000 -7731502.929       .500000               lkva0103 LL

E MABA0303       .000000       .000000      .000000               pkva0303 LL
EQ    20         .000000 -134949853.5       .000000               PROS0303 UL

E MABA0304       .000000  37486071.77       .000000               pkva0403 LL
EQ    21         .000000 -85749394.53       .000000               PROS0304 UL

E MABA0305       .000000  56229106.44       .000000               pkva0503 LL
EQ    22         .000000 -71692109.37       .000000               PROS0305 UL

E MABA0306       .000000  4685759.277     -8.000000               skva0603 UL
EQ    23         .000000 -4685759.277      8.000000               skva0603 LL

E MABA0402       .000000  9371518.554      1.000000               lkva0204 UL
EQ    24         .000000       .000000    -1.000000               lkva0204 LL

E MABA0403       .000000  9371518.554       .500000               lkva0304 UL
EQ    25         .000000       .000000     -.500000               lkva0304 LL

E MABA0404       .000000  46857587.89       .000000               pkva0404 LL
EQ    26         .000000 -48107124.02       .000000               PROS0204 UL

E MABA0405       .000000  9371518.554       .000000               pkva0504 LL
EQ    27         .000000 -48107124.02       .000000               PROS0205 UL

E MABA0406       .000000  32800310.05       .000000               pkva0604 LL
EQ    28         .000000 -52480498.04       .000000               PROS0206 UL

E MABA0502       .000000  46857587.89       .000000               pkva0205 LL
EQ    29         .000000 -134637463.3       .000000               PROS0102 UL

E MABA0503       .000000  9371518.554    -11.000000               skva0305 LL
EQ    30         .000000 -37486071.77     11.000000               skva0305 UL

E MABA0504       .000000  18743035.88       .000000               pkva0405 LL
EQ    31         .000000 -283019824.2       .000000               PROS0404 UL

E MABA0505       .000000  103086694.3       .000000               pkva0505 LL
EQ    32         .000000 -200550476.0       .000000               PROS0105 UL

E MABA0506       .000000  98400937.50    -11.000000               skva0605 UL
EQ    33         .000000 -4685759.277     11.000000               skva0605 LL

E MABA0602       .000000  28114553.22       .000000               pkva0206 LL
EQ    34         .000000 -62164399.41       .000000               PROS0202 UL

E MABA0603       .000000  37486071.77       .000000               pkva0306 LL
EQ    35         .000000 -82469355.46       .000000               PROS0203 UL

E MABA0604       .000000       .000000      .000000               pkva0406 LL
EQ    36         .000000 -24053562.01       .000000               PROS0204 UL
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E MABA0605       .000000  28114553.22       .000000               pkva0506 LL
EQ    37         .000000 -24053562.01       .000000               PROS0205 UL

E MABA0606       .000000  51543344.72       .000000               pkva0606 LL
EQ    38         .000000 -26240249.02       .000000               PROS0206 UL

E MABA0702       .000000  2186687.500      -.375000               lkva0103 UL
EQ    39         .000000 -10308669.43       .375000               lkva0103 LL

E MABA0703       .000000       .000000    -3.000000               skva0307 UL
EQ    40         .000000 -9371518.554      3.000000               skva0307 LL

E MABA0704       .000000  9371518.554       .000000               pkva0407 LL
EQ    41         .000000 -114332519.5       .000000               PROS0304 UL

E MABA0705       .000000  9371518.554       .000000               pkva0507 LL
EQ    42         .000000 -95589482.42       .000000               PROS0305 UL

E MABA0706       .000000  937151.7578     -3.000000               skva0607 UL
EQ    43         .000000 -4685759.277      3.000000               skva0607 LL

L PROS0101    1152.000000  58291992.18      8.571429               skva0102 LL
UL    44         .000000 -7308632.324     -8.571429               skva0102 UL

L PROS0102    1105.000000  4686864.257      .000000               lkva0207 UL
BS    45      431.000000 -1873198.730       .000000               lkva0206 LL

L PROS0103      80.000000  1874383.666      .000000               lkva0206 LL
BS    46     1456.000000     80.000000      .000000               pkva0302 LL

L PROS0104     420.000000   420.000000      .000000               lkva0306 LL
BS    47     1116.000000 -6559642.578       .000000               lkva0402 LL

L PROS0105     510.000000  6560572.753      .000000               lkva0402 LL
BS    48      642.000000 -6559552.734       .000000               lkva0502 LL

L PROS0106     770.000000  6560833.007      .000000               lkva0502 LL
BS    49      766.000000   770.000000       .000000               pkva0607 LL

L PROS0201     437.714286  1339226.074      .000000               skva0107 LL
BS    50      330.285714 -5086958.007       .000000               lkva0106 LL

L PROS0202     370.000000  5623281.250      .000000               lkva0106 LL
BS    51      398.000000 -5622541.503       .000000               lkva0206 LL

L PROS0203     240.000000  5623151.367      .000000               lkva0206 LL
BS    52      528.000000   240.000000       .000000               pkva0302 LL

L PROS0204     230.000000   230.000000      .000000               lkva0306 LL
BS    53      154.000000 -5622681.152       .000000               lkva0406 LL

L PROS0205     230.000000  5623141.113      .000000               lkva0406 LL
BS    54      154.000000 -5622681.152       .000000               lkva0506 LL

L PROS0206     600.000000  5623511.230      .000000               lkva0506 LL
BS    55      168.000000   600.000000       .000000

L PROS0301     406.000000  5623317.382      .000000               lkva0207 UL
BS    56      746.000000 -1311606.567       .000000               PROS0302 UL

L PROS0302     384.000000  1312396.606      .625000               lkva0103 UL
UL    57         .000000 -6184818.359     -.625000                lkva0103 LL

L PROS0303        .000000       .000000      .000000              pkva0302 LL
BS    58     1152.000000 -7497214.843       .000000               lkva0303 LL

L PROS0304     420.000000  7497634.765      .000000               lkva0303 LL
BS    59      732.000000 -7496794.921       .000000               lkva0403 LL
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L PROS0305    540.000000  7497754.882       .000000                lkva0403 LL
BS     60     612.000000 -1873763.671       .000000                lkva0501 LL

L PROS0306    110.000000  1874413.696       .000000                lkva0501 LL
BS     61     658.000000   110.000000       .000000

L PROS0401    152.657143  15744302.97       .000000                skva0104 UL
BS     62     231.342857 -5247897.949       .000000                lkva0104 LL

L PROS0402    123.000000  5997895.019       .000000                lkva0207 UL
BS     63     261.000000 -5247927.246       .000000                pkva0204 LL

L PROS0403       .000000      .000000    200.000000                pkva0301 LL
UL     64        .000000 -7497214.843   -200.000000                skva0301 UL

L PROS0404     82.000000  5248132.324       .000000                pkva0204 LL
BS     65     302.000000 -7497132.812       .000000                lkva0405 LL

L PROS0405    128.000000  7497342.773       .000000                lkva0405 LL
BS     66     256.000000 -5247922.363       .000000                lkva0504 LL

L PROS0406     68.500000  5248118.652       .000000                lkva0504 LL
BS     67     315.500000    68.500000       .000000                pkva0605 LL

L PROS0501     43.825000  19492801.51       .000000                skva0105 UL
BS     68     340.175000 -7497170.898       .000000                skva0107 LL

L PROS0502     38.675000  262441.1865       .000000                PROS0302 UL
BS     69     345.325000 -374822.0214       .000000                lkva0101 LL

L PROS0503       .000000      .000000       .000000                lkva0203 LL
BS     70     384.000000 -1499442.993       .000000                lkva0303 LL

L PROS0504     19.000000  1499461.914       .000000                lkva0303 LL
BS     71     365.000000 -7497195.800       .000000                lkva0405 LL

L PROS0505     66.000000  7497280.761       .000000                lkva0405 LL
BS     72     318.000000    66.000000       .000000

L PROS0506       .000000      .000000    800.000000                pkva0603 LL
UL     73        .000000 -749721.4355   -800.000000                skva0603 UL

E TVUN0101     50.000000  4685809.082      -.500000                lkva0601 UL
EQ     74        .000000 -4685708.984       .500000                lkva0601 LL

E TVUN0102     50.000000  4685809.082      -.500000                lkva0602 UL
EQ     75        .000000 -4685708.984       .500000                lkva0602 LL

E TVUN0103     50.000000  4685809.082     -8.500000                skva0603 LL
EQ     76        .000000 -4685708.984      8.500000                skva0603 UL

E TVUN0104     50.000000  4685809.082      -.500000                lkva0604 UL
EQ     77        .000000 -4685708.984       .500000                lkva0604 LL

E TVUN0105     50.000000  4685809.082    -11.500000                skva0605 LL
EQ     78        .000000 -4685708.984     11.500000                lkva0605 LL

E TVUN0106     50.000000  4685809.082      -.500000                lkva0606 UL
EQ     79        .000000 -4685708.984       .500000                lkva0606 LL

E TVUN0107     50.000000  4685809.082     -3.500000                skva0607 LL
EQ     80        .000000 -937101.7578      3.500000                skva0607 UL

C skva0101    500.000000   500.000000      5.714286      4.285714 skva0102 UL
UL     81      10.000000   500.000000     -5.714286  1.00000E+30 skva0102 LL

C skva0201    600.000000   600.000000      9.875000       .125000 lkva0103 LL
UL     82      10.000000   600.000000     -9.875000  1.00000E+30 lkva0103 UL
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C skva0301    100.000000   100.000000       .000000     10.000000 pkva0302 LL
BS     83      10.000000   100.000000 -9.37152E+34 -9.37152E+34

C skva0401    200.000000   200.000000     10.000000       .000000 pkva0401 LL
UL     84      10.000000   200.000000    -10.000000  1.00000E+30 PROS0204 UL

C skva0501       .000000      .000000     10.000000 -1.00000E+30 pkva0501 LL
LL     85      10.000000      .000000    -10.000000       .000000 PROS0105 UL

C skva0601    500.000000   500.000000     10.000000       .000000 pkva0601 LL
UL     86      10.000000   500.000000    -10.000000  1.00000E+30 PROS0106 UL

C skva0102    888.571429   888.571411 -168687.3046  168693.3105 skva0107 LL
BS     87       6.000000   888.571411 -749721.4355 -749715.4296 skva0101 UL

C skva0202    500.000000   500.000000      6.000000       .000000 pkva0202 LL
UL     88       6.000000   500.000000     -6.000000  1.00000E+30 PROS0102 UL

C skva0302    100.000000   100.000000 -515433.4960  515439.5019 lkva0202 UL
BS     89       6.000000   100.000000       .000000      6.000000 pkva0302 LL

C skva0402    300.000000   300.000000      6.000000       .000000 pkva0402 LL
UL     90       6.000000   300.000000     -6.000000  1.00000E+30 PROS0204 UL

C skva0502    100.000000   100.000000      6.000000       .000000 pkva0502 LL
UL     91       6.000000   100.000000     -6.000000  1.00000E+30 PROS0205 UL

C skva0602    500.000000   500.000000      6.000000       .000000 pkva0602 LL
UL     92       6.000000   500.000000     -6.000000  1.00000E+30 PROS0206 UL

C skva0103    300.000000   300.000000      8.000000       .000000 pkva0103 LL
UL     93       8.000000   300.000000     -8.000000  1.00000E+30 PROS0301 UL

C skva0203    200.000000   200.000000      7.500000       .500000 lkva0103 LL
UL     94       8.000000   200.000000     -7.500000  1.00000E+30 lkva0103 UL

C skva0303       .000000      .000000      8.000000 -1.00000E+30 pkva0303 LL
LL     95       8.000000      .000000     -8.000000       .000000 PROS0303 UL

C skva0403    400.000000   400.000000      8.000000       .000000 pkva0403 LL
UL     96       8.000000   400.000000     -8.000000  1.00000E+30 PROS0304 UL

C skva0503    500.000000   500.000000      8.000000       .000000 pkva0503 LL
UL     97       8.000000   500.000000     -8.000000  1.00000E+30 PROS0305 UL

C skva0603     50.000000    50.000000 -543548.0468  543556.0546 pkva0605 LL
BS     98       8.000000    50.000000 -9.37152E+34 -9.37152E+34

C skva0104    300.000000   300.000000      4.000000       .000000 pkva0104 LL
UL     99       4.000000   300.000000     -4.000000  1.00000E+30 PROS0201 UL

C skva0204       .000000      .000000      5.000000 -1.00000E+30 lkva0204 UL
LL    100       4.000000      .000000     -5.000000     -1.000000 lkva0204 LL

C skva0304       .000000      .000000      4.500000 -1.00000E+30 lkva0304 UL
LL    101       4.000000      .000000     -4.500000      -.500000 lkva0304 LL

C skva0404    500.000000   500.000000      4.000000       .000000 pkva0404 LL
UL    102       4.000000   500.000000     -4.000000  1.00000E+30 PROS0204 UL

C skva0504    100.000000   100.000000      4.000000       .000000 pkva0504 LL
UL    103       4.000000   100.000000     -4.000000  1.00000E+30 PROS0205 UL

C skva0604    300.000000   300.000000      4.000000       .000000 pkva0604 LL
UL    104       4.000000   300.000000     -4.000000  1.00000E+30 PROS0206 UL

C skva0105    800.000000   800.000000      8.428572      2.571429 skva0102 UL
UL    105      11.000000   800.000000     -8.428572  1.00000E+30 pkva0102 LL
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C skva0205   400.000000   400.000000    11.000000      .000000 pkva0205 LL
UL   106      11.000000   400.000000   -11.000000  1.00000E+30 PROS0102 UL

C skva0305   100.000000   100.000000 -984009.3750  984020.3125 lkva0205 UL
BS   107      11.000000   100.000000 -843436.6210 -843425.5859 pkva0305 LL

C skva0405   200.000000   200.000000    11.000000      .000000 pkva0405 LL
UL   108      11.000000   200.000000   -11.000000  1.00000E+30 PROS0404 UL

C skva0505  1000.000000  1000.000000    11.000000      .000000 pkva0505 LL
UL   109      11.000000  1000.000000   -11.000000  1.00000E+30 PROS0105 UL

C skva0605    50.000000    50.000000 -984009.3750  984020.3125 lkva0505 UL
BS   110      11.000000    50.000000 -2717740.478 -2717729.492 pkva0605 LL

C skva0106   200.000000   200.000000     7.285714     1.714286 pkva0106 LL
UL   111       9.000000   200.000000    -7.285714  1.00000E+30 PROS0201 UL

C skva0206   300.000000   300.000000     9.000000      .000000 pkva0206 LL
UL   112       9.000000   300.000000    -9.000000  1.00000E+30 PROS0202 UL

C skva0306   400.000000   400.000000     9.000000      .000000 pkva0306 LL
UL   113       9.000000   400.000000    -9.000000  1.00000E+30 PROS0203 UL

C skva0406      .000000      .000000     9.000000 -1.00000E+30 pkva0406 LL
LL   114       9.000000      .000000    -9.000000      .000000 PROS0204 UL

C skva0506   300.000000   300.000000     9.000000      .000000 pkva0506 LL
UL   115       9.000000   300.000000    -9.000000  1.00000E+30 PROS0205 UL

C skva0606   500.000000   500.000000     9.000000      .000000 pkva0606 LL
UL   116       9.000000   500.000000    -9.000000  1.00000E+30 PROS0206 UL

C skva0107      .000000      .000000    -1.285714 -1.00000E+30 pkva0107 LL
LL   117       3.000000      .000000     1.285714     4.285714 PROS0301 UL

C skva0207   150.000000   150.000000     2.625000      .375000 lkva0103 LL
UL   118       3.000000   150.000000    -2.625000  1.00000E+30 lkva0103 UL

C skva0307   100.000000   100.000000 -199144.7509  199147.7416 lkva0207 UL
BS   119       3.000000   100.000000 -1218297.485 -1218294.433 pkva0307 LL

C skva0407   100.000000   100.000000     3.000000      .000000 pkva0407 LL
UL   120       3.000000   100.000000    -3.000000  1.00000E+30 PROS0304 UL

C skva0507      .000000      .000000     3.000000 -1.00000E+30 pkva0507 LL
LL   121       3.000000      .000000    -3.000000      .000000 PROS0305 UL

C skva0607    50.000000    50.000000 -234287.9394  234290.9423 lkva0507 UL
BS   122       3.000000    50.000000 -3467461.914 -3467458.984 pkva0607 LL

C lkva0101      .000000      .000000    -4.660714 -1.00000E+30 lkva0103 UL
LL   123       -.500000      .000000     4.660714     4.160714 lkva0103 LL

C lkva0201   100.000000   100.000000     9.375000    -9.875000 skva0301 LL
UL   124       -.500000   100.000000    -9.375000  1.00000E+30 lkva0103 UL

C lkva0301      .000000      .000000   -10.500000 -1.00000E+30 skva0301 UL
LL   125       -.500000      .000000    10.500000    10.000000 skva0301 LL

C lkva0401      .000000      .000000     -.500000 -1.00000E+30 pkva0401 LL
LL   126       -.500000      .000000      .500000      .000000 pkva0501 LL

C lkva0501      .000000      .000000     -.500000 -1.00000E+30 pkva0501 LL
LL   127       -.500000      .000000      .500000      .000000 pkva0601 LL

C lkva0601    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   128       -.500000    50.000000 -9.37152E+34 -9.37152E+34
```



```
C lkva0102      .000000      .000000    -6.500000 -1.00000E+30 skva0102 UL
LL   129       -.500000      .000000     6.500000     6.000000 pkva0202 LL

C lkva0202   100.000000   100.000000     5.500000    -6.000000 skva0302 LL
UL   130       -.500000   100.000000    -5.500000  1.00000E+30 skva0302 UL

C lkva0302      .000000      .000000    -6.500000 -1.00000E+30 skva0302 UL
LL   131       -.500000      .000000     6.500000     6.000000 skva0302 LL

C lkva0402      .000000      .000000     -.500000 -1.00000E+30 pkva0402 LL
LL   132       -.500000      .000000      .500000      .000000 pkva0502 LL

C lkva0502      .000000      .000000     -.500000 -1.00000E+30 pkva0502 LL
LL   133       -.500000      .000000      .500000      .000000 pkva0602 LL

C lkva0602    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   134       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0103    82.500000    82.500000 -265526.3427  265525.8300 lkva0207 UL
BS   135       -.500000    82.500000 -46857.59277 -46858.09082 PROS0302 UL

C lkva0203      .000000      .000000    -1.000000 -1.00000E+30 lkva0103 LL
LL   136       -.500000      .000000     1.000000      .500000 pkva0303 LL

C lkva0303      .000000      .000000     -.500000 -1.00000E+30 pkva0303 LL
LL   137       -.500000      .000000      .500000      .000000 pkva0403 LL

C lkva0403      .000000      .000000     -.500000 -1.00000E+30 pkva0403 LL
LL   138       -.500000      .000000      .500000      .000000 pkva0503 LL

C lkva0503   100.000000   100.000000     7.500000    -8.000000 skva0603 LL
UL   139       -.500000   100.000000    -7.500000  1.00000E+30 skva0603 UL

C lkva0603    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   140       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0104      .000000      .000000    -1.500000 -1.00000E+30 lkva0204 LL
LL   141       -.500000      .000000     1.500000     1.000000 lkva0204 UL

C lkva0204      .000000      .000000 -9.37152E+34  9.37152E+34
BS   142       -.500000      .000000 -93715.18554 -93715.68359 pkva0204 LL

C lkva0304      .000000      .000000 -9.37152E+34  9.37152E+34
BS   143       -.500000      .000000 -93715.18554 -93715.68359 pkva0204 LL

C lkva0404      .000000      .000000     -.500000 -1.00000E+30 pkva0404 LL
LL   144       -.500000      .000000      .500000      .000000 pkva0504 LL

C lkva0504      .000000      .000000     -.500000 -1.00000E+30 pkva0504 LL
LL   145       -.500000      .000000      .500000      .000000 pkva0604 LL

C lkva0604    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   146       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0105      .000000      .000000    -3.071429 -1.00000E+30 skva0102 UL
LL   147       -.500000      .000000     3.071429     2.571429 pkva0205 LL

C lkva0205   100.000000   100.000000    10.500000   -11.000000 skva0305 LL
UL   148       -.500000   100.000000   -10.500000  1.00000E+30 skva0305 UL

C lkva0305      .000000      .000000   -11.500000 -1.00000E+30 skva0305 UL
LL   149       -.500000      .000000    11.500000    11.000000 skva0305 LL

C lkva0405      .000000      .000000     -.500000 -1.00000E+30 pkva0405 LL
LL   150       -.500000      .000000      .500000      .000000 pkva0505 LL

C lkva0505   100.000000   100.000000    10.500000   -11.000000 skva0605 LL
UL   151       -.500000   100.000000   -10.500000  1.00000E+30 skva0605 UL
```

```
C lkva0605    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   152       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0106      .000000      .000000    -2.214286 -1.00000E+30 pkva0106 LL
LL   153       -.500000      .000000     2.214286     1.714286 pkva0206 LL

C lkva0206      .000000      .000000     -.500000 -1.00000E+30 pkva0206 LL
LL   154       -.500000      .000000      .500000      .000000 pkva0306 LL

C lkva0306      .000000      .000000     -.500000 -1.00000E+30 PROS0204 UL
LL   155       -.500000      .000000      .500000      .000000 pkva0406 LL

C lkva0406      .000000      .000000     -.500000 -1.00000E+30 pkva0406 LL
LL   156       -.500000      .000000      .500000      .000000 PROS0204 UL

C lkva0506      .000000      .000000     -.500000 -1.00000E+30 PROS0206 UL
LL   157       -.500000      .000000      .500000      .000000 PROS0205 UL

C lkva0606    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   158       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0107      .000000      .000000    -4.410714 -1.00000E+30 pkva0107 LL
LL   159       -.500000      .000000     4.410714     3.910714 lkva0103 LL

C lkva0207   100.000000   100.000000     2.125000    -2.625000 skva0307 LL
UL   160       -.500000   100.000000    -2.125000  1.00000E+30 skva0307 UL

C lkva0307      .000000      .000000    -3.500000 -1.00000E+30 skva0307 UL
LL   161       -.500000      .000000     3.500000     3.000000 skva0307 LL

C lkva0407      .000000      .000000     -.500000 -1.00000E+30 pkva0407 LL
LL   162       -.500000      .000000      .500000      .000000 pkva0507 LL

C lkva0507   100.000000   100.000000     2.500000    -3.000000 skva0607 LL
UL   163       -.500000   100.000000    -2.500000  1.00000E+30 skva0607 UL

C lkva0607    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   164       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C pkva0101   500.000000   500.000000 -535515.2832  535515.2832 skva0101 UL
BS   165        .000000   500.000000 -436779.6386 -436779.6386 lkva0101 LL

C pkva0201   700.000000   700.000000 -436779.6386  436779.6386 lkva0101 LL
BS   166        .000000   700.000000 -9.37152E+34 -9.37152E+34

C pkva0301      .000000      .000000      .000000      .000000 pkva0302 LL
BS   167        .000000      .000000 -9.37152E+34 -9.37152E+34

C pkva0401   200.000000   200.000000 -937151.7578  937151.7578 skva0401 UL
BS   168        .000000   200.000000 -46857.59277 -46857.59277 lkva0401 LL

C pkva0501      .000000      .000000 -46857.59277  46857.59277 lkva0401 LL
BS   169        .000000      .000000 -46857.59277 -46857.59277 lkva0501 LL

C pkva0601   550.000000   550.000000 -46857.59277  46857.59277 lkva0501 LL
BS   170        .000000   550.000000 -9.37152E+34 -9.37152E+34

C pkva0102   888.571429   888.571411 -168687.3046  168687.3046 skva0107 LL
BS   171        .000000   888.571411 -749721.4355 -749721.4355 skva0101 UL

C pkva0202   600.000000   600.000000 -515433.4960  515433.4960 lkva0202 UL
BS   172        .000000   600.000000 -9.37152E+34 -9.37152E+34

C pkva0302      .000000      .000000      .000000 -1.00000E+30 skva0302 LL
LL   173        .000000      .000000      .000000      .000000 pkva0301 LL

C pkva0402   300.000000   300.000000 -562291.0644  562291.0644 skva0402 UL
BS   174        .000000   300.000000 -46857.59277 -46857.59277 lkva0402 LL
```



```
C pkva0502   100.000000   100.000000 -46857.59277  46857.59277 lkva0402 LL
BS   175        .000000   100.000000 -46857.59277 -46857.59277 lkva0502 LL

C pkva0602   550.000000   550.000000 -46857.59277  46857.59277 lkva0502 LL
BS   176        .000000   550.000000 -9.37152E+34 -9.37152E+34

C pkva0103   382.500000   382.500000 -265526.3427  265526.3427 lkva0207 UL
BS   177        .000000   382.500000 -46857.59277 -46857.59277 PROS0302 UL

C pkva0203   117.500000   117.500000 -46857.59277  46857.59277 PROS0302 UL
BS   178        .000000   117.500000 -265526.3427 -265526.3427 lkva0207 UL

C pkva0303      .000000      .000000 -93715.18554  93715.18554 lkva0203 LL
BS   179        .000000      .000000 -46857.59277 -46857.59277 lkva0303 LL

C pkva0403   400.000000   400.000000 -46857.59277  46857.59277 lkva0303 LL
BS   180        .000000   400.000000 -46857.59277 -46857.59277 lkva0403 LL

C pkva0503   600.000000   600.000000 -46857.59277  46857.59277 lkva0403 LL
BS   181        .000000   600.000000 -9.37152E+34 -9.37152E+34

C pkva0603      .000000      .000000 -543548.0468  543548.0468 pkva0605 LL
BS   182        .000000      .000000 -9.37152E+34 -9.37152E+34

C pkva0104   300.000000   300.000000 -374860.7177  374860.7177 skva0104 UL
BS   183        .000000   300.000000 -140572.7661 -140572.7661 lkva0104 LL

C pkva0204      .000000      .000000    -1.000000 -1.00000E+30 lkva0204 LL
LL   184        .000000      .000000     1.000000     1.000000 lkva0204 UL

C pkva0304      .000000      .000000   -14.500000 -1.00000E+30 lkva0304 LL
LL   185        .000000      .000000    14.500000    14.500000 pkva0301 LL

C pkva0404   500.000000   500.000000 -93715.18554  93715.18554 pkva0204 LL
BS   186        .000000   500.000000 -46857.59277 -46857.59277 lkva0404 LL

C pkva0504   100.000000   100.000000 -46857.59277  46857.59277 lkva0404 LL
BS   187        .000000   100.000000 -46857.59277 -46857.59277 lkva0504 LL

C pkva0604   350.000000   350.000000 -46857.59277  46857.59277 lkva0504 LL
BS   188        .000000   350.000000 -9.37152E+34 -9.37152E+34

C pkva0105   800.000000   800.000000 -789885.1074  789885.1074 skva0105 UL
BS   189        .000000   800.000000 -287839.4531 -287839.4531 lkva0105 LL

C pkva0205   500.000000   500.000000 -287839.4531  287839.4531 lkva0105 LL
BS   190        .000000   500.000000 -9.37152E+34 -9.37152E+34

C pkva0305      .000000      .000000    -9.000000 -1.00000E+30 skva0301 UL
LL   191        .000000      .000000     9.000000     9.000000 pkva0301 LL

C pkva0405   200.000000   200.000000 -1030867.065  1030867.065 skva0405 UL
BS   192        .000000   200.000000 -46857.59277 -46857.59277 lkva0405 LL

C pkva0505  1100.000000  1100.000000 -46857.59277  46857.59277 lkva0405 LL
BS   193        .000000  1100.000000 -9.37152E+34 -9.37152E+34

C pkva0605      .000000      .000000   -29.000000 -1.00000E+30 skva0603 UL
LL   194        .000000      .000000    29.000000    29.000000 pkva0603 LL

C pkva0106   200.000000   200.000000 -682781.9824  682781.9824 skva0106 UL
BS   195        .000000   200.000000 -207512.1582 -207512.1582 lkva0106 LL

C pkva0206   300.000000   300.000000 -207512.1582  207512.1582 lkva0106 LL
BS   196        .000000   300.000000 -46857.59277 -46857.59277 lkva0206 LL

C pkva0306   400.000000   400.000000 -46857.59277  46857.59277 lkva0206 LL
BS   197        .000000   400.000000 -46857.59277 -46857.59277 lkva0306 LL
```

```
C pkva0406      .000000      .000000 -46857.59277  46857.59277 lkva0306 LL
BS   198        .000000      .000000 -46857.59277 -46857.59277 lkva0406 LL

C pkva0506   300.000000   300.000000 -46857.59277  46857.59277 lkva0406 LL
BS   199        .000000   300.000000 -46857.59277 -46857.59277 lkva0506 LL

C pkva0606   550.000000   550.000000 -46857.59277  46857.59277 lkva0506 LL
BS   200        .000000   550.000000 -9.37152E+34 -9.37152E+34

C pkva0107      .000000      .000000 -9.37152E+34  9.37152E+34
BS   201        .000000      .000000 -120490.9423 -120490.9423 skva0107 LL

C pkva0207   250.000000   250.000000 -199144.7509  199144.7509 lkva0207 UL
BS   202        .000000   250.000000 -9.37152E+34 -9.37152E+34

C pkva0307      .000000      .000000   -13.000000 -1.00000E+30 skva0307 LL
LL   203        .000000      .000000    13.000000    13.000000 skva0307 UL

C pkva0407   100.000000   100.000000 -281145.5322  281145.5322 skva0407 UL
BS   204        .000000   100.000000 -46857.59277 -46857.59277 lkva0407 LL

C pkva0507   100.000000   100.000000 -46857.59277  46857.59277 lkva0407 LL
BS   205        .000000   100.000000 -9.37152E+34 -9.37152E+34

C pkva0607      .000000      .000000   -37.000000 -1.00000E+30 skva0603 UL
LL   206        .000000      .000000    37.000000    37.000000 pkva0603 LL

XPRESS Modeller Log for problem: plan
RESTORE
?179(1):model save (SVM) file not found: plan.svm
INPUT
! File plan.mod
!
! Obligatorisk dataoeving i fag 92033 Operasjonsanalyse 2
!
! Levert av Trond M. Andersen, fak. for marinteknikk
!
! *******************************************************
!
! Alle filer forbundet med denne oevingen er paa formen plan.*
!
! *******************************************************
!
MODEL PLAN
!
!
TABLES
!
DIMM(5)          ! Inneholder maksverdier for de tre indeksene samt angivelse
!                  av hvilke modell (12.3 & 12.4) som skal kjoeres
DATA(3)          ! Tabell som inneholder skalare data
!
!
DISKDATA
!
 DIMM(1) = plan.dim
 DATA(1) = plan.dat
!
! Setter nye navn paa maks-verdiene til indeksene
!
LET PMAX  = DIMM(1)     ! Maksimalt antall produkter p [-]
LET TMAX  = DIMM(2)     ! Maksimalt antall maskintyper t [-]
LET MMAX  = DIMM(3)     ! Maksimalt antall tidsperioder (mnd.) m [-]
LET MOD   = DIMM(4)     ! Kjoere modell 12.3 (MOD=1) ellers modell 12.4
LET NMAX  = DIMM(5)     ! Max antall spesifikke lagerkrav
LET MLKAP = DATA(1)     ! Maksimal lagerkapasitet for alle produkttype [-]
LET KLAG  = DATA(2)     ! Lagerkost. pr. enhet for alle produkttyp. [NOK/time]
LET TPRM  = DATA(3)     ! Timer produksjon per periode (mnd.) [timer/mnd.]
!
```



```
! Definerer tabeller for data som er indeksspesifiserte
!
! **************************************************************************
!
!  MOD = 1 dersom man oensker aa kjoere modell 12.3
!  MOD = 0 dersom man oensker aa kjoere modell 12.4
!
! **************************************************************************
!
TABLES
!
! Data som leses direkte fra andre filer
!
 PRO(PMAX)          ! Profitt ved aa produsere en enhet av produkt type p
                    ! = diff. mellom salgsinntekt og raavarekostad [NOK/enhet]
!
 TID(TMAX,PMAX)     ! Prosesseringstid for maskin t ved prosessering
                    ! av produkt p [timer]
!
 VED(MMAX,TMAX)     ! Antall maskiner av typen t nede for vedlikehold i
                    ! periode (mnd.) m [-]
!
 ANTMA(TMAX)        ! Antall maskiner av maskintype t
!
 MABE(MMAX,PMAX)    ! Markedsrestriksjoner for produkt p i tidsperiode m [-]
!
 BEH(NMAX,2)        ! Oensket lagerbeholdning av produkt p i tidsperiodene m [-]
!
! Leser inn verdier til tabellene
!
DISKDATA
!
 PRO(1)          = plan.pro
 TID(1,1)        = plan.tid
 VED(1,1)        = plan.ved
 ANTMA(1)        = plan.ant
 MABE(1,1)       = plan.mab
 BEH(1,1)        = plan.beh
!
!
! ****************************************************************************
!
! Definerer variable
!
VARIABLES
!
skvant(m=1:MMAX,p=1:PMAX)        ! Solgt kvantum av produkt p i peridoe m
!
lkvant(m=1:MMAX,p=1:PMAX)        ! Lagret kvantum av produkt p i periode m
!
pkvant(m=1:PMAX,p=1:PMAX)        ! Produsert kvantum av produkt p i perioden m
!
mvedl(m=1:MMAX,t=1:TMAX)         ! Antall maskiner av typen t nede for
                                 ! vedlikehold i perioden m
! ****************************************************************************
CONSTRAINTS
!
! Objektfunksjonen: maks. profitt, dvs. maks av produksjon*nettoverdi
! minus lagringskostnader
!
 MAXOBJ:                                                                  &
 SUM(m=1:MMAX,p=1:PMAX) PRO(p) * skvant(m,p) -                            &
 SUM(m=1:MMAX,p=1:PMAX) KLAG * lkvant(m,p)                                $
!
! "Massebalanse": for hvert produkt p over hver periode p gjelder
! lagr.mengde(m-1,p) + prod.mengde(m,p) = solgt mengde(m,p) + lagr.mengde(m,p)
! Dette gjelder for alle perioder untatt en bestemt, hvor man skal tilfredst.
! en viss lagringsmengde, og den foerste, hvor lageret er tomt
!
```

```
 MAB0(p=1:PMAX):                                                      &
 pkvant(1,p) - skvant(1,p) - lkvant(1,p) = 0
!
 MABAL(p=1:PMAX,m=2:MMAX):                                             &
 lkvant(m-1,p) + pkvant(m,p) - skvant(m,p) - lkvant(m,p) = 0
!
! Prosesseringstid: det er ikke mer tilgjengelig prosesseringstid for hver
! maskintype t i tidsperioden m enn ant.maskiner i produksjon, (dvs. maks
Problem Statistics
Matrix PLAN
Objective MAXOBJ
RHS RHS00001
Problem has     85 rows and    156 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after      1 iterations
Objective function value is  108855.0000


Rows Section
   Number     Row     At      Value      Slack Value   Dual Value         RHS
 N      1  MAXOBJ    BS   108855.0000  -108855.0000      .000000       .000000
 E      2  MAB0  01  EQ       .000000       .000000      .000000       .000000
 E      3  MAB0  02  EQ       .000000       .000000      .000000       .000000
 E      4  MAB0  03  EQ       .000000       .000000      .000000       .000000
 E      5  MAB0  04  EQ       .000000       .000000      .000000       .000000
 E      6  MAB0  05  EQ       .000000       .000000      .000000       .000000
 E      7  MAB0  06  EQ       .000000       .000000      .000000       .000000
 E      8  MAB0  07  EQ       .000000       .000000      .000000       .000000
 E      9  MABA0102  EQ       .000000       .000000      .000000       .000000
 E     10  MABA0103  EQ       .000000       .000000     -.250000       .000000
 E     11  MABA0104  EQ       .000000       .000000   -10.000000       .000000
 E     12  MABA0105  EQ       .000000       .000000      .000000       .000000
 E     13  MABA0106  EQ       .000000       .000000      .000000       .000000
 E     14  MABA0202  EQ       .000000       .000000      .000000       .000000
 E     15  MABA0203  EQ       .000000       .000000     -.150000       .000000
 E     16  MABA0204  EQ       .000000       .000000    -6.000000       .000000
 E     17  MABA0205  EQ       .000000       .000000      .000000       .000000
 E     18  MABA0206  EQ       .000000       .000000      .000000       .000000
 E     19  MABA0302  EQ       .000000       .000000      .000000       .000000
 E     20  MABA0303  EQ       .000000       .000000      .000000       .000000
 E     21  MABA0304  EQ       .000000       .000000    -8.000000       .000000
 E     22  MABA0305  EQ       .000000       .000000      .000000       .000000
 E     23  MABA0306  EQ       .000000       .000000      .000000       .000000
 E     24  MABA0402  EQ       .000000       .000000      .000000       .000000
 E     25  MABA0403  EQ       .000000       .000000     -.350000       .000000
 E     26  MABA0404  EQ       .000000       .000000    -4.000000       .000000
 E     27  MABA0405  EQ       .000000       .000000      .000000       .000000
 E     28  MABA0406  EQ       .000000       .000000      .000000       .000000
 E     29  MABA0502  EQ       .000000       .000000      .000000       .000000
 E     30  MABA0503  EQ       .000000       .000000     -.500000       .000000
 E     31  MABA0504  EQ       .000000       .000000   -11.000000       .000000
 E     32  MABA0505  EQ       .000000       .000000      .000000       .000000
 E     33  MABA0506  EQ       .000000       .000000      .000000       .000000
 E     34  MABA0602  EQ       .000000       .000000      .000000       .000000
 E     35  MABA0603  EQ       .000000       .000000      .000000       .000000
 E     36  MABA0604  EQ       .000000       .000000      .000000       .000000
 E     37  MABA0605  EQ       .000000       .000000      .000000       .000000
 E     38  MABA0606  EQ       .000000       .000000      .000000       .000000
 E     39  MABA0702  EQ       .000000       .000000      .000000       .000000
 E     40  MABA0703  EQ       .000000       .000000     -.400000       .000000
 E     41  MABA0704  EQ       .000000       .000000    -3.000000       .000000
 E     42  MABA0705  EQ       .000000       .000000      .000000       .000000
 E     43  MABA0706  EQ       .000000       .000000      .000000       .000000
 L     44  PROT0101  BS   1280.000000    256.000000      .000000   1536.000000
 L     45  PROT0102  BS   1289.000000    247.000000      .000000   1536.000000
 L     46  PROT0103  BS   1434.000000    102.000000      .000000   1536.000000
 L     47  PROT0104  BS       .000000   1536.000000      .000000   1536.000000
```



```
 L     48  PROT0105  BS    430.000000   1106.000000      .000000   1536.000000
 L     49  PROT0106  BS   1170.000000    366.000000      .000000   1536.000000
 L     50  PROT0201  BS    460.000000    308.000000      .000000    768.000000
 L     51  PROT0202  BS    724.000000     44.000000      .000000    768.000000
 L     52  PROT0203  BS    450.000000    318.000000      .000000    768.000000
 L     53  PROT0204  BS    384.000000    384.000000      .000000    768.000000
 L     54  PROT0205  BS    230.000000    538.000000      .000000    768.000000
 L     55  PROT0206  BS    600.000000    168.000000      .000000    768.000000
 L     56  PROT0301  BS    784.000000    368.000000      .000000   1152.000000
 L     57  PROT0302  BS    370.000000    782.000000      .000000   1152.000000
 L     58  PROT0303  BS   1048.000000    104.000000      .000000   1152.000000
 L     59  PROT0304  BS       .000000   1152.000000      .000000   1152.000000
 L     60  PROT0305  BS    400.000000    752.000000      .000000   1152.000000
 L     61  PROT0306  BS    296.000000    856.000000      .000000   1152.000000
 L     62  PROT0401  BS    164.000000    220.000000      .000000    384.000000
 L     63  PROT0402  BS     97.000000    287.000000      .000000    384.000000
 L     64  PROT0403  UL    124.000000    260.000000     5.000000    384.000000
 L     65  PROT0404  UL    384.000000       .000000   200.000000    384.000000
 L     66  PROT0405  BS    110.000000    274.000000      .000000    384.000000
 L     67  PROT0406  BS    192.300000    191.700000      .000000    384.000000
 L     68  PROT0501  BS     48.000000    336.000000      .000000    384.000000
 L     69  PROT0502  BS     29.500000    354.500000      .000000    384.000000
 L     70  PROT0503  BS     41.000000    343.000000      .000000    384.000000
 L     71  PROT0504  UL    384.000000       .000000   800.000000    384.000000
 L     72  PROT0505  BS     55.000000    329.000000      .000000    384.000000
 L     73  PROT0506  BS     64.500000    319.500000      .000000    384.000000
 E     74  MASK1     EQ      2.000000       .000000      .000000      2.000000
 E     75  MASK1502  EQ      2.000000       .000000      .000000      2.000000
 E     76  MASK1503  EQ      3.000000       .000000      .000000      3.000000
 E     77  MASK1504  EQ      1.000000       .000000      .000000      1.000000
 E     78  MASK1505  EQ      1.000000       .000000      .000000      1.000000
 E     79  TVUN0101  EQ     50.000000       .000000     -.500000     50.000000
 E     80  TVUN0102  EQ     50.000000       .000000     -.500000     50.000000
 E     81  TVUN0103  EQ     50.000000       .000000     -.500000     50.000000
 E     82  TVUN0104  EQ     50.000000       .000000     -.500000     50.000000
 E     83  TVUN0105  EQ     50.000000       .000000     -.500000     50.000000
 E     84  TVUN0106  EQ     50.000000       .000000     -.500000     50.000000
 E     85  TVUN0107  EQ     50.000000       .000000     -.500000     50.000000

Columns Section
   Number    Column   At      Value      Input Cost   Reduced Cost
 C     86  skva0101  UL    500.000000     10.000000    -10.000000
 C     87  skva0201  UL    600.000000     10.000000    -10.000000
 C     88  skva0301  UL    300.000000     10.000000     -9.750000
 C     89  skva0401  BS    100.000000     10.000000       .000000
 C     90  skva0501  LL       .000000     10.000000    -10.000000
 C     91  skva0601  UL    500.000000     10.000000    -10.000000
 C     92  skva0102  UL   1000.000000      6.000000     -6.000000
 C     93  skva0202  UL    500.000000      6.000000     -6.000000
 C     94  skva0302  UL    600.000000      6.000000     -5.850000
 C     95  skva0402  BS    100.000000      6.000000       .000000
 C     96  skva0502  UL    100.000000      6.000000     -6.000000
 C     97  skva0602  UL    500.000000      6.000000     -6.000000
 C     98  skva0103  UL    300.000000      8.000000     -8.000000
 C     99  skva0203  UL    200.000000      8.000000     -8.000000
 C    100  skva0303  LL       .000000      8.000000     -8.000000
 C    101  skva0403  BS    100.000000      8.000000       .000000
 C    102  skva0503  UL    500.000000      8.000000     -8.000000
 C    103  skva0603  UL    100.000000      8.000000     -8.000000
 C    104  skva0104  UL    300.000000      4.000000     -4.000000
 C    105  skva0204  LL       .000000      4.000000     -4.000000
 C    106  skva0304  LL       .000000      4.000000     -3.650000
 C    107  skva0404  BS    100.000000      4.000000       .000000
 C    108  skva0504  UL    100.000000      4.000000     -4.000000
 C    109  skva0604  UL    300.000000      4.000000     -4.000000
 C    110  skva0105  UL    800.000000     11.000000    -11.000000
 C    111  skva0205  UL    400.000000     11.000000    -11.000000
 C    112  skva0305  UL    500.000000     11.000000    -10.500000
 C    113  skva0405  BS    100.000000     11.000000       .000000
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 C    114  skva0505  UL   1000.000000     11.000000    -11.000000
 C    115  skva0605  UL   1100.000000     11.000000    -11.000000
 C    116  skva0106  UL    200.000000      9.000000     -9.000000
 C    117  skva0206  UL    300.000000      9.000000     -9.000000
 C    118  skva0306  UL    400.000000      9.000000     -9.000000
 C    119  skva0406  LL       .000000      9.000000     -9.000000
 C    120  skva0506  UL    300.000000      9.000000     -9.000000
 C    121  skva0606  UL    500.000000      9.000000     -9.000000
 C    122  skva0107  UL    100.000000      3.000000     -3.000000
 C    123  skva0207  UL    150.000000      3.000000     -3.000000
 C    124  skva0307  UL    100.000000      3.000000     -2.600000
 C    125  skva0407  BS    100.000000      3.000000       .000000
 C    126  skva0507  LL       .000000      3.000000     -3.000000
 C    127  skva0607  UL     60.000000      3.000000     -3.000000
 C    128  lkva0101  LL       .000000      -.500000       .500000
 C    129  lkva0201  LL       .000000      -.500000       .250000
 C    130  lkva0301  UL    100.000000      -.500000     -9.250000
 C    131  lkva0401  LL       .000000      -.500000     10.500000
 C    132  lkva0501  LL       .000000      -.500000       .500000
 C    133  lkva0601  BS     50.000000      -.500000       .000000
 C    134  lkva0102  LL       .000000      -.500000       .500000
 C    135  lkva0202  LL       .000000      -.500000       .350000
 C    136  lkva0302  UL    100.000000      -.500000     -5.350000
 C    137  lkva0402  LL       .000000      -.500000      6.500000
 C    138  lkva0502  LL       .000000      -.500000       .500000
 C    139  lkva0602  BS     50.000000      -.500000       .000000
 C    140  lkva0103  LL       .000000      -.500000       .500000
 C    141  lkva0203  LL       .000000      -.500000       .500000
 C    142  lkva0303  UL    100.000000      -.500000     -7.500000
 C    143  lkva0403  LL       .000000      -.500000      8.500000
 C    144  lkva0503  LL       .000000      -.500000       .500000
 C    145  lkva0603  BS     50.000000      -.500000       .000000
 C    146  lkva0104  LL       .000000      -.500000       .500000
 C    147  lkva0204  LL       .000000      -.500000       .150000
 C    148  lkva0304  UL    100.000000      -.500000     -3.150000
 C    149  lkva0404  LL       .000000      -.500000      4.500000
 C    150  lkva0504  LL       .000000      -.500000       .500000
 C    151  lkva0604  BS     50.000000      -.500000       .000000
 C    152  lkva0105  LL       .000000      -.500000       .500000
 C    153  lkva0205  BS       .000000      -.500000       .000000
 C    154  lkva0305  UL    100.000000      -.500000    -10.000000
 C    155  lkva0405  LL       .000000      -.500000     11.500000
 C    156  lkva0505  LL       .000000      -.500000       .500000
 C    157  lkva0605  BS     50.000000      -.500000       .000000
 C    158  lkva0106  LL       .000000      -.500000       .500000
 C    159  lkva0206  LL       .000000      -.500000       .500000
 C    160  lkva0306  LL       .000000      -.500000       .500000
 C    161  lkva0406  LL       .000000      -.500000       .500000
 C    162  lkva0506  LL       .000000      -.500000       .500000
 C    163  lkva0606  BS     50.000000      -.500000       .000000
 C    164  lkva0107  LL       .000000      -.500000       .500000
 C    165  lkva0207  LL       .000000      -.500000       .100000
 C    166  lkva0307  UL    100.000000      -.500000     -2.100000
 C    167  lkva0407  LL       .000000      -.500000      3.500000
 C    168  lkva0507  LL       .000000      -.500000       .500000
 C    169  lkva0607  BS     50.000000      -.500000       .000000
 C    170  pkva0101  BS    500.000000       .000000       .000000
 C    171  pkva0201  BS    600.000000       .000000       .000000
 C    172  pkva0301  BS    400.000000       .000000       .000000
 C    173  pkva0401  LL       .000000       .000000       .000000
 C    174  pkva0501  LL       .000000       .000000       .000000
 C    175  pkva0601  BS    550.000000       .000000       .000000
 C    176  pkva0102  BS   1000.000000       .000000       .000000
 C    177  pkva0202  BS    500.000000       .000000       .000000
 C    178  pkva0302  BS    700.000000       .000000       .000000
 C    179  pkva0402  BS       .000000       .000000       .000000
 C    180  pkva0502  BS    100.000000       .000000       .000000
 C    181  pkva0602  BS    550.000000       .000000       .000000
 C    182  pkva0103  BS    300.000000       .000000       .000000
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 C    183  pkva0203  BS    200.000000       .000000       .000000
 C    184  pkva0303  BS    100.000000       .000000       .000000
 C    185  pkva0403  BS       .000000       .000000       .000000
 C    186  pkva0503  BS    500.000000       .000000       .000000
 C    187  pkva0603  BS    150.000000       .000000       .000000
 C    188  pkva0104  BS    300.000000       .000000       .000000
 C    189  pkva0204  LL       .000000       .000000       .000000
 C    190  pkva0304  BS    100.000000       .000000       .000000
 C    191  pkva0404  LL       .000000       .000000     10.000000
 C    192  pkva0504  BS    100.000000       .000000       .000000
 C    193  pkva0604  BS    350.000000       .000000       .000000
 C    194  pkva0105  BS    800.000000       .000000       .000000
 C    195  pkva0205  BS    400.000000       .000000       .000000
 C    196  pkva0305  BS    600.000000       .000000       .000000
 C    197  pkva0405  LL       .000000       .000000     49.000000
 C    198  pkva0505  BS   1000.000000       .000000       .000000
 C    199  pkva0605  BS   1150.000000       .000000       .000000
 C    200  pkva0106  BS    200.000000       .000000       .000000
 C    201  pkva0206  BS    300.000000       .000000       .000000
 C    202  pkva0306  BS    400.000000       .000000       .000000
 C    203  pkva0406  LL       .000000       .000000       .000000
 C    204  pkva0506  BS    300.000000       .000000       .000000
 C    205  pkva0606  BS    550.000000       .000000       .000000
 C    206  pkva0107  BS    100.000000       .000000       .000000
 C    207  pkva0207  BS    150.000000       .000000       .000000
 C    208  pkva0307  BS    200.000000       .000000       .000000
 C    209  pkva0407  LL       .000000       .000000     53.000000
 C    210  pkva0507  BS       .000000       .000000       .000000
 C    211  pkva0607  BS    110.000000       .000000       .000000
 C    212  mved0101  UL       .000000       .000000       .000000
 C    213  mved0201  UL      1.000000       .000000       .000000
 C    214  mved0301  BS      1.000000       .000000       .000000
 C    215  mved0401  LL       .000000       .000000       .000000
 C    216  mved0501  LL       .000000       .000000       .000000
 C    217  mved0601  UL       .000000       .000000       .000000
 C    218  mved0102  UL       .000000       .000000       .000000
 C    219  mved0202  BS      1.000000       .000000       .000000
 C    220  mved0302  UL       .000000       .000000       .000000
 C    221  mved0402  LL      1.000000       .000000       .000000
 C    222  mved0502  LL       .000000       .000000       .000000
 C    223  mved0602  LL       .000000       .000000       .000000
 C    224  mved0103  UL      1.000000       .000000       .000000
 C    225  mved0203  LL       .000000       .000000       .000000
 C    226  mved0303  BS      2.000000       .000000       .000000
 C    227  mved0403  LL       .000000       .000000       .000000
 C    228  mved0503  LL       .000000       .000000       .000000
 C    229  mved0603  LL       .000000       .000000       .000000
 C    230  mved0104  BS       .000000       .000000       .000000
 C    231  mved0204  LL       .000000       .000000       .000000
 C    232  mved0304  LL       .000000       .000000   1920.000000
 C    233  mved0404  LL      1.000000       .000000   76800.00000
 C    234  mved0504  LL       .000000       .000000       .000000
 C    235  mved0604  LL       .000000       .000000       .000000
 C    236  mved0105  BS       .000000       .000000       .000000
 C    237  mved0205  LL       .000000       .000000       .000000
 C    238  mved0305  LL       .000000       .000000       .000000
 C    239  mved0405  LL      1.000000       .000000   307200.0000
 C    240  mved0505  LL       .000000       .000000       .000000
 C    241  mved0605  LL       .000000       .000000       .000000

Problem Statistics
Matrix PLAN
Objective MAXOBJ
RHS RHS00001
Problem has     80 rows and    126 structural columns

Solution Statistics
Maximisation performed
Optimal solution found after     25 iterations
```

```
Objective function value is  93715.17857

N MAXOBJ    93715.17857  499729541.0      .000000             PROS0101 UL
BS     1   -93715.17857  93715.18554      .000000

E MAB0  01      .000000  14619567.87    -4.285714             skva0102 UL
EQ     2        .000000 -116581677.2     4.285714             skva0102 LL

E MAB0  02      .000000  10442548.82    -6.000000             skva0102 UL
EQ     3        .000000 -83272626.95     6.000000             skva0102 LL

E MAB0  03      .000000  35846054.68      .000000             pkva0103 LL
EQ     4        .000000 -87389404.29      .000000             PROS0301 UL

E MAB0  04      .000000  28114553.22      .000000             pkva0104 LL
EQ     5        .000000 -103175952.1      .000000             PROS0201 UL

E MAB0  05      .000000  24365944.82    -2.571429             skva0102 UL
EQ     6        .000000 -194302795.4     2.571429             pkva0102 LL

E MAB0  06      .000000  18743035.88    -1.714286             pkva0106 LL
EQ     7        .000000 -57018291.01     1.714286             PROS0201 UL

E MAB0  07      .000000      .000000    -4.285714             pkva0107 LL
EQ     8        .000000 -116519201.6     4.285714             PROS0301 UL

E MABA0102      .000000  6560062.988     -.125000             lkva0103 UL
EQ     9        .000000 -30926008.30      .125000             lkva0103 LL

E MABA0103      .000000  9371518.554   -10.000000             skva0301 LL
EQ    10        .000000 -18743035.88    10.000000             skva0301 UL

E MABA0104      .000000  18743035.88      .000000             pkva0401 LL
EQ    11        .000000 -144321374.5      .000000             PROS0204 UL

E MABA0105      .000000      .000000      .000000             pkva0501 LL
EQ    12        .000000 -120330285.6      .000000             PROS0105 UL

E MABA0106      .000000  51543344.72      .000000             pkva0601 LL
EQ    13        .000000 -143571643.0      .000000             PROS0106 UL

E MABA0202      .000000  56229106.44      .000000             pkva0202 LL
EQ    14        .000000 -57701772.46      .000000             PROS0102 UL

E MABA0203      .000000  9371518.554    -6.000000             skva0302 LL
EQ    15        .000000 -46857587.89     6.000000             skva0302 UL

E MABA0204      .000000  28114553.22      .000000             pkva0402 LL
EQ    16        .000000 -72160688.47      .000000             PROS0204 UL

E MABA0205      .000000  9371518.554      .000000             pkva0502 LL
EQ    17        .000000 -72160688.47      .000000             PROS0205 UL

E MABA0206      .000000  51543344.72      .000000             pkva0602 LL
EQ    18        .000000 -78720751.95      .000000             PROS0206 UL

E MABA0302      .000000  1640015.747     -.500000             lkva0103 UL
EQ    19        .000000 -7731502.929      .500000             lkva0103 LL

E MABA0303      .000000      .000000      .000000             pkva0303 LL
EQ    20        .000000 -134949853.5      .000000             PROS0303 UL

E MABA0304      .000000  37486071.77      .000000             pkva0403 LL
EQ    21        .000000 -85749394.53      .000000             PROS0304 UL

E MABA0305      .000000  56229106.44      .000000             pkva0503 LL
EQ    22        .000000 -71692109.37      .000000             PROS0305 UL

E MABA0306      .000000  4685759.277    -8.000000             skva0603 UL
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EQ    23        .000000 -4685759.277     8.000000             skva0603 LL

E MABA0402      .000000  9371518.554     1.000000             lkva0204 UL
EQ    24        .000000      .000000    -1.000000             lkva0204 LL

E MABA0403      .000000  9371518.554      .500000             lkva0304 UL
EQ    25        .000000      .000000     -.500000             lkva0304 LL

E MABA0404      .000000  46857587.89      .000000             pkva0404 LL
EQ    26        .000000 -48107124.02      .000000             PROS0204 UL

E MABA0405      .000000  9371518.554      .000000             pkva0504 LL
EQ    27        .000000 -48107124.02      .000000             PROS0205 UL

E MABA0406      .000000  32800310.05      .000000             pkva0604 LL
EQ    28        .000000 -52480498.04      .000000             PROS0206 UL

E MABA0502      .000000  46857587.89      .000000             pkva0205 LL
EQ    29        .000000 -134637463.3      .000000             PROS0102 UL

E MABA0503      .000000  9371518.554   -11.000000             skva0305 LL
EQ    30        .000000 -37486071.77    11.000000             skva0305 UL

E MABA0504      .000000  18743035.88      .000000             pkva0405 LL
EQ    31        .000000 -283019824.2      .000000             PROS0404 UL

E MABA0505      .000000  103086694.3      .000000             pkva0505 LL
EQ    32        .000000 -200550476.0      .000000             PROS0105 UL

E MABA0506      .000000  98400937.50   -11.000000             skva0605 UL
EQ    33        .000000 -4685759.277    11.000000             skva0605 LL

E MABA0602      .000000  28114553.22      .000000             pkva0206 LL
EQ    34        .000000 -62164399.41      .000000             PROS0202 UL

E MABA0603      .000000  37486071.77      .000000             pkva0306 LL
EQ    35        .000000 -82469355.46      .000000             PROS0203 UL

E MABA0604      .000000      .000000      .000000             pkva0406 LL
EQ    36        .000000 -24053562.01      .000000             PROS0204 UL

E MABA0605      .000000  28114553.22      .000000             pkva0506 LL
EQ    37        .000000 -24053562.01      .000000             PROS0205 UL

E MABA0606      .000000  51543344.72      .000000             pkva0606 LL
EQ    38        .000000 -26240249.02      .000000             PROS0206 UL

E MABA0702      .000000  2186687.500     -.375000             lkva0103 UL
EQ    39        .000000 -10308669.43      .375000             lkva0103 LL

E MABA0703      .000000      .000000    -3.000000             skva0307 UL
EQ    40        .000000 -9371518.554     3.000000             skva0307 LL

E MABA0704      .000000  9371518.554      .000000             pkva0407 LL
EQ    41        .000000 -114332519.5      .000000             PROS0304 UL

E MABA0705      .000000  9371518.554      .000000             pkva0507 LL
EQ    42        .000000 -95589482.42      .000000             PROS0305 UL

E MABA0706      .000000  937151.7578    -3.000000             skva0607 UL
EQ    43        .000000 -4685759.277     3.000000             skva0607 LL

L PROS0101  1152.000000  58291992.18     8.571429             skva0102 LL
UL    44        .000000 -7308632.324    -8.571429             skva0102 UL

L PROS0102  1105.000000  4686864.257      .000000             lkva0207 UL
BS    45     431.000000 -1873198.730      .000000             lkva0206 LL

L PROS0103    80.000000  1874383.666      .000000             lkva0206 LL
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BS    46    1456.000000     80.000000      .000000              pkva0302 LL

L PROS0104   420.000000    420.000000      .000000              lkva0306 LL
BS    47    1116.000000 -6559642.578      .000000              lkva0402 LL

L PROS0105   510.000000  6560572.753      .000000              lkva0402 LL
BS    48     642.000000 -6559552.734      .000000              lkva0502 LL

L PROS0106   770.000000  6560833.007      .000000              lkva0502 LL
BS    49     766.000000    770.000000      .000000              pkva0607 LL

L PROS0201   437.714286  1339226.074      .000000              skva0107 LL
BS    50     330.285714 -5086958.007      .000000              lkva0106 LL

L PROS0202   370.000000  5623281.250      .000000              lkva0106 LL
BS    51     398.000000 -5622541.503      .000000              lkva0206 LL

L PROS0203   240.000000  5623151.367      .000000              lkva0206 LL
BS    52     528.000000    240.000000      .000000              pkva0302 LL

L PROS0204   230.000000    230.000000      .000000              lkva0306 LL
BS    53     154.000000 -5622681.152      .000000              lkva0406 LL

L PROS0205   230.000000  5623141.113      .000000              lkva0406 LL
BS    54     154.000000 -5622681.152      .000000              lkva0506 LL

L PROS0206   600.000000  5623511.230      .000000              lkva0506 LL
BS    55     168.000000    600.000000      .000000

L PROS0301   406.000000  5623317.382      .000000              lkva0207 UL
BS    56     746.000000 -1311606.567      .000000              PROS0302 UL

L PROS0302   384.000000  1312396.606      .625000              lkva0103 UL
UL    57        .000000 -6184818.359     -.625000              lkva0103 LL

L PROS0303      .000000       .000000      .000000              pkva0302 LL
BS    58    1152.000000 -7497214.843      .000000              lkva0303 LL

L PROS0304   420.000000  7497634.765      .000000              lkva0303 LL
BS    59     732.000000 -7496794.921      .000000              lkva0403 LL

L PROS0305   540.000000  7497754.882      .000000              lkva0403 LL
BS    60     612.000000 -1873763.671      .000000              lkva0501 LL

L PROS0306   110.000000  1874413.696      .000000              lkva0501 LL
BS    61     658.000000    110.000000      .000000

L PROS0401   152.657143  15744302.97      .000000              skva0104 UL
BS    62     231.342857 -5247897.949      .000000              lkva0104 LL

L PROS0402   123.000000  5997895.019      .000000              lkva0207 UL
BS    63     261.000000 -5247927.246      .000000              pkva0204 LL

L PROS0403      .000000       .000000   200.000000              pkva0301 LL
UL    64        .000000 -7497214.843  -200.000000              skva0301 UL

L PROS0404    82.000000  5248132.324      .000000              pkva0204 LL
BS    65     302.000000 -7497132.812      .000000              lkva0405 LL

L PROS0405   128.000000  7497342.773      .000000              lkva0405 LL
BS    66     256.000000 -5247922.363      .000000              lkva0504 LL

L PROS0406    68.500000  5248118.652      .000000              lkva0504 LL
BS    67     315.500000     68.500000      .000000              pkva0605 LL

L PROS0501    43.825000  19492801.51      .000000              skva0105 UL
BS    68     340.175000 -7497170.898      .000000              skva0107 LL

L PROS0502    38.675000  262441.1865      .000000              PROS0302 UL
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BS    69     345.325000 -374822.0214      .000000              lkva0101 LL

L PROS0503      .000000       .000000      .000000              lkva0203 LL
BS    70     384.000000 -1499442.993      .000000              lkva0303 LL

L PROS0504    19.000000  1499461.914      .000000              lkva0303 LL
BS    71     365.000000 -7497195.800      .000000              lkva0405 LL

L PROS0505    66.000000  7497280.761      .000000              lkva0405 LL
BS    72     318.000000     66.000000      .000000

L PROS0506      .000000       .000000   800.000000              pkva0603 LL
UL    73        .000000 -749721.4355  -800.000000              skva0603 UL

E TVUN0101    50.000000  4685809.082     -.500000              lkva0601 UL
EQ    74        .000000 -4685708.984      .500000              lkva0601 LL

E TVUN0102    50.000000  4685809.082     -.500000              lkva0602 UL
EQ    75        .000000 -4685708.984      .500000              lkva0602 LL

E TVUN0103    50.000000  4685809.082    -8.500000              skva0603 LL
EQ    76        .000000 -4685708.984     8.500000              skva0603 UL

E TVUN0104    50.000000  4685809.082     -.500000              lkva0604 UL
EQ    77        .000000 -4685708.984      .500000              lkva0604 LL

E TVUN0105    50.000000  4685809.082   -11.500000              skva0605 LL
EQ    78        .000000 -4685708.984    11.500000              lkva0605 LL

E TVUN0106    50.000000  4685809.082     -.500000              lkva0606 UL
EQ    79        .000000 -4685708.984      .500000              lkva0606 LL

E TVUN0107    50.000000  4685809.082    -3.500000              skva0607 LL
EQ    80        .000000 -937101.7578     3.500000              skva0607 UL

C skva0101   500.000000   500.000000     5.714286     4.285714 skva0102 UL
UL    81      10.000000   500.000000    -5.714286  1.00000E+30 skva0102 LL

C skva0201   600.000000   600.000000     9.875000      .125000 lkva0103 LL
UL    82      10.000000   600.000000    -9.875000  1.00000E+30 lkva0103 UL

C skva0301   100.000000   100.000000      .000000    10.000000 pkva0302 LL
BS    83      10.000000   100.000000 -9.37152E+34 -9.37152E+34

C skva0401   200.000000   200.000000    10.000000      .000000 pkva0401 LL
UL    84      10.000000   200.000000   -10.000000  1.00000E+30 PROS0204 UL

C skva0501      .000000      .000000    10.000000 -1.00000E+30 pkva0501 LL
LL    85      10.000000      .000000   -10.000000      .000000 PROS0105 UL

C skva0601   500.000000   500.000000    10.000000      .000000 pkva0601 LL
UL    86      10.000000   500.000000   -10.000000  1.00000E+30 PROS0106 UL

C skva0102   888.571429   888.571411 -168687.3046  168693.3105 skva0107 LL
BS    87       6.000000   888.571411 -749721.4355 -749715.4296 skva0101 UL

C skva0202   500.000000   500.000000     6.000000      .000000 pkva0202 LL
UL    88       6.000000   500.000000    -6.000000  1.00000E+30 PROS0102 UL

C skva0302   100.000000   100.000000 -515433.4960  515439.5019 lkva0202 UL
BS    89       6.000000   100.000000      .000000     6.000000 pkva0302 LL

C skva0402   300.000000   300.000000     6.000000      .000000 pkva0402 LL
UL    90       6.000000   300.000000    -6.000000  1.00000E+30 PROS0204 UL

C skva0502   100.000000   100.000000     6.000000      .000000 pkva0502 LL
UL    91       6.000000   100.000000    -6.000000  1.00000E+30 PROS0205 UL

C skva0602   500.000000   500.000000     6.000000      .000000 pkva0602 LL
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UL    92       6.000000   500.000000    -6.000000  1.00000E+30 PROS0206 UL

C skva0103   300.000000   300.000000     8.000000      .000000 pkva0103 LL
UL    93       8.000000   300.000000    -8.000000  1.00000E+30 PROS0301 UL

C skva0203   200.000000   200.000000     7.500000      .500000 lkva0103 LL
UL    94       8.000000   200.000000    -7.500000  1.00000E+30 lkva0103 UL

C skva0303      .000000      .000000     8.000000 -1.00000E+30 pkva0303 LL
LL    95       8.000000      .000000    -8.000000      .000000 PROS0303 UL

C skva0403   400.000000   400.000000     8.000000      .000000 pkva0403 LL
UL    96       8.000000   400.000000    -8.000000  1.00000E+30 PROS0304 UL

C skva0503   500.000000   500.000000     8.000000      .000000 pkva0503 LL
UL    97       8.000000   500.000000    -8.000000  1.00000E+30 PROS0305 UL

C skva0603    50.000000    50.000000 -543548.0468  543556.0546 pkva0605 LL
BS    98       8.000000    50.000000 -9.37152E+34 -9.37152E+34

C skva0104   300.000000   300.000000     4.000000      .000000 pkva0104 LL
UL    99       4.000000   300.000000    -4.000000  1.00000E+30 PROS0201 UL

C skva0204      .000000      .000000     5.000000 -1.00000E+30 lkva0204 UL
LL   100       4.000000      .000000    -5.000000    -1.000000 lkva0204 LL

C skva0304      .000000      .000000     4.500000 -1.00000E+30 lkva0304 UL
LL   101       4.000000      .000000    -4.500000     -.500000 lkva0304 LL

C skva0404   500.000000   500.000000     4.000000      .000000 pkva0404 LL
UL   102       4.000000   500.000000    -4.000000  1.00000E+30 PROS0204 UL

C skva0504   100.000000   100.000000     4.000000      .000000 pkva0504 LL
UL   103       4.000000   100.000000    -4.000000  1.00000E+30 PROS0205 UL

C skva0604   300.000000   300.000000     4.000000      .000000 pkva0604 LL
UL   104       4.000000   300.000000    -4.000000  1.00000E+30 PROS0206 UL

C skva0105   800.000000   800.000000     8.428572     2.571429 skva0102 UL
UL   105      11.000000   800.000000    -8.428572  1.00000E+30 pkva0102 LL

C skva0205   400.000000   400.000000    11.000000      .000000 pkva0205 LL
UL   106      11.000000   400.000000   -11.000000  1.00000E+30 PROS0102 UL

C skva0305   100.000000   100.000000 -984009.3750  984020.3125 lkva0205 UL
BS   107      11.000000   100.000000 -843436.6210 -843425.5859 pkva0305 LL

C skva0405   200.000000   200.000000    11.000000      .000000 pkva0405 LL
UL   108      11.000000   200.000000   -11.000000  1.00000E+30 PROS0404 UL

C skva0505  1000.000000  1000.000000    11.000000      .000000 pkva0505 LL
UL   109      11.000000  1000.000000   -11.000000  1.00000E+30 PROS0105 UL

C skva0605    50.000000    50.000000 -984009.3750  984020.3125 lkva0505 UL
BS   110      11.000000    50.000000 -2717740.478 -2717729.492 pkva0605 LL

C skva0106   200.000000   200.000000     7.285714     1.714286 pkva0106 LL
UL   111       9.000000   200.000000    -7.285714  1.00000E+30 PROS0201 UL

C skva0206   300.000000   300.000000     9.000000      .000000 pkva0206 LL
UL   112       9.000000   300.000000    -9.000000  1.00000E+30 PROS0202 UL

C skva0306   400.000000   400.000000     9.000000      .000000 pkva0306 LL
UL   113       9.000000   400.000000    -9.000000  1.00000E+30 PROS0203 UL

C skva0406      .000000      .000000     9.000000 -1.00000E+30 pkva0406 LL
LL   114       9.000000      .000000    -9.000000      .000000 PROS0204 UL

C skva0506   300.000000   300.000000     9.000000      .000000 pkva0506 LL
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UL   115       9.000000   300.000000    -9.000000  1.00000E+30 PROS0205 UL

C skva0606   500.000000   500.000000     9.000000      .000000 pkva0606 LL
UL   116       9.000000   500.000000    -9.000000  1.00000E+30 PROS0206 UL

C skva0107      .000000      .000000    -1.285714 -1.00000E+30 pkva0107 LL
LL   117       3.000000      .000000     1.285714     4.285714 PROS0301 UL

C skva0207   150.000000   150.000000     2.625000      .375000 lkva0103 LL
UL   118       3.000000   150.000000    -2.625000  1.00000E+30 lkva0103 UL

C skva0307   100.000000   100.000000 -199144.7509  199147.7416 lkva0207 UL
BS   119       3.000000   100.000000 -1218297.485 -1218294.433 pkva0307 LL

C skva0407   100.000000   100.000000     3.000000      .000000 pkva0407 LL
UL   120       3.000000   100.000000    -3.000000  1.00000E+30 PROS0304 UL

C skva0507      .000000      .000000     3.000000 -1.00000E+30 pkva0507 LL
LL   121       3.000000      .000000    -3.000000      .000000 PROS0305 UL

C skva0607    50.000000    50.000000 -234287.9394  234290.9423 lkva0507 UL
BS   122       3.000000    50.000000 -3467461.914 -3467458.984 pkva0607 LL

C lkva0101      .000000      .000000    -4.660714 -1.00000E+30 lkva0103 UL
LL   123      -.500000      .000000     4.660714     4.160714 lkva0103 LL

C lkva0201   100.000000   100.000000     9.375000    -9.875000 skva0301 LL
UL   124      -.500000   100.000000    -9.375000  1.00000E+30 lkva0103 UL

C lkva0301      .000000      .000000   -10.500000 -1.00000E+30 skva0301 UL
LL   125      -.500000      .000000    10.500000    10.000000 skva0301 LL

C lkva0401      .000000      .000000     -.500000 -1.00000E+30 pkva0401 LL
LL   126      -.500000      .000000      .500000      .000000 pkva0501 LL

C lkva0501      .000000      .000000     -.500000 -1.00000E+30 pkva0501 LL
LL   127      -.500000      .000000      .500000      .000000 pkva0601 LL

C lkva0601    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   128      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0102      .000000      .000000    -6.500000 -1.00000E+30 skva0102 UL
LL   129      -.500000      .000000     6.500000     6.000000 pkva0202 LL

C lkva0202   100.000000   100.000000     5.500000    -6.000000 skva0302 LL
UL   130      -.500000   100.000000    -5.500000  1.00000E+30 skva0302 UL

C lkva0302      .000000      .000000    -6.500000 -1.00000E+30 skva0302 UL
LL   131      -.500000      .000000     6.500000     6.000000 skva0302 LL

C lkva0402      .000000      .000000     -.500000 -1.00000E+30 pkva0402 LL
LL   132      -.500000      .000000      .500000      .000000 pkva0502 LL

C lkva0502      .000000      .000000     -.500000 -1.00000E+30 pkva0502 LL
LL   133      -.500000      .000000      .500000      .000000 pkva0602 LL

C lkva0602    50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   134      -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0103    82.500000    82.500000 -265526.3427  265525.8300 lkva0207 UL
BS   135      -.500000    82.500000 -46857.59277 -46858.09082 PROS0302 UL

C lkva0203      .000000      .000000    -1.000000 -1.00000E+30 lkva0103 LL
LL   136      -.500000      .000000     1.000000      .500000 pkva0303 LL

C lkva0303      .000000      .000000     -.500000 -1.00000E+30 pkva0303 LL
LL   137      -.500000      .000000      .500000      .000000 pkva0403 LL

C lkva0403      .000000      .000000     -.500000 -1.00000E+30 pkva0403 LL
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LL   138       -.500000      .000000      .500000      .000000 pkva0503 LL

C lkva0503  100.000000   100.000000     7.500000    -8.000000 skva0603 LL
UL   139       -.500000   100.000000    -7.500000  1.00000E+30 skva0603 UL

C lkva0603   50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   140       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0104      .000000      .000000    -1.500000 -1.00000E+30 lkva0204 LL
LL   141       -.500000      .000000     1.500000     1.000000 lkva0204 UL

C lkva0204      .000000      .000000 -9.37152E+34  9.37152E+34
BS   142       -.500000      .000000 -93715.18554 -93715.68359 pkva0204 LL

C lkva0304      .000000      .000000 -9.37152E+34  9.37152E+34
BS   143       -.500000      .000000 -93715.18554 -93715.68359 pkva0204 LL

C lkva0404      .000000      .000000     -.500000 -1.00000E+30 pkva0404 LL
LL   144       -.500000      .000000      .500000      .000000 pkva0504 LL

C lkva0504      .000000      .000000     -.500000 -1.00000E+30 pkva0504 LL
LL   145       -.500000      .000000      .500000      .000000 pkva0604 LL

C lkva0604   50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   146       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0105      .000000      .000000    -3.071429 -1.00000E+30 skva0102 UL
LL   147       -.500000      .000000     3.071429     2.571429 pkva0205 LL

C lkva0205  100.000000   100.000000    10.500000   -11.000000 skva0305 LL
UL   148       -.500000   100.000000   -10.500000  1.00000E+30 skva0305 UL

C lkva0305      .000000      .000000   -11.500000 -1.00000E+30 skva0305 UL
LL   149       -.500000      .000000    11.500000    11.000000 skva0305 LL

C lkva0405      .000000      .000000     -.500000 -1.00000E+30 pkva0405 LL
LL   150       -.500000      .000000      .500000      .000000 pkva0505 LL

C lkva0505  100.000000   100.000000    10.500000   -11.000000 skva0605 LL
UL   151       -.500000   100.000000   -10.500000  1.00000E+30 skva0605 UL

C lkva0605   50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   152       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0106      .000000      .000000    -2.214286 -1.00000E+30 pkva0106 LL
LL   153       -.500000      .000000     2.214286     1.714286 pkva0206 LL

C lkva0206      .000000      .000000     -.500000 -1.00000E+30 pkva0206 LL
LL   154       -.500000      .000000      .500000      .000000 pkva0306 LL

C lkva0306      .000000      .000000     -.500000 -1.00000E+30 PROS0204 UL
LL   155       -.500000      .000000      .500000      .000000 pkva0406 LL

C lkva0406      .000000      .000000     -.500000 -1.00000E+30 pkva0406 LL
LL   156       -.500000      .000000      .500000      .000000 PROS0204 UL

C lkva0506      .000000      .000000     -.500000 -1.00000E+30 PROS0206 UL
LL   157       -.500000      .000000      .500000      .000000 PROS0205 UL

C lkva0606   50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   158       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C lkva0107      .000000      .000000    -4.410714 -1.00000E+30 pkva0107 LL
LL   159       -.500000      .000000     4.410714     3.910714 lkva0103 LL

C lkva0207  100.000000   100.000000     2.125000    -2.625000 skva0307 LL
UL   160       -.500000   100.000000    -2.125000  1.00000E+30 skva0307 UL

C lkva0307      .000000      .000000    -3.500000 -1.00000E+30 skva0307 UL
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LL   161       -.500000      .000000     3.500000     3.000000 skva0307 LL

C lkva0407      .000000      .000000     -.500000 -1.00000E+30 pkva0407 LL
LL   162       -.500000      .000000      .500000      .000000 pkva0507 LL

C lkva0507  100.000000   100.000000     2.500000    -3.000000 skva0607 LL
UL   163       -.500000   100.000000    -2.500000  1.00000E+30 skva0607 UL

C lkva0607   50.000000    50.000000 -9.37152E+34  9.37152E+34
BS   164       -.500000    50.000000 -9.37152E+34 -9.37152E+34

C pkva0101  500.000000   500.000000 -535515.2832  535515.2832 skva0101 UL
BS   165        .000000   500.000000 -436779.6386 -436779.6386 lkva0101 LL

C pkva0201  700.000000   700.000000 -436779.6386  436779.6386 lkva0101 LL
BS   166        .000000   700.000000 -9.37152E+34 -9.37152E+34

C pkva0301      .000000      .000000      .000000      .000000 pkva0302 LL
BS   167        .000000      .000000 -9.37152E+34 -9.37152E+34

C pkva0401  200.000000   200.000000 -937151.7578  937151.7578 skva0401 UL
BS   168        .000000   200.000000 -46857.59277 -46857.59277 lkva0401 LL

C pkva0501      .000000      .000000 -46857.59277  46857.59277 lkva0401 LL
BS   169        .000000      .000000 -46857.59277 -46857.59277 lkva0501 LL

C pkva0601  550.000000   550.000000 -46857.59277  46857.59277 lkva0501 LL
BS   170        .000000   550.000000 -9.37152E+34 -9.37152E+34

C pkva0102  888.571429   888.571411 -168687.3046  168687.3046 skva0107 LL
BS   171        .000000   888.571411 -749721.4355 -749721.4355 skva0101 UL

C pkva0202  600.000000   600.000000 -515433.4960  515433.4960 lkva0202 UL
BS   172        .000000   600.000000 -9.37152E+34 -9.37152E+34

C pkva0302      .000000      .000000      .000000 -1.00000E+30 skva0302 LL
LL   173        .000000      .000000      .000000      .000000 pkva0301 LL

C pkva0402  300.000000   300.000000 -562291.0644  562291.0644 skva0402 UL
BS   174        .000000   300.000000 -46857.59277 -46857.59277 lkva0402 LL

C pkva0502  100.000000   100.000000 -46857.59277  46857.59277 lkva0402 LL
BS   175        .000000   100.000000 -46857.59277 -46857.59277 lkva0502 LL

C pkva0602  550.000000   550.000000 -46857.59277  46857.59277 lkva0502 LL
BS   176        .000000   550.000000 -9.37152E+34 -9.37152E+34

C pkva0103  382.500000   382.500000 -265526.3427  265526.3427 lkva0207 UL
BS   177        .000000   382.500000 -46857.59277 -46857.59277 PROS0302 UL

C pkva0203  117.500000   117.500000 -46857.59277  46857.59277 PROS0302 UL
BS   178        .000000   117.500000 -265526.3427 -265526.3427 lkva0207 UL

C pkva0303      .000000      .000000 -93715.18554  93715.18554 lkva0203 LL
BS   179        .000000      .000000 -46857.59277 -46857.59277 lkva0303 LL

C pkva0403  400.000000   400.000000 -46857.59277  46857.59277 lkva0303 LL
BS   180        .000000   400.000000 -46857.59277 -46857.59277 lkva0403 LL

C pkva0503  600.000000   600.000000 -46857.59277  46857.59277 lkva0403 LL
BS   181        .000000   600.000000 -9.37152E+34 -9.37152E+34

C pkva0603      .000000      .000000 -543548.0468  543548.0468 pkva0605 LL
BS   182        .000000      .000000 -9.37152E+34 -9.37152E+34

C pkva0104  300.000000   300.000000 -374860.7177  374860.7177 skva0104 UL
BS   183        .000000   300.000000 -140572.7661 -140572.7661 lkva0104 LL

C pkva0204      .000000      .000000    -1.000000 -1.00000E+30 lkva0204 LL
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LL   184         .000000      .000000     1.000000     1.000000 lkva0204 UL

C pkva0304       .000000      .000000   -14.500000 -1.00000E+30 lkva0304 LL
LL   185         .000000      .000000    14.500000    14.500000 pkva0301 LL

C pkva0404    500.000000   500.000000 -93715.18554  93715.18554 pkva0204 LL
BS   186         .000000   500.000000 -46857.59277 -46857.59277 lkva0404 LL

C pkva0504    100.000000   100.000000 -46857.59277  46857.59277 lkva0404 LL
BS   187         .000000   100.000000 -46857.59277 -46857.59277 lkva0504 LL

C pkva0604    350.000000   350.000000 -46857.59277  46857.59277 lkva0504 LL
BS   188         .000000   350.000000 -9.37152E+34 -9.37152E+34

C pkva0105    800.000000   800.000000 -789885.1074  789885.1074 skva0105 UL
BS   189         .000000   800.000000 -287839.4531 -287839.4531 lkva0105 LL

C pkva0205    500.000000   500.000000 -287839.4531  287839.4531 lkva0105 LL
BS   190         .000000   500.000000 -9.37152E+34 -9.37152E+34

C pkva0305       .000000      .000000    -9.000000 -1.00000E+30 skva0301 UL
LL   191         .000000      .000000     9.000000     9.000000 pkva0301 LL

C pkva0405    200.000000   200.000000 -1030867.065  1030867.065 skva0405 UL
BS   192         .000000   200.000000 -46857.59277 -46857.59277 lkva0405 LL

C pkva0505   1100.000000  1100.000000 -46857.59277  46857.59277 lkva0405 LL
BS   193         .000000  1100.000000 -9.37152E+34 -9.37152E+34

C pkva0605       .000000      .000000   -29.000000 -1.00000E+30 skva0603 UL
LL   194         .000000      .000000    29.000000    29.000000 pkva0603 LL

C pkva0106    200.000000   200.000000 -682781.9824  682781.9824 skva0106 UL
BS   195         .000000   200.000000 -207512.1582 -207512.1582 lkva0106 LL

C pkva0206    300.000000   300.000000 -207512.1582  207512.1582 lkva0106 LL
BS   196         .000000   300.000000 -46857.59277 -46857.59277 lkva0206 LL

C pkva0306    400.000000   400.000000 -46857.59277  46857.59277 lkva0206 LL
BS   197         .000000   400.000000 -46857.59277 -46857.59277 lkva0306 LL

C pkva0406       .000000      .000000 -46857.59277  46857.59277 lkva0306 LL
BS   198         .000000      .000000 -46857.59277 -46857.59277 lkva0406 LL

C pkva0506    300.000000   300.000000 -46857.59277  46857.59277 lkva0406 LL
BS   199         .000000   300.000000 -46857.59277 -46857.59277 lkva0506 LL

C pkva0606    550.000000   550.000000 -46857.59277  46857.59277 lkva0506 LL
BS   200         .000000   550.000000 -9.37152E+34 -9.37152E+34

C pkva0107       .000000      .000000 -9.37152E+34  9.37152E+34
BS   201         .000000      .000000 -120490.9423 -120490.9423 skva0107 LL

C pkva0207    250.000000   250.000000 -199144.7509  199144.7509 lkva0207 UL
BS   202         .000000   250.000000 -9.37152E+34 -9.37152E+34

C pkva0307       .000000      .000000   -13.000000 -1.00000E+30 skva0307 LL
LL   203         .000000      .000000    13.000000    13.000000 skva0307 UL

C pkva0407    100.000000   100.000000 -281145.5322  281145.5322 skva0407 UL
BS   204         .000000   100.000000 -46857.59277 -46857.59277 lkva0407 LL

C pkva0507    100.000000   100.000000 -46857.59277  46857.59277 lkva0407 LL
BS   205         .000000   100.000000 -9.37152E+34 -9.37152E+34

C pkva0607       .000000      .000000   -37.000000 -1.00000E+30 skva0603 UL
LL   206         .000000      .000000    37.000000    37.000000 pkva0603 LL

*************************************************
```



```
*                                                *
*                                                *
*       Oppgave 9 i Williams                     *
*                                                *
*       Loest av:                                *
*       Olav Magne Reinen <olavr@foa.unit.no>    *
*                                                *
*       Foelgende filer kommer fortloepende:     *

        ov9.mod

*                                                *
*                                                *
**************************************************

MODEL ov9

! INDEKSER
! t - tidsperioder t=1...TMAX
! i,j - industri (Manpower ikke med) i,j=1...IMAX
! n - ant. m lfunksjoner n=1...NMAX

TABLES

 DIMM(3)        ! Dimensjonstabell som inneholder maksimalverdi p  de3 indeksene

!                               Leser dimensjonstabellen for indeksene

DISKDATA

 DIMM(1) =  ov9.dim

!       Setter nytt navn p  maksimalverdiene av indeksene

LET TMAX = DIMM(1)
LET  IMAX = DIMM(2)
LET  NMAX = DIMM(3)

!       Definerer tabeller for data som er indeksspesifiserte

TABLES

!       Data som skal leses direkte fra andre filer

 OMAN(IMAX)             ! mengde manpower input for en output i industri i
 CMAN(IMAX)             ! mengde manpower input for en kapasitets°kning i industri i
 DEMAND(IMAX)   !  rlig ettersp°rsel for industri i (eksogen)
 INKAP(IMAX)            ! initiell kapasitet for industri i
 PKOF(IMAX,IMAX)  ! mengde input fra industri i for produksjon av en enhet i industri j
 PKAP(IMAX,IMAX)        ! mengde input fra industri i for kapasitets°kning i industri j
 DELTA(NMAX)            ! indikator for valg av m lfunksjon (binµrvariabel)
 INLAGER(IMAX)  ! lager i  r 0

DISKDATA

 OMAN(1)        = ov9.oma
 CMAN(1)        = ov9.cma
 DEMAND(1)      = ov9.dem
 INKAP(1)       = ov9.ink
 PKOF(1,1)      = ov9.pko
 PKAP(1,1)      = ov9.pka
 DELTA(1)       = ov9.del
 INLAGER(1)     = ov9.inl


VARIABLES

 y (i=1:IMAX,t=2:TMAX) ! ekstra prod.kapasitet for industri i som blir effektiv i  r t.
```

```
 x (i=1:IMAX,t=1:TMAX+2)        ! total output for industri i  r t.
 s (i=1:IMAX,t=1:TMAX+2)        ! lagerniv  for industri i ved begynnelsen av  r t.

CONSTRAINTS

 maal:  SUM(t=2:TMAX,i=1:IMAX | DELTA(1) .eq. 1) y(i,t) &
        + SUM(i=1:IMAX | DELTA(1) .eq. 1) INKAP(i) &
        + SUM(t=TMAX-1:TMAX,i=1:IMAX | DELTA(2) .eq. 1) x(i,t) &
        + SUM(t=1:TMAX, i=1:IMAX | DELTA(3) .eq. 1) OMAN(i) * x(i,t+1) &
        + SUM(t=1:TMAX-2, i=1:IMAX | DELTA(3) .eq. 1) CMAN(i) * y(i,t+2) $

 prodkap(i=1:IMAX,t=1:TMAX+2): x(i,t) < INKAP(i) + SUM(l=2:TMAX | l .le. t) y(i,l)

 manpower(t=1:TMAX | DELTA(3) .eq. 0): SUM(i=1:IMAX ) OMAN(i)* x(i,t+1) &
   + SUM(i=1:IMAX | t .le. TMAX-2) CMAN(i)*y(i,t+2)   <  470

 totalinput(i=1:IMAX,t=1:TMAX+2): SUM(j=1:IMAX | t .le. TMAX+1) PKOF(i,j)*x(j,t+1) &
                        + SUM(j=1:IMAX | t .le. TMAX-2) PKAP(i,j)*y(j,t+2) &
                        < x(i,t) + s(i,t) - SUM(| t .le.  TMAX+1) s(i,t+1)  &
                        - SUM(|DELTA (2) .ne. 1) DEMAND(i)

! hs(i=1:IMAX,t=1:TMAX+2): x(i,t) + s(i,t) - SUM(| t .le.  TMAX+1) s(i,t+1) &
!                         - SUM(|DELTA (2) .ne. 1) DEMAND(i) > 0

 inputaar0(i=1:IMAX): SUM(j=1:IMAX) PKOF(i,j)*x(j,1) &
                        + SUM(j=1:IMAX) PKAP(i,j)*y(j,2) &
                        < INLAGER(i) - s(i,1)

 sl1(i=1:IMAX): s(i,TMAX+2) - s(i,TMAX+1) = 0

 sl2(i=1:IMAX): s(i,TMAX+1) - s(i,TMAX) = 0

GENERATE
*************************************************
*                                               *
*                                               *
*       Oppgave 12 i Williams                   *
*                                               *
*       Loest av:                               *
*       Knut Ragnar Fostad (knutfos@foa.unit.no)*
*       Stig Are Henstein (sah@foa.unit.no)     *
*       Per Ola Sneve (persn@foa.unit.no)       *
*                                               *
*       Foelgende filer kommer fortloepende:    *

        ov12.dim
        ov12.end
        ov12.log
        ov12.lst
        ov12.mod
        ov12.prt


*                                               *
*                                               *
*************************************************

!   File:   ov12.dim
!
!   Setter konstanter i MODEL NORGATES
!
!   IMAX - Maks antall NOR-gates
!   NMAX - Antall innganger
!   LMAX - Antall linjer i logisk tabell
!
!   IMAX    NMAX    LMAX
    5   ,    2   ,   4
!       File: ov12.end
!
```



```
!       Tillhører MODEL NORGATES
!
!       Logisk utgang ved gitte kombinasjoner
!       gitt i logisk.dat
!
        0       ,       0       ,       0       ,       1
!       File: ov12.log
!
!       Tillhører MODEL NORGATES
!
!       Logiske kombinasjoner som inngang
!       til portene. Linjer vertikalt,
!       innganger horisontalt.
!
        0       ,       0       ,       1       ,       1
        0       ,       1       ,       0       ,       1
XPRESS Modeller Log for problem: ov12
input
!  File: ov12.mod
!
!       Obligatorisk oeving i Operasjonsanalyse 2
!
!       Levert av
!
!               Knut Fostad
!               Stig Are Henstein
!               Per Ola Sneve
!
!
!       Xpressmodell for aa finne minste antall
!       NOR-porter for aa bygge en gitt
!       funksjon.
!
!       Leser inn maks antall NOR-porter, antall inganger
!       logisk sluttverdi og alle kombinasjoner for inngangene
!
!
MODEL   NORGATES
!
!
TABLES
!
 DIMM(3)
!
!
DISKDATA
!
 DIMM(1) = ov12.dim
!
LET IMAX = DIMM(1)                          !Maks antall porter
LET NMAX = DIMM(2)                          !Antall innganger
LET LMAX = DIMM(3)                          !Antall linjer i logisk tabell
LET ILAV = int(IMAX/2)
!
!
TABLES
!
 ALFA(NMAX,LMAX)                            !Gir inputverdi fra Input n linje l
 BETA(LMAX)                                 !Outputverdi fra den endelige
!                                           sloeyfa med kombinasjon gitt i
!                                           linje l (fra tabell beta)
!
DISKDATA
!
  ALFA(1,1) = ov12.log
  BETA(1)   = ov12.end
!
!
!
```

```
!
!
!
VARIABLES
!
 port(i=1:IMAX)                   !Indikerer om port i eksisterer
 input(i=1:IMAX,n=1:NMAX)         !Indikerer om Input n er en
!                                  inngang til port i
 x(i=1:IMAX,l=1:LMAX)             !Logisk flyt i NOR-gate sloeyfa
!
!
!
!
CONSTRAINTS
!
!
!       Minimer maalfunksjon
!
 MINOBJ:               &
               sum(i=1:IMAX)port(i)    $
!
!
!       En port kan bare ha en inngang om den eksisterer
!
 Eksists(i=1:IMAX,n=1:NMAX):                     &
               port(i) - input(i,n) > 0
!
!
!       2 innganger pr port
!
 Inngang(i=1:ILAV):               &
               port(2*i) + port(2*i+1) + sum(n=1:NMAX)input(i,n) < 2
!
!
!       Logisk funksjon
!
 Log1(i=1:ILAV,l=1:LMAX):         &
               x(2*i,  l) + x(i,l) < 1
!
 Log2(i=1:ILAV,l=1:LMAX):         &
               x(2*i+1,l) + x(i,l) < 1
!
 Log3(n=1:NMAX,l=1:LMAX,i=1:IMAX | ALFA(n,l) .eq. 1):   &
               input(i,n) + x(i,l)<1
!
!
!       Gjoer gjennom sannhetstabellen for alle
!       kombinasjoner av verdier
!
 Log4(i=ILAV+1:IMAX,l=1:LMAX):            &
               sum(n=1:NMAX | ALFA(n,l) .eq. 1 )input(i,n)     +               &
               x(i,l) - port(i) > 0
!
!
 Log5(i=1:ILAV,l=1:LMAX):                 &
               sum(n=1:NMAX | ALFA(n,l) .eq. 1) input(i,n)     +               &
               x(2*i,l) + x(2*i+1,l)  +                                &
               x(i,l)   - port(i) > 0
!
!
!       Sannhetstabell for resultatkonfigurasjonen
!
 Log6(l=1:LMAX):                &
               x(1,l) = BETA(l)
!
 Log7(i=1:IMAX,l=1:LMAX): &
        port(i) - x(i,l) > 0
!
!
```



```
BOUNDS
!
 port(i=1:IMAX)          .BV.            !Indikerer om port i eksisterer
 input(i=1:IMAX,n=1:NMAX)  .BV.           !Indikerer om Input n er en
!                                         inngang til port i
 x(i=1:IMAX,l=1:LMAX)    .BV.
!
! port(1)=1
!
!
GENERATE

Generating matrix NORGATES
          93 rows
          35 structural columns
         225 matrix elements
          39 rhs elements
          35 bound elements
           0 general integer variables
          35 binary variables
           0 semi-continuous variables
           0 partial integer variables
           0 special ordered sets
           0 set members
           0 directives
density is     6.912442  percent

!  File: ov12.mod
!
!       Obligatorisk oeving i Operasjonsanalyse 2
!
!       Levert av
!
!               Knut Fostad
!               Stig Are Henstein
!               Per Ola Sneve
!
!
!       Xpressmodell for aa finne minste antall
!       NOR-porter for aa bygge en gitt
!       funksjon.
!
!       Leser inn maks antall NOR-porter, antall inganger
!       logisk sluttverdi og alle kombinasjoner for inngangene
!
!
MODEL   NORGATES
!
!
TABLES
!
 DIMM(3)
!
!
DISKDATA
!
 DIMM(1) = ov12.dim
!
LET IMAX = DIMM(1)                       !Maks antall porter
LET NMAX = DIMM(2)                       !Antall innganger
LET LMAX = DIMM(3)                       !Antall linjer i logisk tabell
LET ILAV = int(IMAX/2)
!
!
TABLES
!
 ALFA(NMAX,LMAX)                         !Gir inputverdi fra Input n linje l
 BETA(LMAX)                              !Outputverdi fra den endelige
!                                        sloeyfa med kombinasjon gitt i
```

```
!                                       linje l (fra tabell beta)
!
DISKDATA
!
  ALFA(1,1) = ov12.log
  BETA(1)   = ov12.end
!
!
!
!
!
!
VARIABLES
!
 port(i=1:IMAX)                  !Indikerer om port i eksisterer
 input(i=1:IMAX,n=1:NMAX)        !Indikerer om Input n er en
!                                 inngang til port i
 x(i=1:IMAX,l=1:LMAX)            !Logisk flyt i NOR-gate sloeyfa
!
!
!
!
CONSTRAINTS
!
!
!       Minimer maalfunksjon
!
 MINOBJ:                &
                sum(i=1:IMAX)port(i)    $
!
!
!       En port kan bare ha en inngang om den eksisterer
!
 Eksists(i=1:IMAX,n=1:NMAX):                     &
                port(i) - input(i,n) > 0
!
!
!       2 innganger pr port
!
 Inngang(i=1:ILAV):              &
                port(2*i) + port(2*i+1) + sum(n=1:NMAX)input(i,n) < 2
!
!
!       Logisk funksjon
!
 Log1(i=1:ILAV,l=1:LMAX):        &
                x(2*i,  l) + x(i,l) < 1
!
 Log2(i=1:ILAV,l=1:LMAX):        &
                x(2*i+1,l) + x(i,l) < 1
!
 Log3(n=1:NMAX,l=1:LMAX,i=1:IMAX | ALFA(n,l) .eq. 1):   &
                input(i,n) + x(i,l)<1
!
!
!       Gjoer gjennom sannhetstabellen for alle
!       kombinasjoner av verdier
!
 Log4(i=ILAV+1:IMAX,l=1:LMAX):           &
                sum(n=1:NMAX | ALFA(n,l) .eq. 1 )input(i,n)     +                &
                x(i,l) - port(i) > 0
!
!
 Log5(i=1:ILAV,l=1:LMAX):                &
                sum(n=1:NMAX | ALFA(n,l) .eq. 1) input(i,n)     +                &
                x(2*i,l) + x(2*i+1,l)  +                                 &
                x(i,l)   - port(i) > 0
!
!
```



```
!       Sannhetstabell for resultatkonfigurasjonen
!
 Log6(l=1:LMAX):                  &
                x(1,l) = BETA(l)
!
 Log7(i=1:IMAX,l=1:LMAX): &
        port(i) - x(i,l) > 0
!
!
BOUNDS
!
 port(i=1:IMAX)         .BV.            !Indikerer om port i eksisterer
 input(i=1:IMAX,n=1:NMAX)   .BV.         !Indikerer om Input n er en
!                                        inngang til port i
 x(i=1:IMAX,l=1:LMAX)   .BV.
!
! port(1)=1
!
!
GENERATE

Problem Statistics
Matrix NORGATES
Objective MINOBJ
RHS RHS00001
Problem has     93 rows and     35 structural columns

Solution Statistics
Minimisation performed
Optimal solution found after      4 iterations
Objective function value is     3.000000


Rows Section
   Number     Row     At      Value      Slack Value   Dual Value        RHS
 N      1  MINOBJ    BS      3.000000     -3.000000       .000000       .000000
 G      2  Eksi0101  BS      1.000000      1.000000       .000000       .000000
 G      3  Eksi0102  BS      1.000000      1.000000       .000000       .000000
 G      4  Eksi0201  BS       .000000       .000000       .000000       .000000
 G      5  Eksi0202  BS      1.000000      1.000000       .000000       .000000
 G      6  Eksi0301  BS      1.000000      1.000000       .000000       .000000
 G      7  Eksi0302  BS       .000000       .000000       .000000       .000000
 G      8  Eksi0401  BS       .000000       .000000       .000000       .000000
 G      9  Eksi0402  BS       .000000       .000000       .000000       .000000
 G     10  Eksi0501  BS       .000000       .000000       .000000       .000000
 G     11  Eksi0502  BS       .000000       .000000       .000000       .000000
 L     12  Inngan01  BS      2.000000       .000000       .000000      2.000000
 L     13  Inngan02  BS      1.000000      1.000000       .000000      2.000000
 L     14  Log10101  BS      1.000000       .000000       .000000      1.000000
 L     15  Log10102  BS      1.000000       .000000       .000000      1.000000
 L     16  Log10103  BS       .000000      1.000000       .000000      1.000000
 L     17  Log10104  UL      1.000000       .000000       .000000      1.000000
 L     18  Log10201  BS      1.000000       .000000       .000000      1.000000
 L     19  Log10202  BS      1.000000       .000000       .000000      1.000000
 L     20  Log10203  BS       .000000      1.000000       .000000      1.000000
 L     21  Log10204  BS       .000000      1.000000       .000000      1.000000
 L     22  Log20101  BS      1.000000       .000000       .000000      1.000000
 L     23  Log20102  BS       .000000      1.000000       .000000      1.000000
 L     24  Log20103  BS      1.000000       .000000       .000000      1.000000
 L     25  Log20104  UL      1.000000       .000000       .000000      1.000000
 L     26  Log20201  BS      1.000000       .000000       .000000      1.000000
 L     27  Log20202  BS      1.000000       .000000       .000000      1.000000
 L     28  Log20203  BS       .000000      1.000000       .000000      1.000000
 L     29  Log20204  BS       .000000      1.000000       .000000      1.000000
 L     30  Log3 131  BS       .000000      1.000000       .000000      1.000000
 L     31  Log3 132  BS      1.000000       .000000       .000000      1.000000
 L     32  Log3 133  UL      1.000000       .000000       .000000      1.000000
 L     33  Log3 134  BS       .000000      1.000000       .000000      1.000000
 L     34  Log3 135  BS       .000000      1.000000       .000000      1.000000
```

```
  L     35  Log3 141  UL      1.000000         .000000         .000000       1.000000
  L     36  Log3 142  BS      1.000000         .000000         .000000       1.000000
  L     37  Log3 143  BS       .000000        1.000000         .000000       1.000000
  L     38  Log3 144  BS       .000000        1.000000         .000000       1.000000
  L     39  Log3 145  BS       .000000        1.000000         .000000       1.000000
  L     40  Log3 221  BS       .000000        1.000000         .000000       1.000000
  L     41  Log3 222  BS      1.000000         .000000         .000000       1.000000
  L     42  Log3 223  UL      1.000000         .000000         .000000       1.000000
  L     43  Log3 224  BS       .000000        1.000000         .000000       1.000000
  L     44  Log3 225  BS       .000000        1.000000         .000000       1.000000
  L     45  Log3 241  UL      1.000000         .000000         .000000       1.000000
  L     46  Log3 242  BS       .000000        1.000000         .000000       1.000000
  L     47  Log3 243  BS      1.000000         .000000         .000000       1.000000
  L     48  Log3 244  BS       .000000        1.000000         .000000       1.000000
  L     49  Log3 245  BS       .000000        1.000000         .000000       1.000000
  G     50  Log40301  LL       .000000         .000000         .000000        .000000
  G     51  Log40302  BS       .000000         .000000         .000000        .000000
  G     52  Log40303  BS       .000000         .000000         .000000        .000000
  G     53  Log40304  LL       .000000         .000000         .000000        .000000
  G     54  Log40401  BS       .000000         .000000         .000000        .000000
  G     55  Log40402  BS       .000000         .000000         .000000        .000000
  G     56  Log40403  BS       .000000         .000000         .000000        .000000
  G     57  Log40404  BS       .000000         .000000         .000000        .000000
  G     58  Log40501  BS       .000000         .000000         .000000        .000000
  G     59  Log40502  BS       .000000         .000000         .000000        .000000
  G     60  Log40503  BS       .000000         .000000         .000000        .000000
  G     61  Log40504  BS       .000000         .000000         .000000        .000000
  G     62  Log50101  BS      1.000000        1.000000         .000000        .000000
  G     63  Log50102  LL       .000000         .000000         .000000        .000000
  G     64  Log50103  LL       .000000         .000000         .000000        .000000
  G     65  Log50104  BS       .000000         .000000         .000000        .000000
  G     66  Log50201  LL       .000000         .000000         .000000        .000000
  G     67  Log50202  BS       .000000         .000000         .000000        .000000
  G     68  Log50203  LL       .000000         .000000         .000000        .000000
  G     69  Log50204  LL       .000000         .000000         .000000        .000000
  E     70  Log6  01  EQ       .000000         .000000         .000000        .000000
  E     71  Log6  02  EQ       .000000         .000000         .000000        .000000
  E     72  Log6  03  EQ       .000000         .000000         .000000        .000000
  E     73  Log6  04  EQ      1.000000         .000000       -1.000000       1.000000
  G     74  Log70101  BS      1.000000        1.000000         .000000        .000000
  G     75  Log70102  BS      1.000000        1.000000         .000000        .000000
  G     76  Log70103  BS      1.000000        1.000000         .000000        .000000
  G     77  Log70104  LL       .000000         .000000       -1.000000        .000000
  G     78  Log70201  BS       .000000         .000000         .000000        .000000
  G     79  Log70202  BS       .000000         .000000         .000000        .000000
  G     80  Log70203  BS      1.000000        1.000000         .000000        .000000
  G     81  Log70204  BS      1.000000        1.000000         .000000        .000000
  G     82  Log70301  BS       .000000         .000000         .000000        .000000
  G     83  Log70302  BS      1.000000        1.000000         .000000        .000000
  G     84  Log70303  LL       .000000         .000000         .000000        .000000
  G     85  Log70304  BS      1.000000        1.000000         .000000        .000000
  G     86  Log70401  LL       .000000         .000000       -1.000000        .000000
  G     87  Log70402  BS       .000000         .000000         .000000        .000000
  G     88  Log70403  BS       .000000         .000000         .000000        .000000
  G     89  Log70404  LL       .000000         .000000         .000000        .000000
  G     90  Log70501  LL       .000000         .000000       -1.000000        .000000
  G     91  Log70502  BS       .000000         .000000         .000000        .000000
  G     92  Log70503  BS       .000000         .000000         .000000        .000000
  G     93  Log70504  LL       .000000         .000000         .000000        .000000

 Columns Section
    Number   Column   At       Value      Input Cost   Reduced Cost
  C     94  port  01  BS      1.000000        1.000000         .000000
  C     95  port  02  LL      1.000000        1.000000        1.000000
  C     96  port  03  LL      1.000000        1.000000        1.000000
  C     97  port  04  BS       .000000        1.000000         .000000
  C     98  port  05  BS       .000000        1.000000         .000000
  C     99  inpu0101  BS       .000000         .000000         .000000
  C    100  inpu0201  BS      1.000000         .000000         .000000
```



```
  C    101  inpu0301  BS       .000000        .000000        .000000
  C    102  inpu0401  LL       .000000        .000000        .000000
  C    103  inpu0501  LL       .000000        .000000        .000000
  C    104  inpu0102  BS       .000000        .000000        .000000
  C    105  inpu0202  BS       .000000        .000000        .000000
  C    106  inpu0302  BS      1.000000        .000000        .000000
  C    107  inpu0402  LL       .000000        .000000        .000000
  C    108  inpu0502  LL       .000000        .000000        .000000
  C    109  x   0101  BS       .000000        .000000        .000000
  C    110  x   0201  BS      1.000000        .000000        .000000
  C    111  x   0301  BS      1.000000        .000000        .000000
  C    112  x   0401  LL       .000000        .000000       1.000000
  C    113  x   0501  LL       .000000        .000000       1.000000
  C    114  x   0102  BS       .000000        .000000        .000000
  C    115  x   0202  BS      1.000000        .000000        .000000
  C    116  x   0302  BS       .000000        .000000        .000000
  C    117  x   0402  LL       .000000        .000000        .000000
  C    118  x   0502  LL       .000000        .000000        .000000
  C    119  x   0103  BS       .000000        .000000        .000000
  C    120  x   0203  BS       .000000        .000000        .000000
  C    121  x   0303  BS      1.000000        .000000        .000000
  C    122  x   0403  LL       .000000        .000000        .000000
  C    123  x   0503  LL       .000000        .000000        .000000
  C    124  x   0104  BS      1.000000        .000000        .000000
  C    125  x   0204  BS       .000000        .000000        .000000
  C    126  x   0304  BS       .000000        .000000        .000000
  C    127  x   0404  BS       .000000        .000000        .000000
  C    128  x   0504  BS       .000000        .000000        .000000
*************************************************
*                                               *
*                                               *
*       Oppgave 15 i Williams                   *
*                                               *
*       Loest av:                               *
*       Endre Koksvik Nisja(endreni@foa.unit.no)*
*                                               *
*       Foelgende filer kommer fortloepende:    *

        power.dim
        power.gen
        power.lst
        power.mod
        power.per
        power.prt
        power.res

*                                               *
*                                               *
*************************************************

! File power.dim
!
!       Denne filen inneholder indeksverdier for periode og generatortype
!
! ant. perioder         ant. generatortyper
!    (PMAX)                   (TMAX)

        5,                       3
!
! File power.gen
!
! Denne fila inneholder info om de ulike generatortypene
! Antall generatortyper m  stemme med antallet lagt inn i fila power.dim
!
!
! GENMIN(t)     - min. produksjon for en generator av type t
! GENMAX(t)     - maks. produksjon for en generator av type t
! MINKOST(t)    - kost pr time ved min. prod. for generator av type t
! TIMKOST(t)    - ekstra kost pr time pr MW over minimum for type t
```

```
! STARTK(t)      - startkostnad for generator av type t
! GENANT(t)      - antall tilgjengelige generatorer av type t
!
!
!     GENMIN  GENMAX  MINKOST TIMKOST  STARTK  GENANT
!
        850,    2000,   1000,   2.00,   2000,   12     ! type 1
        1250,   1750,   2600,   1.30,   1000,   10     ! type 2
        1500,   4000,   3000,   3.00,   500,    5       ! type 3

! File power.mod
!
!
MODEL POWER
!
!
!       Definerer tabeller for indeksverdier og reservefaktor
TABLES
!
 DIMM(2)        ! Inneh. ant. perioderog ant. typer generatorer
 RESERV(1)      ! Inneh. faktor for n¢dvendig reserve
!
!
!       Leser indeksverdier og reservefaktor fra fil
DISKDATA
!
 DIMM(1)        = power.dim
 RESERV(1)      = power.res
!
LET     PMAX    = DIMM(1)       ! antall perioder
LET     TMAX    = DIMM(2)       ! antall generatortyper
LET     RESERVE = RESERV(1)     ! faktor for n¢dvendig reserve
!
!
!       Definerer tabeller for indeksavhengige verdier
TABLES
!
 PINFO(PMAX,2)          ! Inneh. periodenes lengde og last
!
 GENINFO(TMAX,6)        ! Inneh. data for generatortypene
!
!
!       Leser inn indeksavhengige verdier
DISKDATA
!
 PINFO(1,1)     = power.per
 GENINFO(1,1)   = power.gen
!
!
!       Legger informasjonen inn i endimensjonale tabeller
ASSIGN
!
 TIMER(p=1:PMAX)    = PINFO(p,1)         ! antall timer i periode p
 LAST(p=1:PMAX)     = PINFO(p,2)         ! ettersp¢rsel i periode p
!
 GENMIN(t=1:TMAX)  = GENINFO(t,1)       ! min.prod for generator av type t
 GENMAX(t=1:TMAX)  = GENINFO(t,2)       ! maks.prod type t
 MINKOST(t=1:TMAX) = GENINFO(t,3)       ! kost pr time ved min. prod.
 TIMKOST(t=1:TMAX) = GENINFO(t,4)       ! ekstra kost pr time pr MW over min.
 STARTK(t=1:TMAX)  = GENINFO(t,5)       ! startkost for generator av type t
 GENANT(t=1:TMAX)  = GENINFO(t,6)       ! ant. tilgjengelige gen. av type t
!
!
!
VARIABLES
!
 n(t=1:TMAX,p=1:PMAX)           ! antall generatorer av type t som er
!                               ! i drift i periode p
!
```



```
 s(t=1:TMAX,p=1:PMAX)           ! antall generatorer av type t som startes
!                               ! opp i periode p
!
 prod(t=1:TMAX,p=1:PMAX)        ! totalproduksjon for generatorer
!                               ! av type t i periode p
!
!
!
CONSTRAINTS
!
!       M l: minimerer totale kostnader
!
 TOTKOST: &
    SUM(t=1:TMAX,p=1:PMAX) (TIMKOST(t) * TIMER(p)) * prod(t,p)   &
  + SUM(t=1:TMAX,p=1:PMAX) (MINKOST(t)                           &
  - TIMKOST(t) * GENMIN(t)) * TIMER(p) * n(t,p)                  &
  + SUM(t=1:TMAX,p=1:PMAX) STARTK(t) * s(t,p)                    $
!
!
!
!       Ettersp¢rselen m  dekkes
!
 DEKNING(p=1:PMAX):&
      SUM(t=1:TMAX) prod(t,p) - LAST(p)         = 0
!
!
!       Generatorprod. m  befinne seg i lovlig omr de
!
 MINPROD(t=1:TMAX,p=1:PMAX):&
      GENMIN(t) * n(t,p) - prod(t,p)            < 0
!
 MAXPROD(t=1:TMAX,p=1:PMAX):&
      prod(t,p) - GENMAX(t) * n(t,p)            < 0
!
!
!        Tilstrekkelig reservekapasitet
!
 RESKAP(p=1:PMAX):&
      RESERVE * LAST(p) - SUM(t=1:TMAX) GENMAX(t) * n(t,p)      < 0
!
!
!       Antall generatorer startet i periode p er gitt ved diff. mellom
!       antall gen. som g r i denne perioden og de som gikk i den forrige.
!       M  bruke ">" for   unng  negative s(t,p)
!
 START(t=1:TMAX,p=2:PMAX):&
      n(t,p) - n(t,p-1) - s(t,p)        < 0     ! alle p utenom den f¢rste
!
 STARTF(t=1:TMAX):&
      n(t,1) - n(t,PMAX) - s(t,1)       < 0     ! f¢rste periode
!
!
!
!
BOUNDS
!
!
!       s er ogs  heltallsvariabel
!
 s(t=1:TMAX,p=1:PMAX) .UI. GENANT(t)
!
!       Kan ikke overskride antall tilgjengelige generatorer
!
 n(t=1:TMAX,p=1:PMAX) .UI. GENANT(t)
!
GENERATE
!
! File power.per
!
```

```
! Denne filen inneholder info om den enkelte periode
! Antall perioder m  stemme medantallet lagt inn i filen power.dim
!
!
!   ant. timer      ettersp rsel
!    TIMER(p)          LAST(p)
!
        6,             15000  ! periode 1
        3,             30000  ! periode 2
        6,             25000  ! periode 3
        3,             40000  ! periode 4
        6,             27000   ! periode 5



Problem Statistics
Matrix POWER
Objective TOTKOST
RHS RHS00001
Problem has     56 rows and     45 structural columns

Solution Statistics
Minimisation performed
Optimal solution found after      1 iterations
Objective function value is  988540.0000


Rows Section
   Number     Row    At      Value      Slack Value   Dual Value        RHS
 N      1  TOTKOST   BS   988540.0000  -988540.0000      .000000       .000000
 E      2  DEKNIN01  EQ   15000.00000       .000000    -7.800000   15000.00000
 E      3  DEKNIN02  EQ   30000.00000       .000000    -6.000000   30000.00000
 E      4  DEKNIN03  EQ   25000.00000       .000000   -12.000000   25000.00000
 E      5  DEKNIN04  EQ   40000.00000       .000000    -6.000000   40000.00000
 E      6  DEKNIN05  EQ   27000.00000       .000000   -12.000000   27000.00000
 L      7  MINP0101  UL       .000000       .000000     4.200000       .000000
 L      8  MINP0102  BS  -5800.000000   5800.000000      .000000       .000000
 L      9  MINP0103  BS   -800.000000    800.000000      .000000       .000000
 L     10  MINP0104  BS  -11050.00000   11050.00000      .000000       .000000
 L     11  MINP0105  BS  -1050.000000   1050.000000      .000000       .000000
 L     12  MINP0201  BS  -1050.000000   1050.000000      .000000       .000000
 L     13  MINP0202  BS  -4000.000000   4000.000000      .000000       .000000
 L     14  MINP0203  BS  -4000.000000   4000.000000      .000000       .000000
 L     15  MINP0204  BS  -4500.000000   4500.000000      .000000       .000000
 L     16  MINP0205  BS  -4500.000000   4500.000000      .000000       .000000
 L     17  MINP0301  UL       .000000       .000000     6.333333       .000000
 L     18  MINP0302  UL       .000000       .000000     3.000000       .000000
 L     19  MINP0303  UL       .000000       .000000     6.000000       .000000
 L     20  MINP0304  UL       .000000       .000000     3.000000       .000000
 L     21  MINP0305  UL       .000000       .000000     6.000000       .000000
 L     22  MAXP0101  BS  -13800.00000   13800.00000      .000000       .000000
 L     23  MAXP0102  BS  -8000.000000   8000.000000      .000000       .000000
 L     24  MAXP0103  BS  -13000.00000   13000.00000      .000000       .000000
 L     25  MAXP0104  BS  -2750.000000   2750.000000      .000000       .000000
 L     26  MAXP0105  BS  -12750.00000   12750.00000      .000000       .000000
 L     27  MAXP0201  BS   -450.000000    450.000000      .000000       .000000
 L     28  MAXP0202  UL       .000000       .000000     2.100000       .000000
 L     29  MAXP0203  UL       .000000       .000000     4.200000       .000000
 L     30  MAXP0204  UL       .000000       .000000     2.100000       .000000
 L     31  MAXP0205  UL       .000000       .000000     4.200000       .000000
 L     32  MAXP0301  BS       .000000       .000000      .000000       .000000
 L     33  MAXP0302  BS       .000000       .000000      .000000       .000000
 L     34  MAXP0303  BS       .000000       .000000      .000000       .000000
 L     35  MAXP0304  BS  -5000.000000   5000.000000      .000000       .000000
 L     36  MAXP0305  BS       .000000       .000000      .000000       .000000
 L     37  RESKAP01  BS  -29250.00000   12000.00000      .000000  -17250.00000
 L     38  RESKAP02  BS  -38000.00000   3500.000000      .000000  -34500.00000
 L     39  RESKAP03  BS  -38000.00000   9250.000000      .000000  -28750.00000
 L     40  RESKAP04  BS  -47750.00000   1750.000000      .000000  -46000.00000
```



```
 L     41  RESKAP05  BS  -39750.00000   8700.000000      .000000  -31050.00000
 L     42  STAR0102  BS       .000000       .000000      .000000       .000000
 L     43  STAR0103  BS       .000000       .000000      .000000       .000000
 L     44  STAR0104  UL       .000000       .000000  2000.000000       .000000
 L     45  STAR0105  UL       .000000       .000000  2000.000000       .000000
 L     46  STAR0202  UL       .000000       .000000  1000.000000       .000000
 L     47  STAR0203  UL       .000000       .000000   250.000000       .000000
 L     48  STAR0204  UL       .000000       .000000  1000.000000       .000000
 L     49  STAR0205  UL       .000000       .000000   250.000000       .000000
 L     50  STAR0302  UL       .000000       .000000   500.000000       .000000
 L     51  STAR0303  UL       .000000       .000000   500.000000       .000000
 L     52  STAR0304  UL       .000000       .000000   500.000000       .000000
 L     53  STAR0305  BS     -2.000000      2.000000      .000000       .000000
 L     54  STARTF01  BS       .000000       .000000      .000000       .000000
 L     55  STARTF02  BS     -6.000000      6.000000      .000000       .000000
 L     56  STARTF03  BS       .000000       .000000      .000000       .000000

Columns Section
   Number    Column    At      Value      Input Cost   Reduced Cost
 C     57  n    0101  UL     12.000000  -4200.000000   -630.000000
 C     58  n    0201  LL      3.000000   5850.000000   4850.000000
 C     59  n    0301  BS       .000000  -9000.000000       .000000
 C     60  n    0102  UL     12.000000  -2100.000000  -2100.000000
 C     61  n    0202  BS      8.000000   2925.000000       .000000
 C     62  n    0302  BS       .000000  -4500.000000       .000000
 C     63  n    0103  UL     12.000000  -4200.000000  -6200.000000
 C     64  n    0203  UL      8.000000   5850.000000  -2250.000000
 C     65  n    0303  UL       .000000  -9000.000000       .000000
 C     66  n    0104  UL     12.000000  -2100.000000  -2100.000000
 C     67  n    0204  BS      9.000000   2925.000000       .000000
 C     68  n    0304  LL      2.000000  -4500.000000    500.000000
 C     69  n    0105  UL     12.000000  -4200.000000  -2200.000000
 C     70  n    0205  UL      9.000000   5850.000000  -1250.000000
 C     71  n    0305  BS       .000000  -9000.000000       .000000
 C     72  s    0101  LL       .000000   2000.000000   2000.000000
 C     73  s    0201  LL       .000000   1000.000000   1000.000000
 C     74  s    0301  LL       .000000    500.000000    500.000000
 C     75  s    0102  LL       .000000   2000.000000   2000.000000
 C     76  s    0202  BS      5.000000   1000.000000       .000000
 C     77  s    0302  BS       .000000    500.000000       .000000
 C     78  s    0103  LL       .000000   2000.000000   2000.000000
 C     79  s    0203  LL       .000000   1000.000000    750.000000
 C     80  s    0303  BS       .000000    500.000000       .000000
 C     81  s    0104  BS       .000000   2000.000000       .000000
 C     82  s    0204  BS      1.000000   1000.000000       .000000
 C     83  s    0304  BS      2.000000    500.000000       .000000
 C     84  s    0105  BS       .000000   2000.000000       .000000
 C     85  s    0205  LL       .000000   1000.000000    750.000000
 C     86  s    0305  LL       .000000    500.000000    500.000000
 C     87  prod0101  BS   10200.00000     12.000000       .000000
 C     88  prod0201  BS   4800.000000      7.800000       .000000
 C     89  prod0301  LL       .000000     18.000000      3.866667
 C     90  prod0102  BS   16000.00000      6.000000       .000000
 C     91  prod0202  BS   14000.00000      3.900000       .000000
 C     92  prod0302  LL       .000000      9.000000       .000000
 C     93  prod0103  BS   11000.00000     12.000000       .000000
 C     94  prod0203  BS   14000.00000      7.800000       .000000
 C     95  prod0303  BS       .000000     18.000000       .000000
 C     96  prod0104  BS   21250.00000      6.000000       .000000
 C     97  prod0204  BS   15750.00000      3.900000       .000000
 C     98  prod0304  BS   3000.000000      9.000000       .000000
 C     99  prod0105  BS   11250.00000     12.000000       .000000
 C    100  prod0205  BS   15750.00000      7.800000       .000000
 C    101  prod0305  LL       .000000     18.000000       .000000
! File power.res
!
!       Denne filen inneholder den n dvendige samlede reserve for de
!       produksjonsenheter som er i drift.
!
```

```
!       Reserven oppgis som et forholdstall.
!       En reserve p  20% oppgis som 1.2
!
 1.15
!
************************************************
*                                              *
*                                              *
*       Oppgave 15 i Williams                   *
*                                              *
*       Loest av:                              *
*       Håvard Andre Aspenes(havarda@foa.unit.no)
*       Morten Dagfinn Brennvik(mortebr@foa.unit.no)
*       Anita Foshaug(anitafo@foa.unit.no)     *
*                                              *
*       Foelgende filer kommer fortloepende:   *

        nett.ant
        nett.dim
        nett.dri
        nett.ett
        nett.len
        nett.lst
        nett.max
        nett.min
        nett.mod
        nett.ost
        nett.prt
        nett.res
        nett.sta



*                                              *
*                                              *
************************************************

!  NETT.ANT: Antall generatorer av type t^M
!^M
!       Type1           Type2           Type3^M
        12      ,       10      ,       5^M
!  NETT.DIM: Maksimal indeksverdi for indeksene spesifisert i modellen nett.^M
!^M
!^M
!       Antall typer    Antall perioder^M
!       TMAX            PMAX^M
!^M
        3       ,       5^M
! DRI.NETT: Driftskostnader pr MW over minimum for de ulke generatorene^M
!^M
!       Type 1          Type2           Type3^M
        2       ,       1.3     ,       3^M
!  NETT.ETT: Effekttersporsel i de forskjellige periodene^M
!^M
!       Periode 1       2       3       4       5^M
                15000,  30000,  25000,  40000,  27000^M
!  NETT.LEN: Lengde paa periodene^M
!^M
!       Periode 1       2       3       4       5^M
                6,      3,      6,      3,      6^M
XPRESS Modeller Log for problem: A:NETT^M
input^M
!       SAMKJORINGSNETT FOR XPRESS^M
!^M
!^M
MODEL NETT^M
!^M
TABLES^M
!^M
```



```
 DIMM(2)^M
!^M
!^M
!^M
DISKDATA^M
!^M
 DIMM(1) = nett.dim^M
!^M
!       Setter nytt navn paa maksimalverdiene av indeksene      ^M
!^M
LET TMAX = DIMM(1)       ! Antall typer generatorer, t som indeks for type^M
LET PMAX = DIMM(2)       ! Antall tidsperioder, p som indeks for periode^M
!^M
!       Definerer data for tabeller som er indeksregulerte^M
!^M
TABLES^M
!^M
 STARTK(TMAX)   ! Kostnader for oppstart av en generator av type t^M
!^M
 DRIFTK(TMAX)   ! Kostnader pr time pr MW over min-nivaa for gen. type t^M
!^M
 MINKOST(TMAX)  ! Kostnad pr time ved min-nivaa for gen. type t^M
!^M
 MAXNIV(TMAX)   ! Maksimalt effektuttak for gen av type t^M
!^M
 MINNIV(TMAX)   ! Minimalt effektuttak for gen av type t^M
!^M
 LENGDE(PMAX)   ! Antall timer i periode p^M
!^M
 ETTERSP(PMAX)  ! Ettersporsel av effekt i periode p^M
!^M
 RESERVE        ! Krav til kraftresereve^M
!^M
 ANTALL(TMAX)   ! Antall generatorer av type t^M
!^M
 TAB(TMAX,PMAX) ! Hjelpeberegninger for maalfunksjonen, beregnet under assign^M
!^M
!^M
!^M
DISKDATA^M
!^M
  STARTK(1)  = nett.sta^M
  DRIFTK(1)  = nett.dri^M
  MINKOST(1) = nett.ost^M
  MAXNIV(1)  = nett.max^M
  MINNIV(1)  = nett.min^M
  LENGDE(1)  = nett.len^M
  ETTERSP(1) = nett.ett^M
  RESERVE    = nett.res^M
  ANTALL(1)  = nett.ant^M
!  ^M
!^M
!^M
!       Definerer variablene for de aktuelle indekskombinasjonene^M
!^M
VARIABLES^M
!^M
 nummer(t=1:TMAX,p=1:PMAX)  ! Antall generatorer i drift av type t i periode p^M
!^M
 start(t=1:TMAX,p=1:PMAX)   ! Antall oppstartede generatorer av type t i per.p^M
!^M
 effekt(t=1:TMAX,p=1:PMAX)  ! Totalt effektuttak fra generator av type t i per p^M
!^M
!^M
ASSIGN^M
!^M
!       Beregning av element i maalfunksjonen.^M
!^M
 TAB(t=1:TMAX,p=1:PMAX)                                &^M
```

```
       = (DRIFTK(t) *  MINNIV(t) -  MINKOST(t)) * LENGDE(p)^M
!^M
CONSTRAINTS^M
!^M
!       Maalfunksjonen: minimerer kostnadene^M
!^M
 MINOBJ:                                                             &^M
        SUM(t=1:TMAX,p=1:PMAX)                                       &^M
         DRIFTK(t) * LENGDE(p) * effekt(t,p)                         &^M
        - SUM(t=1:TMAX,p=1:PMAX) TAB(t,p) * nummer(t,p)              &^M
        + SUM(t=1:TMAX,p=1:PMAX) STARTK(t) * start(t,p)              $^M
!                                                                             ^M
!^M
!       Begrenser minste effekt fra hver genereator^M
 MINEFF(t=1:TMAX,p=1:PMAX):                            &^M
        MINNIV(t) * nummer(t,p) - effekt(t,p) < 0               ^M
!^M
!^M
!       Begrenser maksimale effekt fra hver generator^M
 MAXEFF(t=1:TMAX,p=1:PMAX):                            &^M
        effekt(t,p) - MAXNIV(t) * nummer(t,p) < 0               ^M
!^M
!^M
!       Krav til effektreserve^M
 RESKRAV(p=1:PMAX):                                    &^M
        RESERVE * ETTERSP(p)                           &^M
        - SUM(t=1:TMAX) MAXNIV(t) * nummer(t,p) < 0^M
!^M
!^M
!       Antall oppstarter^M
 OPPSTART(t=1:TMAX,p=2:PMAX):                          &^M
        nummer(t,p) - nummer(t,p-1) < start(t,p)                    ^M
 OPPSTAR(t=1:TMAX,p=1:1):                              &^M
        nummer(t,p) - nummer(t,PMAX) < start(t,p)^M
!^M
!^M
!       Angir at total produksjon maa v`re lik ettersporselen^M
 ETTSPOR(p=1:PMAX):                                    &^M
        ETTERSP(p) - SUM(t=1:TMAX) effekt(t,p) = 0^M
!^M
!^M
BOUNDS^M
!^M
!^M
!^M
 nummer(t=1:TMAX,p=1:PMAX).UI.ANTALL(t)^M
!^M
 start(t=1:TMAX,p=1:PMAX).UI.ANTALL(t)^M
!^M
!^M
GENERATE^M
^M
Generating matrix NETT    ^M
^M
          56 rows^M
          45 structural columns^M
         180 matrix elements^M
          10 rhs elements^M
          30 bound elements^M
          30 general integer variables^M
           0 binary variables^M
           0 semi-continuous variables^M
           0 partial integer variables^M
           0 special ordered sets^M
           0 directives^M
density is     7.142857  percent^M
^M
!  NETT.MAX: Maksimal ekkekt fra de forskjellige generatorene^M
!^M
```



```
!       Type1           Type2           Type3^M
        2000    ,       1750    ,       4000^M
!  NETT.MIN: Minimal effekt fra de forskjellige generatorene^M
!^M
!       Type1           Type2           Type3^M
        850     ,       1250    ,       1500^M
!       SAMKJORINGSNETT FOR XPRESS^M
!^M
!^M
MODEL NETT^M
!^M
TABLES^M
!^M
 DIMM(2)^M
!^M
!^M
!^M
DISKDATA^M
!^M
 DIMM(1) = nett.dim^M
!^M
!       Setter nytt navn paa maksimalverdiene av indeksene      ^M
!^M
LET TMAX = DIMM(1)       ! Antall typer generatorer, t som indeks for type^M
LET PMAX = DIMM(2)       ! Antall tidsperioder, p som indeks for periode^M
!^M
!       Definerer data for tabeller som er indeksregulerte^M
!^M
TABLES^M
!^M
 STARTK(TMAX)   ! Kostnader for oppstart av en generator av type t^M
!^M
 DRIFTK(TMAX)   ! Kostnader pr time pr MW over min-nivaa for gen. type t^M
!^M
 MINKOST(TMAX)  ! Kostnad pr time ved min-nivaa for gen. type t^M
!^M
 MAXNIV(TMAX)   ! Maksimalt effektuttak for gen av type t^M
!^M
 MINNIV(TMAX)   ! Minimalt effektuttak for gen av type t^M
!^M
 LENGDE(PMAX)   ! Antall timer i periode p^M
!^M
 ETTERSP(PMAX)  ! Ettersporsel av effekt i periode p^M
!^M
 RESERVE        ! Krav til kraftresereve^M
!^M
 ANTALL(TMAX)   ! Antall generatorer av type t^M
!^M
 TAB(TMAX,PMAX) ! Hjelpeberegninger for maalfunksjonen, beregnet under assign^M
!^M
!^M
!^M
DISKDATA^M
!^M
  STARTK(1)  = nett.sta^M
  DRIFTK(1)  = nett.dri^M
  MINKOST(1) = nett.ost^M
  MAXNIV(1)  = nett.max^M
  MINNIV(1)  = nett.min^M
  LENGDE(1)  = nett.len^M
  ETTERSP(1) = nett.ett^M
  RESERVE    = nett.res^M
  ANTALL(1)  = nett.ant^M
!  ^M
!^M
!^M
!       Definerer variablene for de aktuelle indekskombinasjonene^M
!^M
VARIABLES^M
```

```
!^M
 nummer(t=1:TMAX,p=1:PMAX)  ! Antall generatorer i drift av type t i periode p^M
!^M
 start(t=1:TMAX,p=1:PMAX)   ! Antall oppstartede generatorer av type t i per.p^M
!^M
 effekt(t=1:TMAX,p=1:PMAX)  ! Totalt effektuttak fra generator av type t i per p^M
!^M
!^M
ASSIGN^M
!^M
!       Beregning av element i maalfunksjonen.^M
!^M
 TAB(t=1:TMAX,p=1:PMAX)                                   &^M
       = (DRIFTK(t) *  MINNIV(t) -  MINKOST(t)) * LENGDE(p)^M
!^M
CONSTRAINTS^M
!^M
!       Maalfunksjonen: minimerer kostnadene^M
!^M
 MINOBJ:                                                                      &^M
        SUM(t=1:TMAX,p=1:PMAX)                                                &^M
         DRIFTK(t) * LENGDE(p) * effekt(t,p)                                  &^M
        - SUM(t=1:TMAX,p=1:PMAX) TAB(t,p) * nummer(t,p)                       &^M
        + SUM(t=1:TMAX,p=1:PMAX) STARTK(t) * start(t,p)                       $^M
!                                                                                      ^M
!^M
!       Begrenser minste effekt fra hver genereator^M
 MINEFF(t=1:TMAX,p=1:PMAX):                               &^M
        MINNIV(t) * nummer(t,p) - effekt(t,p) < 0                   ^M
!^M
!^M
!       Begrenser maksimale effekt fra hver generator^M
 MAXEFF(t=1:TMAX,p=1:PMAX):                               &^M
        effekt(t,p) - MAXNIV(t) * nummer(t,p) < 0                   ^M
!^M
!^M
!       Krav til effektreserve^M
 RESKRAV(p=1:PMAX):                                       &^M
        RESERVE * ETTERSP(p)                              &^M
        - SUM(t=1:TMAX) MAXNIV(t) * nummer(t,p) < 0^M
!^M
!^M
!       Antall oppstarter^M
 OPPSTART(t=1:TMAX,p=2:PMAX):                             &^M
        nummer(t,p) - nummer(t,p-1) < start(t,p)                        ^M
 OPPSTAR(t=1:TMAX,p=1:1):                                 &^M
        nummer(t,p) - nummer(t,PMAX) < start(t,p)^M
!^M
!^M
!       Angir at total produksjon maa v`re lik ettersporselen^M
 ETTSPOR(p=1:PMAX):                                       &^M
        ETTERSP(p) - SUM(t=1:TMAX) effekt(t,p) = 0^M
!^M
!^M
BOUNDS^M
!^M
!^M
!^M
 nummer(t=1:TMAX,p=1:PMAX).UI.ANTALL(t)^M
!^M
 start(t=1:TMAX,p=1:PMAX).UI.ANTALL(t)^M
!^M
!^M
GENERATE^M
^M
^M
!  NETT.OST: Kostsnader pr time ved minimumsdrift av de ulike generatorene^M
!^M
!       Type1           Type2           Type3^M
```



```
        1000    ,       2600    ,       3000^M
^M
Problem Statistics^M
Matrix NETT    ^M
Objective MINOBJ  ^M
RHS RHS00001^M
Problem has     56 rows and     45 structural columns^M
^M
Solution Statistics^M
Minimisation performed^M
Optimal solution found after      1 iterations^M
Objective function value is  988290.0000^M
^M
^M
Rows Section^M
   Number     Row     At      Value       Slack Value   Dual Value          RHS^M
 N      1  MINOBJ     BS   988290.0000  -988290.0000      .000000        .000000^M
 L      2  MINE0101   UL       .000000       .000000     4.200000        .000000^M
 L      3  MINE0102   BS  -5800.000000   5800.000000      .000000        .000000^M
 L      4  MINE0103   BS   -800.000000    800.000000      .000000        .000000^M
 L      5  MINE0104   BS  -10800.00000   10800.00000      .000000        .000000^M
 L      6  MINE0105   BS  -1050.000000   1050.000000      .000000        .000000^M
 L      7  MINE0201   BS  -1050.000000   1050.000000      .000000        .000000^M
 L      8  MINE0202   BS  -4000.000000   4000.000000      .000000        .000000^M
 L      9  MINE0203   BS  -4000.000000   4000.000000      .000000        .000000^M
 L     10  MINE0204   BS  -5000.000000   5000.000000      .000000        .000000^M
 L     11  MINE0205   BS  -4500.000000   4500.000000      .000000        .000000^M
 L     12  MINE0301   UL       .000000       .000000     6.333333        .000000^M
 L     13  MINE0302   UL       .000000       .000000     3.000000        .000000^M
 L     14  MINE0303   UL       .000000       .000000     6.000000        .000000^M
 L     15  MINE0304   UL       .000000       .000000     3.000000        .000000^M
 L     16  MINE0305   UL       .000000       .000000     6.000000        .000000^M
 L     17  MAXE0101   BS  -13800.00000   13800.00000      .000000        .000000^M
 L     18  MAXE0102   BS  -8000.000000   8000.000000      .000000        .000000^M
 L     19  MAXE0103   BS  -13000.00000   13000.00000      .000000        .000000^M
 L     20  MAXE0104   BS  -3000.000000   3000.000000      .000000        .000000^M
 L     21  MAXE0105   BS  -12750.00000   12750.00000      .000000        .000000^M
 L     22  MAXE0201   BS   -450.000000    450.000000      .000000        .000000^M
 L     23  MAXE0202   UL       .000000       .000000     2.100000        .000000^M
 L     24  MAXE0203   UL       .000000       .000000     4.200000        .000000^M
 L     25  MAXE0204   UL       .000000       .000000     2.100000        .000000^M
 L     26  MAXE0205   UL       .000000       .000000     4.200000        .000000^M
 L     27  MAXE0301   BS       .000000       .000000      .000000        .000000^M
 L     28  MAXE0302   BS       .000000       .000000      .000000        .000000^M
 L     29  MAXE0303   BS       .000000       .000000      .000000        .000000^M
 L     30  MAXE0304   BS  -2500.000000   2500.000000      .000000        .000000^M
 L     31  MAXE0305   BS       .000000       .000000      .000000        .000000^M
 L     32  RESKRA01   BS  -29250.00000   12750.00000      .000000   -16500.00000^M
 L     33  RESKRA02   BS  -38000.00000   5000.000000      .000000   -33000.00000^M
 L     34  RESKRA03   BS  -38000.00000   10500.00000      .000000   -27500.00000^M
 L     35  RESKRA04   BS  -45500.00000   1500.000000      .000000   -44000.00000^M
 L     36  RESKRA05   BS  -39750.00000   10050.00000      .000000   -29700.00000^M
 L     37  OPPS0102   UL       .000000       .000000  2000.000000        .000000^M
 L     38  OPPS0103   UL       .000000       .000000  2000.000000        .000000^M
 L     39  OPPS0104   BS       .000000       .000000      .000000        .000000^M
 L     40  OPPS0105   UL       .000000       .000000  2000.000000        .000000^M
 L     41  OPPS0202   UL       .000000       .000000  1000.000000        .000000^M
 L     42  OPPS0203   UL       .000000       .000000   250.000000        .000000^M
 L     43  OPPS0204   UL       .000000       .000000  1000.000000        .000000^M
 L     44  OPPS0205   BS     -1.000000      1.000000      .000000        .000000^M
 L     45  OPPS0302   UL       .000000       .000000   500.000000        .000000^M
 L     46  OPPS0303   UL       .000000       .000000   500.000000        .000000^M
 L     47  OPPS0304   UL       .000000       .000000   500.000000        .000000^M
 L     48  OPPS0305   BS     -1.000000      1.000000      .000000        .000000^M
 L     49  OPPS0101   BS       .000000       .000000      .000000        .000000^M
 L     50  OPPS0201   BS     -6.000000      6.000000      .000000        .000000^M
 L     51  OPPS0301   BS       .000000       .000000      .000000        .000000^M
 E     52  ETTSPO01   EQ  -15000.00000       .000000     7.800000   -15000.00000^M
 E     53  ETTSPO02   EQ  -30000.00000       .000000     6.000000   -30000.00000^M
```

```
 E     54  ETTSPO03  EQ  -25000.00000       .000000     12.000000  -25000.00000^M
 E     55  ETTSPO04  EQ  -40000.00000       .000000      6.000000  -40000.00000^M
 E     56  ETTSPO05  EQ  -27000.00000       .000000     12.000000  -27000.00000^M
^M
Columns Section^M
   Number    Column    At       Value      Input Cost   Reduced Cost^M
 C     57  numm0101  UL     12.000000  -4200.000000  -2630.000000         ^M
 C     58  numm0201  LL      3.000000   5850.000000   4850.000000         ^M
 C     59  numm0301  BS       .000000  -9000.000000       .000000         ^M
 C     60  numm0102  UL     12.000000  -2100.000000  -2100.000000         ^M
 C     61  numm0202  BS      8.000000   2925.000000       .000000         ^M
 C     62  numm0302  BS       .000000  -4500.000000       .000000         ^M
 C     63  numm0103  UL     12.000000  -4200.000000  -2200.000000         ^M
 C     64  numm0203  UL      8.000000   5850.000000  -2250.000000         ^M
 C     65  numm0303  BS       .000000  -9000.000000       .000000         ^M
 C     66  numm0104  UL     12.000000  -2100.000000  -4100.000000         ^M
 C     67  numm0204  LL     10.000000   2925.000000   250.000000          ^M
 C     68  numm0304  LL      1.000000  -4500.000000   500.000000          ^M
 C     69  numm0105  UL     12.000000  -4200.000000  -2200.000000         ^M
 C     70  numm0205  UL      9.000000   5850.000000  -1500.000000         ^M
 C     71  numm0305  BS       .000000  -9000.000000       .000000         ^M
 C     72  star0101  LL       .000000   2000.000000  2000.000000          ^M
 C     73  star0201  LL       .000000   1000.000000  1000.000000          ^M
 C     74  star0301  LL       .000000    500.000000   500.000000          ^M
 C     75  star0102  BS       .000000   2000.000000       .000000         ^M
 C     76  star0202  BS      5.000000   1000.000000       .000000         ^M
 C     77  star0302  BS       .000000    500.000000       .000000         ^M
 C     78  star0103  BS       .000000   2000.000000       .000000         ^M
 C     79  star0203  LL       .000000   1000.000000   750.000000          ^M
 C     80  star0303  BS       .000000    500.000000       .000000         ^M
 C     81  star0104  LL       .000000   2000.000000  2000.000000          ^M
 C     82  star0204  BS      2.000000   1000.000000       .000000         ^M
 C     83  star0304  BS      1.000000    500.000000       .000000         ^M
 C     84  star0105  BS       .000000   2000.000000       .000000         ^M
 C     85  star0205  LL       .000000   1000.000000  1000.000000          ^M
 C     86  star0305  LL       .000000    500.000000   500.000000          ^M
 C     87  effe0101  BS   10200.00000     12.000000       .000000         ^M
 C     88  effe0201  BS   4800.000000      7.800000       .000000         ^M
 C     89  effe0301  LL       .000000     18.000000      3.866667         ^M
 C     90  effe0102  BS   16000.00000      6.000000       .000000         ^M
 C     91  effe0202  BS   14000.00000      3.900000       .000000         ^M
 C     92  effe0302  LL       .000000      9.000000       .000000         ^M
 C     93  effe0103  BS   11000.00000     12.000000       .000000         ^M
 C     94  effe0203  BS   14000.00000      7.800000       .000000         ^M
 C     95  effe0303  LL       .000000     18.000000       .000000         ^M
 C     96  effe0104  BS   21000.00000      6.000000       .000000         ^M
 C     97  effe0204  BS   17500.00000      3.900000       .000000         ^M
 C     98  effe0304  BS   1500.000000      9.000000       .000000         ^M
 C     99  effe0105  BS   11250.00000     12.000000       .000000         ^M
 C    100  effe0205  BS   15750.00000      7.800000       .000000         ^M
 C    101  effe0305  LL       .000000     18.000000       .000000         ^M
!  NETT.RES: Reservekrav til effekt^M
!^M
!^M
        1.1^M
!  NETT.STA: Startkostnader for de ulike generatortypene^M
!^M
!       Startkostnader^M
        2000    ,       1000    ,       500^M
                                                                                      ^M
! Fil distru20.ind
!
! Denne filen angir om en skal optimalisere p  kostnad eller preferanse
! for problem 18 eller om en skal optimalisere p  kostnad for problem 19
!
! 1 angir kostnad for problem 18
! 2 angir preferanse for problem 18
! 3 angir kostnad for problem 19
1
```



```
!
! Fil distru20.mod
!
! Trenger filen som heter distru20.wk1
!
!       Gir modellen et navn
!
MODEL distru20
!
!
!
!       Definerer tabeller
!
!
TABLES
!
        INDIK(1)
!
DISKDATA
!
        INDIK = distru20.ind !  leser indikator for preferanse, kostnad og problem
!                               1 er kostnad for problem 18,
!                               2 er preferanse for problem 18,
!                               3 er kostnad for problem 19
!
LET IND = INDIK(1)
!
!
TABLES
!
        DIMM(3)          ! dimensjon eller max antall indekser
!
!
DISKDATA -l
!
        DIMM = distru20.wk1 (INDEXST)
!
!
LET FMAX = DIMM(1)
LET DMAX = DIMM(2)
LET KMAX = DIMM(3)
!
!
TABLES
!
        MAXPROD(FMAX)           ! Maksimalt antall produserte enheter paa bedrift f
!
        MAXSTR(DMAX)            ! Maksimal stroem gjennom et depot d
!
        MAXOK(DMAX)             ! Maksimal oekning av depot (12.19)
!
        OKKOST(DMAX)            ! Oekning av kostnad ved depotoekning (12.19)
!
        DKOST(DMAX)             ! positive tall angir kostnad for bruk av depot d
!
        DSPAR(DMAX)             ! Kostnadsbesparelse ved aa legge ned depot d
!
        MAXDEP(1)               ! max antall tillatte depoter
!
        BEHOV(KMAX)             ! Kundebehov
!
        FDKOST(FMAX, DMAX)      ! Kostnad frakt fabrikk til depot
!
        FKKOST(FMAX, KMAX)      ! Kostnad frakt fabrikk til kunde
!
        DKKOST(DMAX, KMAX)      ! Kostnad frakt depot til kunde
!
        FDPREF(FMAX, DMAX)      ! Preferanse frakt fra fabrikk til depot
!
```

```
        FKPREF(FMAX, KMAX)      ! Preferanse frakt fra fabrikk til kunde
!
        DKPREF(DMAX, KMAX)      ! Preferanse frakt fra depot til kunde
!
!
DISKDATA -l
!
! Innlesing av data fra lotusfil distru20.wk1
!
        MAXPROD = distru20.wk1 (MAXKAPF)        !
!
        MAXSTR = distru20.wk1 (MAXSTRD)
!
        DKOST = distru20.wk1 (DKOSTD)
!
IF IND < 3      ! kjoere modell 12.18 med min kostn eller max pref
ASSIGN
!
        MAXSTR(d=1:DMAX | DKOST(d) .gt. 0) = 0          ! Setter kapasitet i depoter som
 ikke
                                                        ! finnes i problem 18 til 0
!
        MAXOK(d=1:DMAX) = 0                             ! Konstanter som brukes i 12.19
                                                        ! settes lik 0
!
        OKKOST(d=1:DMAX) = 0                            !                ""
!
        DKOST(d=1:DMAX) = 0                             !                ""
!
        DSPAR(d=1:DMAX) = 0                             !                ""
!
!
ELSE    ! (IF IND ==3)  kjoere modell 12.19
!
!
DISKDATA -l
!
        MAXOK = distru20.wk1 (MAXOKD)
!
        OKKOST = distru20.wk1 (OKKOSTD)
!
        DSPAR = distru20.wk1 (DSPARD)
!
!
!
ENDIF
!
!
ASSIGN
!
        DKOST(d=1:DMAX | DSPAR(d) .gt. 0) = DSPAR(d)    ! Setter sparing ved nedleggelse
 lik
!                                                         kostnad ved bruk.
        ANTNULL = SUM(d=1:DMAX | DKOST(d) .eq. 0) 1     ! Teller opp antallet depoter so
m finnes,
                                                        ! og ikke kan legges ned
!
! Innlesing av data fra lotusfil
!
DISKDATA -l
!
        MAXANTD = distru20.wk1 (MAXANTD)        ! max antall tillatte depoter
!
        BEHOV = distru20.wk1 (BEHOVK)
!
        FDKOST = distru20.wk1 (KOSTFD)
!
        FKKOST = distru20.wk1 (KOSTFK)
!
```



```
        DKKOST = distru20.wk1 (KOSTDK)
!
!
IF IND == 2     ! Velger 12.18 med max pref
!
DISKDATA -l
!
        FDPREF = distru20.wk1 (PREFFD)
!
        FKPREF = distru20.wk1 (PREFFK)
!
        DKPREF = distru20.wk1 (PREFDK)
!
!
ELSE            ! enten modell 12.18 min kostn, eller 12.19
!
ASSIGN
!
        FDPREF(f=1:FMAX, d=1:DMAX) = 1          ! ved kostnadoptimering er det ingen pre
feranser
!                                               ! og derfor settes preferanser lik 1 som
 indikerer
        FKPREF(f=1:FMAX, k=1:KMAX) = 1          ! ingen preferanse
!
        DKPREF(d=1:DMAX, k=1:KMAX) = 1
ENDIF
!
!
!
VARIABLES
!
!
! Stroem fra fabrikk til depot, defineres ikke hvis frakt er umulig og depot har null ka
p
!
 fdstrom(f=1:FMAX, d=1:DMAX | (FDKOST(f, d) .ge. 0) .AND. (MAXSTR(d) .gt. 0))
!
!
!
! Stroem fra fabrikk til kunde, defineres ikke hvis frakt er umulig
!
 fkstrom(f=1:FMAX, k=1:KMAX | FKKOST(f, k) .ge. 0)
!
!
! Stroem fra depot til kunde, defineres ikke hvis frakt er umulig og depot har null kap
!
 dkstrom(d=1:DMAX, k=1:KMAX | (DKKOST(d, k) .ge. 0) .AND. (MAXSTR(d) .gt. 0))
!
!
! Binaervariabel som avgjoer om depot skal benyttes.
! Defineres ikke hvis depotet ikke kan nedlegges
!
 dbruk(d=1:DMAX | DKOST(d) .gt. 0)
!
!
! Binaervariabel som avgjoer om depotkapasiteten skal oekes
! Defineres ikke hvis depotkapasiteten ikke kan oekes
!
 dokes(d=1:DMAX | MAXOK(d) .gt. 0)
!
!
!
CONSTRAINTS
!
!       M lfunksjon som minimerer kostnad eller maximerer preferanse
!
!
        MINOBJ:   &
                SUM(f=1:FMAX, d=1:DMAX) FDKOST(f, d) * FDPREF(f, d) * fdstrom(f, d) &
```

```
              + SUM(f=1:FMAX, k=1:KMAX) FKKOST(f, k) * FKPREF(f, k) * fkstrom(f, k) &

              + SUM(d=1:DMAX, k=1:KMAX) DKKOST(d, k) * DKPREF(d, k) * dkstrom(d, k) &
              - SUM(d=1:DMAX) DSPAR(d)            &  ! Spart ved nedleggelse
              + SUM(d=1:DMAX) DKOST(d) * dbruk(d)   &  ! Kostnad ved bruk
              + SUM(d=1:DMAX) OKKOST(d) * dokes(d)  $
!
!
!       Kapasitet for fabrikker maa ikke overskrides
!
        KAPFAB(f=1:FMAX):       &
                SUM(d=1:DMAX) fdstrom(f, d) + SUM(k=1:KMAX) fkstrom(f, k) < MAXPROD(f)
!
!
!       Kapasitet for depoter maa ikke overskrives
!
        KAPDEP(d=1:DMAX):     &
                SUM(f=1:FMAX) fdstrom(f, d) < SUM(|DKOST(d)=0) MAXSTR(d) + MAXSTR(d) * d
bruk(d) + MAXOK(d) * dokes(d)
!
!
!       Likevektligning for depoter
!
        LIKEVE(d=1:DMAX):     &
                SUM(k=1:KMAX) dkstrom(d, k) - SUM(f=1:FMAX) fdstrom(f, d) = 0
!
!
!       Kundebehov maa dekkes
!
        KUNDEB(k=1:KMAX):     &
                SUM(d=1:DMAX) dkstrom(d, k) + SUM(f=1:FMAX) fkstrom(f, k) > BEHOV(k)
!
!
IF IND == 3  ! Kjoerer modell 12.19
!
!
!       Antall depoter ibruk kan ikke vaere mer enn spesifisert i modellen
!
        ANTDEP:         &
                SUM(d=1:DMAX) dbruk(d) < MAXANTD - ANTNULL
!
!
!       Oekning aksepteres ikke for depoter som ikke er  ibruk
!
        DOKLOV(d=1:DMAX | DKOST(d) .gt. 0):      &
                dokes(d) < dbruk(d)
ENDIF
!
!
BOUNDS
!

 dbruk(d=1:DMAX) .BV.   ! Binaervariabel som avgjoer om depotet  er ibruk
!
 dokes(d=1:DMAX) .BV.   ! Binaervariabel som avgjoer om depotet skal oekes
!
!
!
GENERATE
!
IF IND == 2     ! Velger modell 12.18 med maksmering av preferanse. Da gir ikke maalfunk
sjon
!                 ut kostnad og denne maa derfor beregnes etter optimering.
ASSIGN
!
    KOSTNAD =    SUM(f=1:FMAX, d=1:DMAX) FDKOST(f, d) * fdstrom(f, d) &
                +SUM(f=1:FMAX, k=1:KMAX) FKKOST(f, k) * fkstrom(f, k) &
                +SUM(d=1:DMAX, k=1:KMAX) DKKOST(d, k) * dkstrom(d, k)
!
```



```
PRINT
   KOSTNAD
ENDIF

PRINT
! Stroem fra fabrikk til deopt
        fdstrom
! Stroem fra fabrikk til kunde
        fkstrom
! Stroem fra depot til kunde
        dkstrom
!
!
!
TABLES
        SKYGF(FMAX)               ! Skyggepriser for fabrikkapasitet
        SKYGD(DMAX)               ! Skyggepriser for depotkapasitet
!
!
ASSIGN
!
!
        SKYGF(f=1:FMAX) = dual(KAPFAB(f))
!
        SKYGD(d=1:DMAX) = dual(KAPDEP(d))
!
!
!
PRINT
!
!       Skyggepriser for fabrikkapasitet
!
        SKYGF
!
!       Skyggepriser for depotkapasitet
!
        SKYGD
!
!XPRESS Modeller Log for problem: DISTRU20^M
restore^M
input^M
!^M
IF IND == 2     ! Velger modell 12.18 med maksmering av preferanse. Da gir ikke maalfunk
sjon^M
!                 ut kostnad og denne maa derfor beregnes etter optimering.^M
ASSIGN^M
! ^M
    KOSTNAD =    SUM(f=1:FMAX, d=1:DMAX) FDKOST(f, d) * fdstrom(f, d) &^M
                +SUM(f=1:FMAX, k=1:KMAX) FKKOST(f, k) * fkstrom(f, k) &          ^M
                +SUM(d=1:DMAX, k=1:KMAX) DKKOST(d, k) * dkstrom(d, k) ^M
!^M
PRINT ^M
   KOSTNAD^M
ENDIF^M
^M
PRINT^M
! Stroem fra fabrikk til deopt^M
        fdstrom ^M
     .000000,     .000000,     .000000,     .400000,     .000000,     .000000^M
     .000000,     .500000,     .550000,     .000000,     .000000,     .000000^M
! Stroem fra fabrikk til kunde^M
        fkstrom^M
     .500000,     .000000,     .000000,     .000000,     .000000,     .200000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
! Stroem fra depot til kunde    ^M
        dkstrom^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
     .000000,     .100000,     .000000,     .350000,     .050000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .550000,     .000000^M
```

```
     .000000,     .000000,     .400000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
!^M
!^M
!^M
TABLES^M
        SKYGF(FMAX)             ! Skyggepriser for fabrikkapasitet^M
        SKYGD(DMAX)             ! Skyggepriser for depotkapasitet^M
!^M
!^M
ASSIGN^M
!^M
!^M
        SKYGF(f=1:FMAX) = dual(KAPFAB(f))^M
!^M
        SKYGD(d=1:DMAX) = dual(KAPDEP(d))^M
!^M
!^M
!^M
PRINT^M
!^M
!       Skyggepriser for fabrikkapasitet^M
!^M
        SKYGF^M
     .000000^M
     .000000^M
!^M
!       Skyggepriser for depotkapasitet^M
!^M
        SKYGD^M
     .000000^M
     .200000^M
     .000000^M
     .300000^M
     .000000^M
     .000000^M
!^M
!^M
quit^M
^M
Problem Statistics^M
Matrix distru20^M
Objective MINOBJ  ^M
RHS RHS00001^M
Problem has     17 rows and     29 structural columns^M
^M
Solution Statistics^M
Minimisation performed^M
Optimal solution found after     16 iterations^M
Objective function value is     1.985000^M
^M
^M
Rows Section^M
   Number     Row    At      Value      Slack Value   Dual Value        RHS^M
 N      1  MINOBJ    BS      1.985000     -1.985000       .000000       .000000^M
 L      2  KAPFAB01  BS      1.100000       .400000       .000000      1.500000^M
 L      3  KAPFAB02  BS      1.050000       .950000       .000000      2.000000^M
 L      4  KAPDEP01  BS       .000000       .700000       .000000       .700000^M
 L      5  KAPDEP02  UL       .500000       .000000       .200000       .500000^M
 L      6  KAPDEP03  BS       .550000       .450000       .000000      1.000000^M
 L      7  KAPDEP04  UL       .400000       .000000       .300000       .400000^M
 E      8  LIKEVE01  EQ       .000000       .000000       .200000       .000000^M
 E      9  LIKEVE02  EQ       .000000       .000000       .500000       .000000^M
 E     10  LIKEVE03  EQ       .000000       .000000       .500000       .000000^M
 E     11  LIKEVE04  EQ       .000000       .000000       .500000       .000000^M
 G     12  KUNDEB01  LL       .500000       .000000     -1.000000       .500000^M
 G     13  KUNDEB02  LL       .100000       .000000     -1.000000       .100000^M
 G     14  KUNDEB03  LL       .400000       .000000      -.700000       .400000^M
```



```
 G     15  KUNDEB04  LL       .350000       .000000     -1.500000       .350000^M
 G     16  KUNDEB05  LL       .600000       .000000     -1.000000       .600000^M
 G     17  KUNDEB06  LL       .200000       .000000     -1.000000       .200000^M
^M
Columns Section^M
   Number   Column   At      Value      Input Cost   Reduced Cost^M
 C     18  fdst0101  LL       .000000       .500000       .300000          ^M
 C     19  fdst0102  LL       .000000       .500000       .200000          ^M
 C     20  fdst0202  BS       .500000       .300000       .000000          ^M
 C     21  fdst0103  LL       .000000      1.000000       .500000          ^M
 C     22  fdst0203  BS       .550000       .500000       .000000          ^M
 C     23  fdst0104  BS       .400000       .200000       .000000          ^M
 C     24  fdst0204  LL       .000000       .200000       .000000          ^M
 C     25  fkst0101  BS       .500000      1.000000       .000000          ^M
 C     26  fkst0201  LL       .000000      2.000000      1.000000          ^M
 C     27  fkst0103  LL       .000000      1.500000       .800000          ^M
 C     28  fkst0104  LL       .000000      2.000000       .500000          ^M
 C     29  fkst0106  BS       .200000      1.000000       .000000          ^M
 C     30  dkst0201  LL       .000000      1.000000       .500000          ^M
 C     31  dkst0102  LL       .000000      1.500000       .700000          ^M
 C     32  dkst0202  BS       .100000       .500000       .000000          ^M
 C     33  dkst0302  LL       .000000      1.500000      1.000000          ^M
 C     34  dkst0103  BS       .000000       .500000       .000000          ^M
 C     35  dkst0203  LL       .000000       .500000       .300000          ^M
 C     36  dkst0303  LL       .000000      2.000000      1.800000          ^M
 C     37  dkst0403  BS       .400000       .200000       .000000          ^M
 C     38  dkst0104  LL       .000000      1.500000       .200000          ^M
 C     39  dkst0204  BS       .350000      1.000000       .000000          ^M
 C     40  dkst0404  LL       .000000      1.500000       .500000          ^M
 C     41  dkst0205  BS       .050000       .500000       .000000          ^M
 C     42  dkst0305  BS       .550000       .500000       .000000          ^M
 C     43  dkst0405  BS       .000000       .500000       .000000          ^M
 C     44  dkst0106  LL       .000000      1.000000       .200000          ^M
 C     45  dkst0306  LL       .000000      1.500000      1.000000          ^M
 C     46  dkst0406  LL       .000000      1.500000      1.000000          ^M
^M
Problem Statistics^M
Matrix distru20^M
Objective MINOBJ  ^M
RHS RHS00001^M
Problem has     17 rows and     29 structural columns^M
^M
Solution Statistics^M
Minimisation performed^M
Optimal solution found after     16 iterations^M
Objective function value is     1.985000^M
^M
N MINOBJ      1.985000     1.985000  1.00000E+30                   ^M
BS     1     -1.985000     1.995000     1.000000            KAPDEP02 UL^M
^M
L KAPFAB01     1.100000      .700000      .000000            fdst0204 LL^M
BS     2       .400000     1.600000      .200000            fdst0102 LL^M
^M
L KAPFAB02     1.050000      .650000      .200000            fdst0102 LL^M
BS     3       .950000     1.450000      .000000            fdst0204 LL^M
^M
L KAPDEP01      .000000      .000000  2.00000E+30                   ^M
BS     4       .700000      .400000      .300000            fdst0101 LL^M
^M
L KAPDEP02      .500000      .450000      .200000            dkst0205 LL^M
UL     5       .000000     1.050000     -.200000            fdst0203 LL^M
^M
L KAPDEP03      .550000      .150000      .300000            fdst0101 LL^M
BS     6       .450000      .550000      .200000            dkst0106 LL^M
^M
L KAPDEP04      .400000      .400000      .300000            dkst0405 LL^M
UL     7       .000000      .800000     -.300000            KAPFAB01 UL^M
^M
E LIKEVE01      .000000      .000000      .200000            dkst0103 LL^M
```

```
EQ     8         .000000       .400000     -.200000                dkst0403 LL^M
^M
E LIKEVE02       .000000     -.050000      .500000                dkst0205 LL^M
EQ     9         .000000       .550000     -.500000                fdst0203 LL^M
^M
E LIKEVE03       .000000     -.450000      .500000                KAPDEP03 UL^M
EQ    10         .000000       .550000     -.500000                fdst0203 LL^M
^M
E LIKEVE04       .000000       .000000      .500000                dkst0405 LL^M
EQ    11         .000000       .550000     -.500000                fdst0203 LL^M
^M
G KUNDEB01       .500000       .000000    -1.000000                fkst0101 LL^M
LL    12         .000000       .900000     1.000000                KAPFAB01 UL^M
^M
G KUNDEB02       .100000       .000000    -1.000000                dkst0202 LL^M
LL    13         .000000       .150000     1.000000                dkst0205 LL^M
^M
G KUNDEB03       .400000       .000000     -.700000                dkst0403 LL^M
LL    14         .000000       .400000      .700000                dkst0405 LL^M
^M
G KUNDEB04       .350000       .000000    -1.500000                dkst0204 LL^M
LL    15         .000000       .400000     1.500000                dkst0205 LL^M
^M
G KUNDEB05       .600000       .050000    -1.000000                fdst0203 LL^M
LL    16         .000000      1.050000     1.000000                KAPDEP03 UL^M
^M
G KUNDEB06       .200000       .000000    -1.000000                fkst0106 LL^M
LL    17         .000000       .600000     1.000000                KAPFAB01 UL^M
^M
C fdst0101       .000000       .000000     -.300000  1.00000E+30 dkst0103 LL^M
LL    18         .500000       .400000      .300000       .200000 KAPFAB01 UL^M
^M
C fdst0102       .000000     -.950000     -.200000  1.00000E+30 KAPFAB02 UL^M
LL    19         .500000       .400000      .200000       .300000 KAPFAB01 UL^M
^M
C fdst0202       .500000       .100000      .200000       .500000 fdst0102 LL^M
BS    20         .300000       .500000  2.00000E+30 -2.00000E+30            ^M
^M
C fdst0103       .000000     -.950000     -.500000  1.00000E+30 KAPFAB02 UL^M
LL    21        1.000000       .400000      .500000       .500000 KAPFAB01 UL^M
^M
C fdst0203       .550000       .150000      .300000       .800000 fdst0101 LL^M
BS    22         .500000       .550000      .200000       .300000 dkst0106 LL^M
^M
C fdst0104       .400000     -.550000      .000000       .200000 fdst0204 LL^M
BS    23         .200000       .400000  2.00000E+30 -2.00000E+30            ^M
^M
C fdst0204       .000000     -.400000      .000000  1.00000E+30 KAPFAB01 UL^M
LL    24         .200000       .400000      .000000       .200000 fdst0104 LL^M
^M
C fkst0101       .500000       .450000      .500000      1.500000 dkst0201 LL^M
BS    25        1.000000       .900000     1.000000       .000000 KUNDEB01 LL^M
^M
C fkst0201       .000000     -.400000    -1.000000  1.00000E+30 KAPFAB01 UL^M
LL    26        2.000000       .500000     1.000000      1.000000 fkst0101 LL^M
^M
C fkst0103       .000000       .000000     -.800000  1.00000E+30 dkst0405 LL^M
LL    27        1.500000       .400000      .800000       .700000 KAPFAB01 UL^M
^M
C fkst0104       .000000     -.050000     -.500000  1.00000E+30 dkst0205 LL^M
LL    28        2.000000       .350000      .500000      1.500000 dkst0204 LL^M
^M
C fkst0106       .200000       .200000      .200000      1.200000 dkst0106 LL^M
BS    29        1.000000       .600000     1.000000       .000000 KUNDEB06 LL^M
^M
C dkst0201       .000000     -.400000     -.500000  1.00000E+30 KAPFAB01 UL^M
LL    30        1.000000       .050000      .500000       .500000 dkst0205 LL^M
^M
C dkst0102       .000000     -.050000     -.700000  1.00000E+30 dkst0205 LL^M
```



```
LL    31        1.500000       .000000       .700000       .800000 dkst0103 LL^M
^M
C dkst0202       .100000       .100000       .700000      1.200000 dkst0102 LL^M
BS    32         .500000       .150000      1.000000      -.500000 KUNDEB02 LL^M
^M
C dkst0302       .000000     -.050000     -1.000000  1.00000E+30 dkst0205 LL^M
LL    33        1.500000       .100000      1.000000       .500000 dkst0202 LL^M
^M
C dkst0103       .000000       .000000       .200000       .700000 dkst0106 LL^M
BS    34         .500000       .400000       .300000       .200000 fdst0101 LL^M
^M
C dkst0203       .000000       .000000      -.300000  1.00000E+30 dkst0405 LL^M
LL    35         .500000       .050000       .300000       .200000 dkst0205 LL^M
^M
C dkst0303       .000000       .000000     -1.800000  1.00000E+30 dkst0405 LL^M
LL    36        2.000000       .400000      1.800000       .200000 dkst0403 LL^M
^M
C dkst0403       .400000       .350000       .300000       .500000 dkst0203 LL^M
BS    37         .200000       .400000       .200000       .000000 dkst0106 LL^M
^M
C dkst0104       .000000     -.050000      -.200000  1.00000E+30 dkst0205 LL^M
LL    38        1.500000       .000000       .200000      1.300000 dkst0103 LL^M
^M
C dkst0204       .350000       .350000       .200000      1.200000 dkst0104 LL^M
BS    39        1.000000       .400000      1.500000      -.500000 KUNDEB04 LL^M
^M
C dkst0404       .000000     -.050000      -.500000  1.00000E+30 dkst0205 LL^M
LL    40        1.500000       .000000       .500000      1.000000 dkst0405 LL^M
^M
C dkst0205       .050000     -.400000       .200000       .700000 KAPDEP02 UL^M
BS    41         .500000       .050000       .200000       .300000 dkst0104 LL^M
^M
C dkst0305       .550000       .150000       .300000       .800000 fdst0101 LL^M
BS    42         .500000       .550000       .200000       .300000 dkst0106 LL^M
^M
C dkst0405       .000000       .000000       .200000       .700000 dkst0106 LL^M
BS    43         .500000       .050000       .300000       .200000 dkst0203 LL^M
^M
C dkst0106       .000000     -.400000      -.200000  1.00000E+30 KAPFAB01 UL^M
LL    44        1.000000       .000000       .200000       .800000 dkst0103 LL^M
^M
C dkst0306       .000000     -.400000     -1.000000  1.00000E+30 KAPFAB01 UL^M
LL    45        1.500000       .200000      1.000000       .500000 fkst0106 LL^M
^M
C dkst0406       .000000     -.400000     -1.000000  1.00000E+30 KAPFAB01 UL^M
LL    46        1.500000       .000000      1.000000       .500000 dkst0405 LL^M
^M
XPRESS Modeller Log for problem: DISTRU20^M
restore^M
input^M
!^M
IF IND == 2     ! Velger modell 12.18 med maksmering av preferanse. Da gir ikke maalfunk
sjon^M
!                 ut kostnad og denne maa derfor beregnes etter optimering.^M
ASSIGN^M
! ^M
    KOSTNAD =    SUM(f=1:FMAX, d=1:DMAX) FDKOST(f, d) * fdstrom(f, d) &^M
                +SUM(f=1:FMAX, k=1:KMAX) FKKOST(f, k) * fkstrom(f, k) &         ^M
                +SUM(d=1:DMAX, k=1:KMAX) DKKOST(d, k) * dkstrom(d, k) ^M
!^M
PRINT ^M
   KOSTNAD^M
    2.460000^M
ENDIF^M
^M
PRINT^M
! Stroem fra fabrikk til deopt^M
        fdstrom ^M
     .100000,     .000000,     .000000,     .400000,     .000000,     .000000^M
```

```
     .000000,     .500000,     .300000,     .000000,     .000000,     .000000^M
! Stroem fra fabrikk til kunde^M
        fkstrom^M
     .500000,     .000000,     .000000,     .350000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
! Stroem fra depot til kunde    ^M
        dkstrom^M
     .000000,     .100000,     .000000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .500000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .100000,     .200000^M
     .000000,     .000000,     .400000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
!^M
!^M
!^M
TABLES^M
        SKYGF(FMAX)             ! Skyggepriser for fabrikkapasitet^M
        SKYGD(DMAX)             ! Skyggepriser for depotkapasitet^M
!^M
!^M
ASSIGN^M
!^M
!^M
        SKYGF(f=1:FMAX) = dual(KAPFAB(f))^M
!^M
        SKYGD(d=1:DMAX) = dual(KAPDEP(d))^M
!^M
!^M
!^M
PRINT^M
!^M
!       Skyggepriser for fabrikkapasitet^M
!^M
        SKYGF^M
     .000000^M
     .000000^M
!^M
!       Skyggepriser for depotkapasitet^M
!^M
        SKYGD^M
     .000000^M
     .700000^M
     .000000^M
     .300000^M
     .000000^M
     .000000^M
!^M
!^M
quit^M
^M
Problem Statistics^M
Matrix distru20^M
Objective MINOBJ  ^M
RHS RHS00001^M
Problem has     17 rows and     29 structural columns^M
^M
Solution Statistics^M
Minimisation performed^M
Optimal solution found after     14 iterations^M
Objective function value is     1.260000^M
^M
^M
Rows Section^M
   Number     Row     At      Value      Slack Value   Dual Value        RHS^M
 N      1  MINOBJ    BS      1.260000     -1.260000      .000000        .000000^M
 L      2  KAPFAB01  BS      1.350000       .150000      .000000       1.500000^M
 L      3  KAPFAB02  BS       .800000      1.200000      .000000       2.000000^M
 L      4  KAPDEP01  BS       .100000       .600000      .000000        .700000^M
```



```
 L      5  KAPDEP02  UL       .500000       .000000       .700000       .500000^M
 L      6  KAPDEP03  BS       .300000       .700000       .000000      1.000000^M
 L      7  KAPDEP04  UL       .400000       .000000       .300000       .400000^M
 E      8  LIKEVE01  EQ       .000000       .000000       .500000       .000000^M
 E      9  LIKEVE02  EQ       .000000       .000000      1.000000       .000000^M
 E     10  LIKEVE03  EQ       .000000       .000000       .500000       .000000^M
 E     11  LIKEVE04  EQ       .000000       .000000       .500000       .000000^M
 G     12  KUNDEB01  LL       .500000       .000000       .000000       .500000^M
 G     13  KUNDEB02  LL       .100000       .000000      -.500000       .100000^M
 G     14  KUNDEB03  LL       .400000       .000000      -.700000       .400000^M
 G     15  KUNDEB04  LL       .350000       .000000     -2.000000       .350000^M
 G     16  KUNDEB05  LL       .600000       .000000     -1.000000       .600000^M
 G     17  KUNDEB06  LL       .200000       .000000      -.500000       .200000^M
^M
Columns Section^M
   Number   Column    At      Value      Input Cost   Reduced Cost^M
 C     18  fdst0101  BS       .100000       .500000       .000000          ^M
 C     19  fdst0102  LL       .000000       .500000       .200000          ^M
 C     20  fdst0202  BS       .500000       .300000       .000000          ^M
 C     21  fdst0103  LL       .000000      1.000000       .500000          ^M
 C     22  fdst0203  BS       .300000       .500000       .000000          ^M
 C     23  fdst0104  BS       .400000       .200000       .000000          ^M
 C     24  fdst0204  LL       .000000       .200000       .000000          ^M
 C     25  fkst0101  BS       .500000       .000000       .000000          ^M
 C     26  fkst0201  LL       .000000      2.000000      2.000000          ^M
 C     27  fkst0103  LL       .000000      1.500000       .800000          ^M
 C     28  fkst0104  BS       .350000      2.000000       .000000          ^M
 C     29  fkst0106  LL       .000000      1.000000       .500000          ^M
 C     30  dkst0201  LL       .000000      1.000000      2.000000          ^M
 C     31  dkst0102  BS       .100000       .000000       .000000          ^M
 C     32  dkst0202  LL       .000000       .500000      1.000000          ^M
 C     33  dkst0302  LL       .000000      1.500000      1.500000          ^M
 C     34  dkst0103  LL       .000000       .500000       .300000          ^M
 C     35  dkst0203  LL       .000000       .500000       .800000          ^M
 C     36  dkst0303  LL       .000000      2.000000      1.800000          ^M
 C     37  dkst0403  BS       .400000       .200000       .000000          ^M
 C     38  dkst0104  LL       .000000      1.500000       .000000          ^M
 C     39  dkst0204  LL       .000000      1.000000       .000000          ^M
 C     40  dkst0404  LL       .000000      1.500000       .000000          ^M
 C     41  dkst0205  BS       .500000       .000000       .000000          ^M
 C     42  dkst0305  BS       .100000       .500000       .000000          ^M
 C     43  dkst0405  LL       .000000       .500000       .000000          ^M
 C     44  dkst0106  LL       .000000      1.000000      1.000000          ^M
 C     45  dkst0306  BS       .200000       .000000       .000000          ^M
 C     46  dkst0406  BS       .000000       .000000       .000000          ^M
^M
Problem Statistics^M
Matrix distru20^M
Objective MINOBJ  ^M
RHS RHS00001^M
Problem has     17 rows and     29 structural columns^M
^M
Solution Statistics^M
Minimisation performed^M
Optimal solution found after     14 iterations^M
Objective function value is     1.260000^M
^M
N MINOBJ       1.260000     1.260000  1.00000E+30                       ^M
BS     1      -1.260000     1.610000     1.000000             KAPDEP02 UL^M
^M
L KAPFAB01     1.350000      .950000      .000000             fdst0204 LL^M
BS     2        .150000  1.00000E+30      .000000             KUNDEB01 LL^M
^M
L KAPFAB02      .800000      .650000      .200000             fdst0102 LL^M
BS     3       1.200000     1.200000      .000000             fdst0204 LL^M
^M
L KAPDEP01      .100000      .000000     1.000000             dkst0202 LL^M
BS     4        .600000      .450000      .000000             dkst0104 LL^M
^M
```

```
L KAPDEP02       .500000       .000000       .700000              fdst0202 LL^M
UL     5        .000000       .600000      -.700000              dkst0305 LL^M
^M
L KAPDEP03       .300000       .150000       .300000              dkst0103 LL^M
BS     6        .700000       .650000       .000000              dkst0204 LL^M
^M
L KAPDEP04       .400000       .400000       .300000              dkst0406 LL^M
UL     7        .000000       .550000      -.300000              KAPFAB01 UL^M
^M
E LIKEVE01       .000000      -.150000       .500000              KAPFAB01 UL^M
EQ     8        .000000       .100000      -.500000              fdst0101 LL^M
^M
E LIKEVE02       .000000      -.500000      1.000000              dkst0205 LL^M
EQ     9        .000000       .100000     -1.000000              dkst0305 LL^M
^M
E LIKEVE03       .000000      -.700000       .500000              KAPDEP03 UL^M
EQ    10        .000000       .300000      -.500000              fdst0203 LL^M
^M
E LIKEVE04       .000000       .000000       .500000              dkst0406 LL^M
EQ    11        .000000       .200000      -.500000              dkst0306 LL^M
^M
G KUNDEB01       .500000       .000000       .000000              fkst0101 LL^M
LL    12        .000000       .650000       .000000              KAPFAB01 UL^M
^M
G KUNDEB02       .100000       .000000      -.500000              fdst0101 LL^M
LL    13        .000000       .250000       .500000              KAPFAB01 UL^M
^M
G KUNDEB03       .400000       .200000      -.700000              dkst0306 LL^M
LL    14        .000000       .400000       .700000              dkst0406 LL^M
^M
G KUNDEB04       .350000       .000000     -2.000000              fkst0104 LL^M
LL    15        .000000       .500000      2.000000              KAPFAB01 UL^M
^M
G KUNDEB05       .600000       .500000     -1.000000              dkst0305 LL^M
LL    16        .000000      1.300000      1.000000              KAPDEP03 UL^M
^M
G KUNDEB06       .200000       .000000      -.500000              dkst0306 LL^M
LL    17        .000000       .900000       .500000              KAPDEP03 UL^M
^M
C fdst0101       .100000       .000000      1.000000     1.500000 dkst0202 LL^M
BS    18        .500000       .450000       .000000      .500000 dkst0104 LL^M
^M
C fdst0102       .000000     -1.200000      -.200000  1.00000E+30 KAPFAB02 UL^M
LL    19        .500000       .150000       .200000      .300000 KAPFAB01 UL^M
^M
C fdst0202       .500000       .350000       .200000      .500000 fdst0102 LL^M
BS    20        .300000       .500000   2.00000E+30 -2.00000E+30          ^M
^M
C fdst0103       .000000     -1.200000      -.500000  1.00000E+30 KAPFAB02 UL^M
LL    21       1.000000       .150000       .500000      .500000 KAPFAB01 UL^M
^M
C fdst0203       .300000       .150000       .300000      .800000 dkst0103 LL^M
BS    22        .500000       .650000       .000000      .500000 dkst0204 LL^M
^M
C fdst0104       .400000      -.800000       .000000      .200000 fdst0204 LL^M
BS    23        .200000       .400000   2.00000E+30 -2.00000E+30          ^M
^M
C fdst0204       .000000      -.150000       .000000  1.00000E+30 KAPFAB01 UL^M
LL    24        .200000       .400000       .000000      .200000 fdst0104 LL^M
^M
C fkst0101       .500000      -.700000      2.000000     2.000000 fkst0201 LL^M
BS    25        .000000       .650000       .000000      .000000 KUNDEB01 LL^M
^M
C fkst0201       .000000      -.150000     -2.000000  1.00000E+30 KAPFAB01 UL^M
LL    26       2.000000       .500000      2.000000      .000000 fkst0101 LL^M
^M
C fkst0103       .000000       .000000      -.800000  1.00000E+30 dkst0406 LL^M
LL    27       1.500000       .150000       .800000      .700000 KAPFAB01 UL^M
^M
```



```
C fkst0104       .350000      -.250000       .000000     2.000000 dkst0104 LL^M
BS    28       2.000000       .500000      2.000000      .000000 KUNDEB04 LL^M
^M
C fkst0106       .000000      -.700000      -.500000  1.00000E+30 KAPDEP03 UL^M
LL    29       1.000000       .150000       .500000      .500000 KAPFAB01 UL^M
^M
C dkst0201       .000000      -.100000     -2.000000  1.00000E+30 dkst0305 LL^M
LL    30       1.000000       .500000      2.000000    -1.000000 dkst0205 LL^M
^M
C dkst0102       .100000       .000000      1.000000     1.000000 dkst0202 LL^M
BS    31        .000000       .250000       .500000     -.500000 KUNDEB02 LL^M
^M
C dkst0202       .000000      -.100000     -1.000000  1.00000E+30 dkst0305 LL^M
LL    32        .500000       .100000      1.000000     -.500000 fdst0101 LL^M
^M
C dkst0302       .000000      -.150000     -1.500000  1.00000E+30 KAPFAB01 UL^M
LL    33       1.500000       .100000      1.500000      .000000 fdst0101 LL^M
^M
C dkst0103       .000000       .000000      -.300000  1.00000E+30 dkst0406 LL^M
LL    34        .500000       .150000       .300000      .200000 KAPFAB01 UL^M
^M
C dkst0203       .000000       .000000      -.800000  1.00000E+30 dkst0406 LL^M
LL    35        .500000       .200000       .800000     -.300000 dkst0306 LL^M
^M
C dkst0303       .000000       .000000     -1.800000  1.00000E+30 dkst0406 LL^M
LL    36       2.000000       .200000      1.800000      .200000 dkst0306 LL^M
^M
C dkst0403       .400000       .250000       .300000      .500000 dkst0103 LL^M
BS    37        .200000       .400000       .700000     -.500000 KUNDEB03 LL^M
^M
C dkst0104       .000000      -.100000       .000000  1.00000E+30 fdst0101 LL^M
LL    38       1.500000       .350000       .000000     1.500000 fkst0104 LL^M
^M
C dkst0204       .000000      -.100000       .000000  1.00000E+30 dkst0305 LL^M
LL    39       1.000000       .350000       .000000     1.000000 fkst0104 LL^M
^M
C dkst0404       .000000      -.150000       .000000  1.00000E+30 KAPFAB01 UL^M
LL    40       1.500000       .000000       .000000     1.500000 dkst0406 LL^M
^M
C dkst0205       .500000       .150000       .000000      .000000 dkst0204 LL^M
BS    41        .000000       .500000   2.00000E+30 -2.00000E+30          ^M
^M
C dkst0305       .100000       .100000       .000000      .500000 dkst0405 LL^M
BS    42        .500000       .450000       .000000      .500000 dkst0204 LL^M
^M
C dkst0405       .000000      -.200000       .000000  1.00000E+30 dkst0306 LL^M
LL    43        .500000       .000000       .000000      .500000 dkst0406 LL^M
^M
C dkst0106       .000000      -.100000     -1.000000  1.00000E+30 fdst0101 LL^M
LL    44       1.000000       .150000      1.000000      .000000 KAPFAB01 UL^M
^M
C dkst0306       .200000       .050000       .300000      .300000 dkst0103 LL^M
BS    45        .000000       .200000       .000000      .000000 dkst0404 LL^M
^M
C dkst0406       .000000      -.350000       .000000      .000000 dkst0404 LL^M
BS    46        .000000       .150000       .300000     -.300000 dkst0103 LL^M
^M
XPRESS Modeller Log for problem: DISTRU20^M
restore^M
input^M
!^M
IF IND == 2     ! Velger modell 12.18 med maksmering av preferanse. Da gir ikke maalfunk
sjon^M
!                 ut kostnad og denne maa derfor beregnes etter optimering.^M
ASSIGN^M
! ^M
    KOSTNAD =    SUM(f=1:FMAX, d=1:DMAX) FDKOST(f, d) * fdstrom(f, d) &^M
                +SUM(f=1:FMAX, k=1:KMAX) FKKOST(f, k) * fkstrom(f, k) &         ^M
                +SUM(d=1:DMAX, k=1:KMAX) DKKOST(d, k) * dkstrom(d, k) ^M
```

```
!^M
PRINT ^M
   KOSTNAD^M
ENDIF^M
^M
PRINT^M
! Stroem fra fabrikk til deopt^M
        fdstrom ^M
     .000000,     .000000,     .000000,     .400000,     .000000,     .000000^M
     .000000,     .700000,     .100000,     .000000,     .000000,     .250000^M
! Stroem fra fabrikk til kunde^M
        fkstrom^M
     .500000,     .000000,     .000000,     .000000,     .000000,     .200000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
! Stroem fra depot til kunde    ^M
        dkstrom^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
     .000000,     .100000,     .000000,     .100000,     .500000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .100000,     .000000^M
     .000000,     .000000,     .400000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000^M
     .000000,     .000000,     .000000,     .250000,     .000000,     .000000^M
!^M
!^M
!^M
TABLES^M
        SKYGF(FMAX)             ! Skyggepriser for fabrikkapasitet^M
        SKYGD(DMAX)             ! Skyggepriser for depotkapasitet^M
!^M
!^M
ASSIGN^M
!^M
!^M
        SKYGF(f=1:FMAX) = dual(KAPFAB(f))^M
!^M
        SKYGD(d=1:DMAX) = dual(KAPDEP(d))^M
!^M
!^M
!^M
PRINT^M
!^M
!       Skyggepriser for fabrikkapasitet^M
!^M
        SKYGF^M
     .000000^M
     .000000^M
!^M
!       Skyggepriser for depotkapasitet^M
!^M
        SKYGD^M
     .000000^M
     .200000^M
     .000000^M
     .300000^M
     .300000^M
     .700000^M
!^M
!^M
quit^M
^M
Problem Statistics^M
Matrix distru20^M
Objective MINOBJ  ^M
RHS RHS00001^M
Problem has     26 rows and     47 structural columns^M
^M
Solution Statistics^M
Minimisation performed^M
Optimal solution found after      0 iterations^M
```



```
Objective function value is     1.740000^M
^M
^M
Rows Section^M
   Number      Row     At       Value      Slack Value   Dual Value        RHS^M
 N       1  MINOBJ     BS      1.890000     -1.740000       .000000       .150000^M
 L       2  KAPFAB01   BS      1.100000       .400000       .000000      1.500000^M
 L       3  KAPFAB02   BS      1.050000       .950000       .000000      2.000000^M
 L       4  KAPDEP01   BS       .000000       .000000       .000000       .000000^M
 L       5  KAPDEP02   UL       .500000       .000000       .200000       .500000^M
 L       6  KAPDEP03   BS       .100000       .900000       .000000      1.000000^M
 L       7  KAPDEP04   UL       .000000       .000000       .300000       .000000^M
 L       8  KAPDEP05   UL       .000000       .000000       .300000       .000000^M
 L       9  KAPDEP06   UL       .000000       .000000       .700000       .000000^M
 E      10  LIKEVE01   EQ       .000000       .000000       .500000       .000000^M
 E      11  LIKEVE02   EQ       .000000       .000000       .500000       .000000^M
 E      12  LIKEVE03   EQ       .000000       .000000       .500000       .000000^M
 E      13  LIKEVE04   EQ       .000000       .000000       .500000       .000000^M
 E      14  LIKEVE05   EQ       .000000       .000000       .700000       .000000^M
 E      15  LIKEVE06   EQ       .000000       .000000      1.000000       .000000^M
 G      16  KUNDEB01   LL       .500000       .000000     -1.000000       .500000^M
 G      17  KUNDEB02   LL       .100000       .000000     -1.000000       .100000^M
 G      18  KUNDEB03   LL       .400000       .000000      -.700000       .400000^M
 G      19  KUNDEB04   LL       .350000       .000000     -1.500000       .350000^M
 G      20  KUNDEB05   LL       .600000       .000000     -1.000000       .600000^M
 G      21  KUNDEB06   LL       .200000       .000000     -1.000000       .200000^M
 L      22  ANTDEP     UL      2.000000       .000000       .070000      2.000000^M
 L      23  DOKLOV01   UL       .000000       .000000       .170000       .000000^M
 L      24  DOKLOV04   BS     -1.000000      1.000000       .000000       .000000^M
 L      25  DOKLOV05   BS       .000000       .000000       .000000       .000000^M
 L      26  DOKLOV06   BS     -1.000000      1.000000       .000000       .000000^M
^M
Columns Section^M
   Number    Column    At       Value      Input Cost   Reduced Cost^M
 C      27  fdst0101   BS       .000000       .500000       .000000           ^M
 C      28  fdst0102   LL       .000000       .500000       .200000           ^M
 C      29  fdst0202   BS       .700000       .300000       .000000           ^M
 C      30  fdst0103   LL       .000000      1.000000       .500000           ^M
 C      31  fdst0203   BS       .100000       .500000       .000000           ^M
 C      32  fdst0104   BS       .400000       .200000       .000000           ^M
 C      33  fdst0204   LL       .000000       .200000       .000000           ^M
 C      34  fdst0105   LL       .000000       .600000       .200000           ^M
 C      35  fdst0205   BS       .000000       .400000       .000000           ^M
 C      36  fdst0106   LL       .000000       .400000       .100000           ^M
 C      37  fdst0206   BS       .250000       .300000       .000000           ^M
 C      38  fkst0101   BS       .500000      1.000000       .000000           ^M
 C      39  fkst0201   LL       .000000      2.000000      1.000000           ^M
 C      40  fkst0103   LL       .000000      1.500000       .800000           ^M
 C      41  fkst0104   LL       .000000      2.000000       .500000           ^M
 C      42  fkst0106   BS       .200000      1.000000       .000000           ^M
 C      43  dkst0201   LL       .000000      1.000000       .500000           ^M
 C      44  dkst0501   LL       .000000      1.200000       .900000           ^M
 C      45  dkst0102   LL       .000000      1.500000      1.000000           ^M
 C      46  dkst0202   BS       .100000       .500000       .000000           ^M
 C      47  dkst0302   LL       .000000      1.500000      1.000000           ^M
 C      48  dkst0502   LL       .000000       .600000       .300000           ^M
 C      49  dkst0602   LL       .000000       .400000       .400000           ^M
 C      50  dkst0103   LL       .000000       .500000       .300000           ^M
 C      51  dkst0203   LL       .000000       .500000       .300000           ^M
 C      52  dkst0303   LL       .000000      2.000000      1.800000           ^M
 C      53  dkst0403   BS       .400000       .200000       .000000           ^M
 C      54  dkst0503   LL       .000000       .500000       .500000           ^M
 C      55  dkst0104   LL       .000000      1.500000       .500000           ^M
 C      56  dkst0204   BS       .100000      1.000000       .000000           ^M
 C      57  dkst0404   LL       .000000      1.500000       .500000           ^M
 C      58  dkst0604   BS       .250000       .500000       .000000           ^M
 C      59  dkst0205   BS       .500000       .500000       .000000           ^M
 C      60  dkst0305   BS       .100000       .500000       .000000           ^M
 C      61  dkst0405   BS       .000000       .500000       .000000           ^M
```

```
 C     62  dkst0505  BS       .000000       .300000       .000000          ^M
 C     63  dkst0605  LL       .000000       .600000       .600000          ^M
 C     64  dkst0106  LL       .000000      1.000000       .500000          ^M
 C     65  dkst0306  LL       .000000      1.500000      1.000000          ^M
 C     66  dkst0406  LL       .000000      1.500000      1.000000          ^M
 C     67  dkst0506  LL       .000000       .800000       .500000          ^M
 C     68  dkst0606  LL       .000000       .900000       .900000          ^M
 C     69  dbruk 01  BS       .000000       .100000       .000000          ^M
 C     70  dbruk 04  BS      1.000000       .050000       .000000          ^M
 C     71  dbruk 05  LL       .000000       .120000       .100000          ^M
 C     72  dbruk 06  UL      1.000000       .040000      -.065000          ^M
 C     73  dokes 02  UL      1.000000       .030000      -.010000          ^M
*************************************************
*                                               *
*                                               *
*       Oppgave 18 og 19 i Williams             *
*                                               *
*       Loest av:                               *
*       Arne Soerli<arneso@foa.unit.no>         *
*                                               *
*       Foelgende filer kommer fortloepende:    *

        ovning.bak
        ovning.dat
        ovning.dim
        ovning.dka
        ovning.dky
        ovning.dom
        ovning.dps
        ovning.fka
        ovning.kdf
        ovning.kdk
        ovning.ket
        ovning.kfd
        ovning.kfk
        ovning.kny
        ovning.lis
        ovning.lst
        ovning.mod
        ovning.nnn
        ovning.pas
        ovning.pdk
        ovning.pfk
        ovning.pr2
        ovning.prt
        ovning.val

*                                               *
*                                               *
*************************************************

! kostnadsmatrise fabrikk-depot
! fabrikk1, fabrikk2
0.5,0.5,1,0.2,0.6,0.4 ! fabrikk1
0,0.3,0.5,0.2,0.4,0.3 ! fabrikk2

OVNING.DIM

! antall fabrikker, antall depoter, antall kunder, depot-limit (max # depoter)
2, 6, 6, 4


OVNING.VAL

1      ! Alfa, 0 = maximere preferanser, 1 = minimalisere kostnader.
1000   ! M, Stoerrelsen paa M som brukes for aa vekte funksjonene
1      ! Beta, 0 = oppgave 12.18, 1 = oppgave 12.19
```



```
OVNING.KFD

! kostnadsmatrise fabrikk-depot
! fabrikk1, fabrikk2
0.5,0.5,1,0.2,0.6,0.4 ! fabrikk 1
0,0.3,0.5,0.2,0.4,0.3 ! fabrikk 2


OVNING.KFK

! Kostnadsmatrise fabrikk-kunde
! fabrikk1, fabrikk2
1.0, 0.0, 1.5, 2.0, 0.0, 1.0 ! fabrikk 1
2.0, 0.0, 0.0, 0.0, 0.0, 0.0 ! fabrikk 2


OVNING.KDK

! kostnadsmatrise depot-kunde
! kunder ->
0.0, 1.5, 0.5, 1.5, 0.0, 1.0       ! depot 1
1.0, 0.5, 0.5, 1.0, 0.5, 0.0       !
0.0, 1.5, 2.0, 0.0, 0.5, 1.5       !
0.0, 0.0, 0.2, 1.5, 0.5, 1.5       !
1.2, 0.6, 0.5, 0.0, 0.3, 0.8       ! Nytt depot 5
0.0, 0.4, 0.0, 0.5, 0.6, 0.9       ! Nytt depot 6


OVNING.PFK

! preferanser fabrikk-kunde
0, 1, 0, 0, 1, 1   !    0 hvis preferert
1, 1, 0, 0, 1, 1   !    (maaler avviket fra preferensene)


OVNING.PDK

! preferanser depot-kunde
1, 0, 0, 0, 1, 1 !
1, 1, 0, 0, 0, 1 !
1, 1, 0, 0, 1, 0 !
1, 1, 0, 0, 1, 0 !
0, 0, 0, 0, 0, 0 !
0, 0, 0, 0, 0, 0 !


OVNING.FKA

! kapasitet fabrikk 1, fabrikk 2, .....
150000, 200000


OVNING.DKA

! (opprinnelig) kapasitet depot 1, depot 2, depot 3, etc.
70000, 50000, 100000, 40000, 0, 0


OVNING.KET

! etterspoersel kunde 1, kunde 2, kunde 3, kunde 4, ...
50000, 10000, 40000, 35000, 60000, 20000 !


OVNING.DKY

! ny kapasitet (etter endring) depot 1, depot 2, depot 3, etc.
0, 70000, 100000, 0, 30000, 25000
```

```
OVNING.KNY

! Kostnader(innsparinger) ved ny/utbygginger (nedleggelser) av depoter
-10000, 3000, 0, -5000, 12000, 4000



! antall fabrikker, antall depoter, antall kunder, depot-limit
2, 6, 6, 4
! (opprinnelig) kapasitet depot 1, depot 2, depot 3, etc.
70000, 50000, 100000, 40000, 0, 0
! ny kapasitet (etter endring) depot 1, depot 2, depot 3, etc.
0, 70000, 100000, 0, 30000, 25000
MODEL ovning

TABLES
 VALG(2)                        ! Inneholder var. for bestemmelse av min. kost
 DIM(3)                         ! eller min pref.avvik, samt stoerrelsen paa M
                                ! som brukes til aa vekte funksjonene (goalp.)
DISKDATA
 VALG(1)=ovning.val
 DIM(1)=ovning.dim
 LET ALFA=VALG(1)               ! Alfa=0 -> min preferanseavvik
 LET M=VALG(2)                  ! Alfa=1 -> min kostnad
 LET FMAX=DIM(1)
 LET DMAX=DIM(2)
 LET KMAX=DIM(3)
TABLES
 FKAP(FMAX)
 DKAP(DMAX)
 KETT(KMAX)
DISKDATA
 FKAP(1)=ovning.fka       ! Farbrik KAPasitet.
 DKAP(1)=ovning.dka       ! Depot KAPasitet.
 KETT(1)=ovning.ket       ! Kundes ETTerss¢rsel

TABLES
 KFD(FMAX,DMAX)           ! Kostnad Fabrikk Depot
 KFK(FMAX,KMAX)           ! Kostnad Fabrikk Kunde
 KDK(DMAX,KMAX)           ! Kostnad Depot Fabrikk
 PFK(FMAX,KMAX)           ! Preferanse Fabrikk Kunde
 PDK(DMAX,KMAX)           ! Preferanse Depot Kunde
DISKDATA
 KFD(1,1)=ovning.kdf
 KFK(1,1)=ovning.kfk
 KDK(1,1)=ovning.kdk
 PFK(1,1)=ovning.pfk
 PDK(1,1)=ovning.pdk

VARIABLES
 fd(f=1:FMAX,d=1:DMAX | KFD(f,d) .gt.0)       ! Defineres bare der
 fk(f=1:FMAX,k=1:KMAX | KFK(f,k) .gt.0)       ! det er kapasitet
 dk(d=1:DMAX,k=1:KMAX | KDK(d,k) .gt.0)
 pREFAVVI                                     ! Preferanseavvik
 tOTKOST                                      ! Totalkostnad

CONSTRAINTS
 OBJFUNK: ALFA*tOTKOST + ALFA*(1/M)*pREFAVVI + &         ! Alfa=0 -> min.
          (1-ALFA)*pREFAVVI + (1-ALFA)*(1/M)*tOTKOST $   ! foerst pref.avvik
                                                         ! deretter kost.
                                                         ! Alfa=1 -> motsatt
 KOST:  SUM(f=1:FMAX,d=1:DMAX) KFD(f,d)*fd(f,d) + &
        SUM(f=1:FMAX,k=1:KMAX) KFK(f,k)*fk(f,k) + &
        SUM(d=1:DMAX,k=1:KMAX) KDK(d,k)*dk(d,k) - tOTKOST  = 0

 AVVIK: SUM(f=1:FMAX,k=1:KMAX) PFK(f,k)*fk(f,k) + &
         SUM(d=1:DMAX,k=1:KMAX) PDK(d,k)*dk(d,k) - pREFAVVI = 0
```



```
 FABKAP(f=1:FMAX): SUM(d=1:DMAX) fd(f,d) + SUM(k=1:KMAX) fk(f,k) < FKAP(f)
 DEPKAP(d=1:DMAX): SUM(k=1:KMAX) dk(d,k) < DKAP(d)
 KUNETT(k=1:KMAX): SUM(f=1:FMAX) fk(f,k) + SUM(d=1:DMAX) dk(d,k) > KETT(k)
 MIDNOD(d=1:DMAX): SUM(f=1:FMAX) fd(f,d) - SUM(k=1:KMAX) dk(d,k) = 0

GENERATE

PRINT pREFAVVI
PRINT tOTKOST
PRINT fd
PRINT fk
PRINT dk
! kapasitet fabrikk 1, fabrikk 2, .....
150000, 200000
! kostnadsmatrise fabrikk-depot
! depoter ->
0.5, 0.5,   1, 0.2, 0.6, 0.4 ! fabrikk1
  0, 0.3, 0.5, 0.2, 0.4, 0.3 ! fabrikk2

! kostnadsmatrise depot-kunde
! kunder ->
0.0, 1.5, 0.5, 1.5, 0.0, 1.0       ! depot1
1.0, 0.5, 0.5, 1.0, 0.5, 0.0       !
0.0, 1.5, 2.0, 0.0, 0.5, 1.5       !
0.0, 0.0, 0.2, 1.5, 0.5, 1.5       !
1.2, 0.6, 0.5, 0.0, 0.3, 0.8         ! Nytt depot 5
0.0, 0.4, 0.0, 0.5, 0.6, 0.9         ! Nytt depot 6
! ettersp¢rsel kunde 1, kunde 2, kunde 3, kunde 4, ...
50000, 10000, 40000, 35000, 60000, 20000 !


! kostnadsmatrise fabrikk-depot
! fabrikk1, fabrikk2
0.5,0.5,1,0.2,0.6,0.4 ! fabrikk1
0,0.3,0.5,0.2,0.4,0.3 ! fabrikk2

! Kostnadsmatrise fabrikk-kunde
! fabrikk1, fabrikk2
1.0, 0.0, 1.5, 2.0, 0.0, 1.0 ! fabrikk1
2.0, 0.0, 0.0, 0.0, 0.0, 0.0 ! fabrikk2
! Kostnader(innsparinger) ved ny/utbygginger (nedleggelser) av depoter
-10000, 3000, 0, -5000, 12000, 4000
XPRESS-MP Report Writer
Release  7.01
(c) Copyright Dash Associates 1984-1993
Enter problem name >
Type HELP for summary information
Problem Statistics
Matrix ovning
Objective OBJFUNK
RHS RHS00001
Problem has     24 rows and     49 structural columns
Solution Statistics
Minimisation performed
Optimal solution found after      0 iterations
Objective function value is   203.000000

>Full print and exit? (Y/N)>

   Number     Row     At      Value       Slack Value   Dual Value        RHS
 N      1  OBJFUNK    BS    203.000000   -203.000000      .000000       .000000
 E      2  KOST       UL       .000000       .000000      .001000       .000000
 E      3  AVVIK      UL       .000000       .000000      .001000       .000000
 L      4  FABKAP01   BS   100000.0000   50000.00000      .000000   150000.0000
 L      5  FABKAP02   BS   115000.0000   85000.00000      .000000   200000.0000
 L      6  DEPKAP01   UL   70000.00000       .000000   5.14286E-04  70000.00000
 L      7  DEPKAP02   UL   50000.00000       .000000   7.00000E-04  50000.00000
 L      8  DEPKAP03   BS   20000.00000   80000.00000      .000000   100000.0000
```

```
 L      9  DEPKAP04  UL   40000.00000       .000000    7.75000E-04   40000.00000
 L     10  DEPKAP05  UL        .000000      .000000    9.00000E-04        .000000
 L     11  DEPKAP06  UL        .000000      .000000        .001200        .000000
 G     12  KUNETT01  LL   50000.00000       .000000       -.001000   50000.00000
 G     13  KUNETT02  LL   10000.00000       .000000       -.001900   10000.00000
 G     14  KUNETT03  LL   40000.00000       .000000       -.001175   40000.00000
 G     15  KUNETT04  LL   35000.00000       .000000       -.002000   35000.00000
 G     16  KUNETT05  LL   60000.00000       .000000       -.001500   60000.00000
 G     17  KUNETT06  LL   20000.00000       .000000       -.002000   20000.00000
 E     18  MIDNOD01  UL        .000000      .000000   -1.60714E-04        .000000
 E     19  MIDNOD02  UL        .000000      .000000   -3.00000E-04        .000000
 E     20  MIDNOD03  UL        .000000      .000000   -5.00000E-04        .000000
 E     21  MIDNOD04  UL        .000000      .000000   -2.00000E-04        .000000
 E     22  MIDNOD05  UL        .000000      .000000   -4.00000E-04        .000000
 E     23  MIDNOD06  UL        .000000      .000000   -3.00000E-04        .000000
 L     24  DEPLIMIT  UL        .000000      .000000      26.000000        .000000
<end of rows>


   Number   Column   At       Value       Input Cost   Reduced Cost
 C     25  fd  0101  LL        .000000      .000000    3.39286E-04
 C     26  fd  0102  LL        .000000      .000000    2.00000E-04
 C     27  fd  0202  BS   70000.00000       .000000        .000000
 C     28  fd  0103  LL        .000000      .000000    5.00000E-04
 C     29  fd  0203  BS   20000.00000       .000000        .000000
 C     30  fd  0104  BS   40000.00000       .000000        .000000
 C     31  fd  0204  LL        .000000      .000000        .000000
 C     32  fd  0105  LL        .000000      .000000    2.00000E-04
 C     33  fd  0205  BS        .000000      .000000        .000000
 C     34  fd  0106  LL        .000000      .000000    1.00000E-04
 C     35  fd  0206  BS   25000.00000       .000000        .000000
 C     36  fk  0101  BS   50000.00000       .000000        .000000
 C     37  fk  0201  LL        .000000      .000000        .002000
 C     38  fk  0103  LL        .000000      .000000    3.25000E-04
 C     39  fk  0104  BS   10000.00000       .000000        .000000
 C     40  fk  0106  BS        .000000      .000000        .000000
 C     41  dk  0201  LL        .000000      .000000        .002000
 C     42  dk  0501  LL        .000000      .000000        .001500
 C     43  dk  0102  LL        .000000      .000000    2.75000E-04
 C     44  dk  0202  LL        .000000      .000000    6.00000E-04
 C     45  dk  0302  LL        .000000      .000000        .001100
 C     46  dk  0502  BS        .000000      .000000        .000000
 C     47  dk  0602  BS   10000.00000       .000000        .000000
 C     48  dk  0103  BS        .000000      .000000        .000000
 C     49  dk  0203  LL        .000000      .000000    3.25000E-04
 C     50  dk  0303  LL        .000000      .000000        .001325
 C     51  dk  0403  BS   40000.00000       .000000        .000000
 C     52  dk  0503  LL        .000000      .000000    6.25000E-04
 C     53  dk  0104  LL        .000000      .000000    1.75000E-04
 C     54  dk  0204  BS   10000.00000       .000000        .000000
 C     55  dk  0404  LL        .000000      .000000    4.75000E-04
 C     56  dk  0604  BS   15000.00000       .000000        .000000
 C     57  dk  0205  BS   60000.00000       .000000        .000000
 C     58  dk  0305  LL        .000000      .000000    5.00000E-04
 C     59  dk  0405  LL        .000000      .000000    9.75000E-04
 C     60  dk  0505  LL        .000000      .000000    1.00000E-04
 C     61  dk  0605  LL        .000000      .000000    6.00000E-04
 C     62  dk  0106  LL        .000000      .000000    6.75000E-04
 C     63  dk  0306  BS   20000.00000       .000000        .000000
 C     64  dk  0406  LL        .000000      .000000    4.75000E-04
 C     65  dk  0506  LL        .000000      .000000    1.00000E-04
 C     66  dk  0606  LL        .000000      .000000    4.00000E-04
 C     67  eNDRED01  BS       1.000000      .000000        .000000
 C     68  eNDRED02  UL       1.000000      .000000     -11.000000
 C     69  eNDRED04  BS        .000000      .000000        .000000
 C     70  eNDRED05  LL        .000000      .000000      11.000000
 C     71  eNDRED06  BS       1.000000      .000000        .000000
 C     72  pREFAVVI  LL        .000000     1.000000        .999000
 C     73  tOTKOST   BS   203000.0000       .001000        .000000
```



```
XPRESS Modeller Log for problem: ovning
RESTORE
INPUT

PRINT tOTKOST
 174000.0000
PRINT pREFAVVI
 40000.00000
PRINT fd
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000
     .000000, 70000.00000, 10000.00000, 40000.00000,     .000000, 25000.00000
PRINT fk
 50000.00000,     .000000,     .000000,     .000000,     .000000, 20000.00000
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000
PRINT dk
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000
     .000000, 10000.00000,     .000000, 10000.00000, 50000.00000,     .000000
     .000000,     .000000,     .000000,     .000000, 10000.00000,     .000000
     .000000,     .000000, 40000.00000,     .000000,     .000000,     .000000
     .000000,     .000000,     .000000,     .000000,     .000000,     .000000
     .000000,     .000000,     .000000, 25000.00000,     .000000,     .000000
PRINT eNDREDEP
    1.000000
    1.000000
     .000000
     .000000
     .000000
    1.000000
QUIT
MODEL ovning

TABLES
 VALG(3)                        ! Inneholder var. for bestemmelse av min. kost
 DIM(4)                         ! eller min pref.avvik, samt stoerrelsen paa M
                                ! som brukes til aa vekte funksjonene (goalp.)
DISKDATA
 VALG(1)=ovning.val
 DIM(1)=ovning.dim
LET ALFA   = VALG(1)            ! Alfa=0 -> min preferanseavvik
LET M      = VALG(2)            ! Alfa=1 -> min kostnad
LET BETA   = VALG(3)            ! Beta=0: Oppgave 12.18
LET FMAX   = DIM(1)             ! Beta=1: Oppgave 12.19
LET DMAX   = DIM(2)             ! FMAX, DMAX og KMAX er maks antall fabrikker,
LET KMAX   = DIM(3)             ! depoter og kunder
LET DLIMIT = DIM(4)             ! Valgt verdi for max ant. depoter


TABLES
 KFD(FMAX,DMAX)                 ! Kostnad Fabrikk-Depot
 KFK(FMAX,KMAX)                 ! Kostnad Fabrikk-Kunde
 KDK(DMAX,KMAX)                 ! Kostnad Depot-Fabrikk
 PFK(FMAX,KMAX)                 ! Preferanse Fabrikk-Kunde
 PDK(DMAX,KMAX)                 ! Preferanse Depot-Kunde
 FKAP(FMAX)                     ! FabrikKAPasitet
 DKAP(DMAX)                     ! DepotKAPasitet (opprinnelig)
 KETT(KMAX)                     ! KundeETTerspoersel
 DKAPNY(DMAX)                   ! Depotkapasitet etter endring
 KNYDEP(DMAX)                   ! Kostnad for NYtt DEPot. Denne er
                                ! 0 for uendrede depoter og negativ
                                ! for depoter som kan selges. Positiv
                                ! ved utvidelse/nybygg

DISKDATA
 KFD(1,1)  = ovning.kfd
 KFK(1,1)  = ovning.kfk
 KDK(1,1)  = ovning.kdk
 PFK(1,1)  = ovning.pfk
 PDK(1,1)  = ovning.pdk
 FKAP(1)   = ovning.fka
```

```
 DKAP(1)   = ovning.dka
 KETT(1)   = ovning.ket
 DKAPNY(1) = ovning.dky
 KNYDEP(1) = ovning.kny

ASSIGN DMAXENDR = DLIMIT - SUM(d=1:DMAX | DKAP(d) .gt. 0) 1
                               ! Maxendring, antall depoter: grense - gamle

VARIABLES
 fd(f=1:FMAX,d=1:DMAX | KFD(f,d) .gt. 0)          ! Defineres bare der
 fk(f=1:FMAX,k=1:KMAX | KFK(f,k) .gt. 0)          ! kostnad > 0
 dk(d=1:DMAX,k=1:KMAX | KDK(d,k) .gt. 0)
 pREFAVVI                                          ! Preferanseavvik
 tOTKOST                                           ! Totalkostnad
 eNDREDEP(d=1:DMAX | (DKAPNY(d) .ne. DKAP(d)) .and. BETA == 1)
                                                   ! EndreDepot, = 1 hvis
                                                   ! nedlegger/utvider/nytt,
                                                   ! 0 ellers. Defineres bare
                                                   ! for oppgave 12.19

CONSTRAINTS
 OBJFUNK: ALFA*tOTKOST + ALFA*(1/M)*pREFAVVI + &         ! Alfa=0 -> min.
          (1-ALFA)*pREFAVVI + (1-ALFA)*(1/M)*tOTKOST $   ! foerst pref.avvik
                                                         ! deretter kost.
                                                         ! Alfa=1 -> motsatt

 KOST: SUM(f=1:FMAX,k=1:KMAX | KFK(f,k) .gt. 0) KFK(f,k)*fk(f,k) +   &
       SUM(f=1:FMAX,d=1:DMAX | KFD(f,d) .gt. 0) KFD(f,d)*fd(f,d) +   &
       SUM(d=1:DMAX,k=1:KMAX | KDK(d,k) .gt. 0) KDK(d,k)*dk(d,k) +   &
       SUM(d=1:DMAX) BETA*KNYDEP(d)*eNDREDEP(d)                      &
                                                        - tOTKOST  = 0

 AVVIK: SUM(f=1:FMAX,k=1:KMAX) PFK(f,k)*fk(f,k) +                    &
        SUM(d=1:DMAX,k=1:KMAX) PDK(d,k)*dk(d,k)                      &
                                                        - pREFAVVI = 0

 FABKAP(f=1:FMAX): SUM(d=1:DMAX) fd(f,d) + SUM(k=1:KMAX) fk(f,k)     < FKAP(f)

 DEPKAP(d=1:DMAX): SUM(k=1:KMAX) dk(d,k) - DKAP(d) +                 &
                   DKAP(d)*eNDREDEP(d) - DKAPNY(d)*eNDREDEP(d)       < 0

 KUNETT(k=1:KMAX): SUM(f=1:FMAX) fk(f,k) + SUM(d=1:DMAX) dk(d,k)     > KETT(k)

 MIDNOD(d=1:DMAX): SUM(f=1:FMAX) fd(f,d) - SUM(k=1:KMAX) dk(d,k)     = 0

 DEPLIMIT: SUM(d=1:DMAX|(DKAPNY(d) .gt. DKAP(d)) .and. (DKAP(d)=0))  &
           eNDREDEP(d) -                                             &
           SUM(d=1:DMAX | DKAPNY(d) .lt. DKAP(d)) eNDREDEP(d)        < DMAXENDR

BOUNDS
 eNDREDEP(d=1:DMAX | (DKAPNY(d) .ne. DKAP(d)) .and. BETA==1) .BV.    ! Binaerv.

GENERATE

PRINT tOTKOST
PRINT pREFAVVI
PRINT fd
PRINT fk
PRINT dk
PRINT eNDREDEP

Obligatorisk EDB-°vning i operasjonsanalyse 2

Arne S°rli, Robin Olsen og Stein Jacopsen

Oppgave 12.18

a) Hvilket distribusjonsm°nster vil minimalisere kostnadene :
```



```
Henviser til utskrift fra xpress, vedlegg 1, med notater.

b) Hvilken effekt p  distribusjonskost. ved °ke fabrikk / depot kapasitene.

Øke kap. til fabr. 1 med 1000 enhet vil minke kost. med    0.00
Øke kap. til fabr. 2 med 1000 enhet vil minke kost. med    0.00
Øke kap. til depot 1 med 1000 enhet vil minke kost. med    0.00
Øke kap. til depot 2 med 1000 enhet vil minke kost. med  201.00
Øke kap. til depot 3 med 1000 enhet vil minke kost. med    0.00
Øke kap. til depot 4 med 1000 enhet vil minke kost. med  601.00

d) Ville det vµre mulig   m°te alle kundenes preferanser ved valg av depot og fabrikk o
g hvis s  hva ville vµre de ekstra kostnadene.

Henviser til utskrift fra xpress, vedlegg 2, max preferanser.
Nesten alle kunders preferanser ved valg av depot og fabrikk blir m°tt. Unntaket er kund
e C5 som °nsker   f  levert varer fra depoet Birmingham, men hvor 10 av totalt 60 i vir
keligheten blir mottat fra depot i London

Kostnadsdiff. = 246000-198500 = 47500

^MOppgave 12.19 ( se vedlegg 3 ).

a) Hvilke nye depoter b°r bygges ?
Depot nr. 6 Northamton b°r bygges ut.

b) B°r Birmingham utvide ?
Ja, Birmingham b°r utvide.

c) B°r Exeter eller Newcastle legges ned.
Newcastle b°r legges ned.

d) Hva er det beste distribusjonsm°nsteret for minimalisere kostander.
Henvises til utskrift fra express, vedlegg 3
MODEL ovning

TABLES
 VALG(3)                         ! Inneholder var. for bestemmelse av min. kost
 DIM(4)                          ! eller min pref.avvik, samt stoerrelsen paa M
                                 ! som brukes til aa vekte funksjonene (goalp.)
DISKDATA
 VALG(1)=ovning.val
 DIM(1)=ovning.dim
 LET ALFA=VALG(1)                ! Alfa=0 -> min preferanseavvik
 LET M=VALG(2)                   ! Alfa=1 -> min kostnad
 LET BETA = VALG(3)              ! Beta=0: Oppgave 12.18
 LET FMAX=DIM(1)                 ! Beta=1: Oppgave 12.19
 LET DMAX=DIM(2)
 LET KMAX=DIM(3)
 LET DLIMIT=DIM(4) - 4           ! Valgt verdi for max ant. depoter

TABLES
 FKAP(FMAX)
 DKAP(DMAX)
 KETT(KMAX)
 DKAPNY(DMAX)                    ! Endringspotensiale for depoter
 KNYDEP(DMAX)                    ! Kostnad for NYtt DEPot. Denne er
                                 ! 0 for gamle depoter og negativ
                                 ! for depoter som kan selges

DISKDATA
 FKAP(1)=ovning.fka              ! Fabrikk KAPasitet.
 DKAP(1)=ovning.dka              ! Depot KAPasitet.
 KETT(1)=ovning.ket              ! Kundes ETTersp°rsel
 DKAPNY(1)=ovning.dky    ! Ny Depot KAPasitet
 KNYDEP(1)=ovning.kny

TABLES
 KFD(FMAX,DMAX)                  ! Kostnad Fabrikk Depot
```

```
 KFK(FMAX,KMAX)                  ! Kostnad Fabrikk Kunde
 KDK(DMAX,KMAX)                  ! Kostnad Depot Fabrikk
 PFK(FMAX,KMAX)                  ! Preferanse Fabrikk Kunde
 PDK(DMAX,KMAX)                  ! Preferanse Depot Kunde

DISKDATA
 KFD(1,1)=ovning.kfd
 KFK(1,1)=ovning.kfk
 KDK(1,1)=ovning.kdk
 PFK(1,1)=ovning.pfk
 PDK(1,1)=ovning.pdk

VARIABLES
 fd(f=1:FMAX,d=1:DMAX | KFD(f,d) .gt. 0)
 fk(f=1:FMAX,k=1:KMAX | KFK(f,k) .gt.0)
 dk(d=1:DMAX,k=1:KMAX | KDK(d,k) .gt. 0)
                        !Defineres bare der det er kapasitet og der det
                        ! er muligheter for nybygging/nedlegging
 eNDREDEP(d=1:DMAX | (DKAPNY(d) .ne. DKAP(d)) .and. BETA == 1)
                        ! Denne =1 n r man endrer (bygger/nedlegger)
                        ! Denne =0 n r man ikke endrer depotet
 pREFAVVI               ! Preferanseavvik
 tOTKOST                ! Totalkostnad


BOUNDS
 eNDREDEP(d=1:DMAX | (DKAPNY(d) .ne. DKAP(d)) .and. BETA==1) .BV.
                        ! Defineres som binµre variable

CONSTRAINTS
 OBJFUNK: ALFA*tOTKOST + ALFA*(1/M)*pREFAVVI + &         ! Alfa=0 -> min.
          (1-ALFA)*pREFAVVI + (1-ALFA)*(1/M)*tOTKOST $   ! foerst pref.avvik
                                                         ! deretter kost.
                                                         ! Alfa=1 -> motsatt

 KOST:  SUM(f=1:FMAX,k=1:KMAX | KFK(f,k) .gt. 0) KFK(f,k)*fk(f,k) +             &
         SUM(f=1:FMAX,d=1:DMAX | KFD(f,d) .gt. 0) KFD(f,d)*fd(f,d) +             &
         SUM(d=1:DMAX,k=1:KMAX | KDK(d,k) .gt. 0) KDK(d,k)*dk(d,k)               &
            +   SUM(d=1:DMAX)          &
                BETA*KNYDEP(d)*eNDREDEP(d)                                       &
                                                            - tOTKOST  = 0

 AVVIK: SUM(f=1:FMAX,k=1:KMAX) PFK(f,k)*fk(f,k) + &
          SUM(d=1:DMAX,k=1:KMAX) PDK(d,k)*dk(d,k) - pREFAVVI = 0

 FABKAP(f=1:FMAX): SUM(d=1:DMAX) fd(f,d) + SUM(k=1:KMAX) fk(f,k) < FKAP(f)

 DEPA(d=1:DMAX | DKAPNY(d) == DKAP(d)): SUM(k=1:KMAX) dk(d,k) < DKAP(d)

 DEPB(d=1:DMAX | DKAPNY(d) .ne. DKAP(d)):                     &
                         SUM(k=1:KMAX) BETA*dk(d,k) -          &
        DKAP(d) + DKAP(d)*eNDREDEP(d) - DKAPNY(d)*eNDREDEP(d) < 0

 KUNETT(k=1:KMAX): SUM(f=1:FMAX) fk(f,k) + SUM(d=1:DMAX) dk(d,k) > KETT(k)

 MIDNOD(d=1:DMAX): SUM(f=1:FMAX) fd(f,d) - SUM(k=1:KMAX) dk(d,k) = 0

 DEPLIMIT:      SUM(d=1:DMAX | (DKAPNY(d) .gt. DKAP(d)).and.(DKAP(d) =0))  &
              eNDREDEP(d) -      &
                SUM(d=1:DMAX | DKAPNY(d) .lt. DKAP(d)) eNDREDEP(d) < DLIMIT

GENERATE

PRINT pREFAVVI
PRINT tOTKOST
PRINT fd
PRINT fk
PRINT dk
PRINT eNDREDEP
```



```
PRINT DLIMIT
MODELL ovning

TABLES
 DIM(3)
DISKDATA
 DIM(1)=ovning.dim
 LET FMAX=DIM(1)
 LET DMAX=DIM(2)
 LET KMAX=DIM(3)
TABLES
 FKAP(FMAX)
 DKAP(DMAX)
 KETT(KMAX)
DISKDATA
 FKAP(1)=ovning.fka     ! Farbrik KAPasitet.
 DKAP(1)=ovning.dka     ! Depot KAPasitet.
 KETT(1)=ovning.ket     ! Kundes ETTerss¢rsel
TABLES
 KFD(FMAX,DMAX)         ! Kostnad Fabrikk Depot
 KFK(FMAX,KMAX)         ! Kostnad Fabrikk Kunde
 KDK(DMAX,KMAX)         ! Kostnad Depot Fabrikk

 PFK(FMAX,KMAX)         ! Preferanse Fabrikk Kunde
 PDK(DMAX,KMAX)         ! Preferanse Depot Kunde
DISKDATA
 KFD(1,1)=ovning.kdf
 KFK(1,1)=ovning.kfk
 KDK(1,1)=ovning.kdk

 PFK(1,1)=ovning.pfk
 PDK(1,1)=ovning.pdk

VARIABLES
 fd(f=1:FMAX,d=1:DMAX)
 fk(f=1:FMAX,k=1:KMAX)
 dk(d=1:DMAX,k=1:KMAX)

CONSTRAINTS
 MINKOST : SUM(f=1:FMAX,d=1:DMAX) KFD(f,d)*fd(f,d) + &
           SUM(f=1:FMAX,k=1:KMAX) KFK(f,k)*fk(f,k) + &
           SUM(d=1:DMAX,k=1:KMAX) KDK(d,k)*fk(d,k)
 FabKAP(f=1:FMAX): SUM(d=1:DMAX) fd(f,d) + SUM(k=1:KMAX) fk(f,k) < FKAP(f)
 DepKAP(d=1:DMAX): SUM(k=1:KMAX) dk(d,k) < DKAP(d)
 KunETT(k=1:KMAX): SUM(f=1:FMAX) fk(f,k) + SUM(d=1:DMAX) dk(d,k) > KETT(k)
 MIDNOD(d=1:DMAX): SUM(f=1:FMAX) fd(f,d) - SUM(k=1:KMAX) dk(d,k) = 0

GENERATE! preferanser depot-kunde
1,0,0,0,1,1 !
1,1,0,0,0,1 !
1,1,0,0,1,0 !
1,1,0,0,1,0 !
0,0,0,0,0,0 !
0,0,0,0,0,0 !
! preferanser fabrikk-kunde
0,1,0,0,1,1 !
1,1,0,0,1,1 !


Problem Statistics
Matrix ovning
Objective OBJFUNK
RHS RHS00001
Problem has     19 rows and     31 structural columns

Solution Statistics
Minimisation performed
Optimal solution found after     14 iterations
Objective function value is  10246.00000
```

Rows Section

	Number	Row	At	Value	Slack Value	Dual Value	RHS
N	1	OBJFUNK	BS	10246.00000	-10246.00000	.000000	.000000
E	2	KOST	EQ	.000000	.000000	.001000	.000000
E	3	AVVIK	EQ	.000000	.000000	1.000000	.000000
L	4	FABKAP01	BS	135000.0000	15000.00000	.000000	150000.0000
L	5	FABKAP02	BS	80000.00000	120000.0000	.000000	200000.0000
L	6	DEPKAP01	BS	10000.00000	60000.00000	.000000	70000.00000
L	7	DEPKAP02	UL	50000.00000	.000000	1.000200	50000.00000
L	8	DEPKAP03	BS	30000.00000	70000.00000	.000000	100000.0000
L	9	DEPKAP04	UL	40000.00000	.000000	6.00000E-04	40000.00000
G	10	KUNETT01	LL	50000.00000	.000000	-.001000	50000.00000
G	11	KUNETT02	LL	10000.00000	.000000	-.002000	10000.00000
G	12	KUNETT03	LL	40000.00000	.000000	-.001000	40000.00000
G	13	KUNETT04	LL	35000.00000	.000000	-.002000	35000.00000
G	14	KUNETT05	LL	60000.00000	.000000	-1.001000	60000.00000
G	15	KUNETT06	LL	20000.00000	.000000	-.002000	20000.00000
E	16	MIDNOD01	EQ	.000000	.000000	-5.00000E-04	.000000
E	17	MIDNOD02	EQ	.000000	.000000	-3.00000E-04	.000000
E	18	MIDNOD03	EQ	.000000	.000000	-5.00000E-04	.000000
E	19	MIDNOD04	EQ	.000000	.000000	-2.00000E-04	.000000

Columns Section

	Number	Column	At	Value	Input Cost	Reduced Cost
C	20	fd 0101	BS	10000.00000	.000000	.000000
C	21	fd 0102	LL	.000000	.000000	2.00000E-04
C	22	fd 0202	BS	50000.00000	.000000	.000000
C	23	fd 0103	LL	.000000	.000000	5.00000E-04
C	24	fd 0203	BS	30000.00000	.000000	.000000
C	25	fd 0104	BS	40000.00000	.000000	.000000
C	26	fd 0204	LL	.000000	.000000	.000000
C	27	fk 0101	BS	50000.00000	.000000	.000000
C	28	fk 0201	LL	.000000	.000000	1.001000
C	29	fk 0103	LL	.000000	.000000	5.00000E-04
C	30	fk 0104	BS	35000.00000	.000000	.000000
C	31	fk 0106	LL	.000000	.000000	.999000
C	32	dk 0201	LL	.000000	.000000	2.000500
C	33	dk 0102	BS	10000.00000	.000000	.000000
C	34	dk 0202	LL	.000000	.000000	1.999000
C	35	dk 0302	LL	.000000	.000000	1.000000
C	36	dk 0103	BS	.000000	.000000	.000000
C	37	dk 0203	LL	.000000	.000000	1.000000
C	38	dk 0303	LL	.000000	.000000	.001500
C	39	dk 0403	BS	40000.00000	.000000	.000000
C	40	dk 0104	LL	.000000	.000000	.000000
C	41	dk 0204	LL	.000000	.000000	.999500
C	42	dk 0404	LL	.000000	.000000	3.00000E-04
C	43	dk 0205	BS	50000.00000	.000000	.000000
C	44	dk 0305	BS	10000.00000	.000000	.000000
C	45	dk 0405	LL	.000000	.000000	3.00000E-04
C	46	dk 0106	LL	.000000	.000000	.999500
C	47	dk 0306	BS	20000.00000	.000000	.000000
C	48	dk 0406	LL	.000000	.000000	3.00000E-04
C	49	pREFAVVI	BS	10000.00000	1.000000	.000000
C	50	tOTKOST	BS	246000.0000	.001000	.000000

Problem Statistics
Matrix ovning
Objective OBJFUNK
RHS RHS00001
Problem has 24 rows and 49 structural columns

Solution Statistics
Minimisation performed
Optimal solution found after 0 iterations
Objective function value is 174040.0000

Rows Section

	Number	Row	At	Value	Slack Value	Dual Value	RHS
N	1	OBJFUNK	BS	174040.0000	-174040.0000	.000000	.000000
E	2	KOST	EQ	.000000	.000000	1.000000	.000000
E	3	AVVIK	EQ	.000000	.000000	.001000	.000000
L	4	FABKAP01	BS	70000.00000	80000.00000	.000000	150000.0000
L	5	FABKAP02	BS	145000.0000	55000.00000	.000000	200000.0000
L	6	DEPKAP01	UL	70000.00000	.000000	.336071	70000.00000
L	7	DEPKAP02	UL	50000.00000	.000000	.201000	50000.00000
L	8	DEPKAP03	BS	10000.00000	90000.00000	.000000	100000.0000
L	9	DEPKAP04	UL	40000.00000	.000000	.601000	40000.00000
L	10	DEPKAP05	UL	.000000	.000000	.301000	.000000
L	11	DEPKAP06	UL	.000000	.000000	.701000	.000000
G	12	KUNETT01	LL	50000.00000	.000000	-1.000000	50000.00000
G	13	KUNETT02	LL	10000.00000	.000000	-1.002000	10000.00000
G	14	KUNETT03	LL	40000.00000	.000000	-1.001000	40000.00000
G	15	KUNETT04	LL	35000.00000	.000000	-1.501000	35000.00000
G	16	KUNETT05	LL	60000.00000	.000000	-1.001000	60000.00000
G	17	KUNETT06	LL	20000.00000	.000000	-1.001000	20000.00000
E	18	MIDNOD01	EQ	.000000	.000000	-.500000	.000000
E	19	MIDNOD02	EQ	.000000	.000000	-.300000	.000000
E	20	MIDNOD03	EQ	.000000	.000000	-.500000	.000000
E	21	MIDNOD04	EQ	.000000	.000000	-.200000	.000000
E	22	MIDNOD05	EQ	.000000	.000000	-.400000	.000000
E	23	MIDNOD06	EQ	.000000	.000000	-.300000	.000000
L	24	DEPLIMIT	UL	.000000	.000000	13525.00000	.000000

Columns Section

	Number	Column	At	Value	Input Cost	Reduced Cost
C	25	fd 0101	BS	.000000	.000000	.000000
C	26	fd 0102	LL	.000000	.000000	.200000
C	27	fd 0202	BS	70000.00000	.000000	.000000
C	28	fd 0103	LL	.000000	.000000	.500000
C	29	fd 0203	BS	10000.00000	.000000	.000000
C	30	fd 0104	LL	.000000	.000000	.000000
C	31	fd 0204	BS	40000.00000	.000000	.000000
C	32	fd 0105	LL	.000000	.000000	.200000
C	33	fd 0205	BS	.000000	.000000	.000000
C	34	fd 0106	LL	.000000	.000000	.100000
C	35	fd 0206	BS	25000.00000	.000000	.000000
C	36	fk 0101	BS	50000.00000	.000000	.000000
C	37	fk 0201	LL	.000000	.000000	1.001000
C	38	fk 0103	LL	.000000	.000000	.499000
C	39	fk 0104	LL	.000000	.000000	.499000
C	40	fk 0106	BS	20000.00000	.000000	.000000
C	41	dk 0201	LL	.000000	.000000	.502000
C	42	dk 0501	LL	.000000	.000000	.901000
C	43	dk 0102	LL	.000000	.000000	1.334071
C	44	dk 0202	BS	10000.00000	.000000	.000000
C	45	dk 0302	LL	.000000	.000000	.999000
C	46	dk 0502	LL	.000000	.000000	.299000
C	47	dk 0602	LL	.000000	.000000	.399000
C	48	dk 0103	LL	.000000	.000000	.335071
C	49	dk 0203	BS	.000000	.000000	.000000
C	50	dk 0303	LL	.000000	.000000	1.499000
C	51	dk 0403	BS	40000.00000	.000000	.000000
C	52	dk 0503	LL	.000000	.000000	.200000
C	53	dk 0104	LL	.000000	.000000	.835071
C	54	dk 0204	BS	10000.00000	.000000	.000000
C	55	dk 0404	LL	.000000	.000000	.800000
C	56	dk 0604	BS	25000.00000	.000000	.000000
C	57	dk 0205	BS	50000.00000	.000000	.000000
C	58	dk 0305	BS	10000.00000	.000000	.000000
C	59	dk 0405	LL	.000000	.000000	.301000
C	60	dk 0505	BS	.000000	.000000	.000000
C	61	dk 0605	LL	.000000	.000000	.600000
C	62	dk 0106	LL	.000000	.000000	.836071
C	63	dk 0306	LL	.000000	.000000	.999000

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 C     64  dk  0406  LL       .000000       .000000      1.300000
 C     65  dk  0506  LL       .000000       .000000       .500000
 C     66  dk  0606  LL       .000000       .000000       .900000
 C     67  pREFAVVI  BS   40000.00000       .001000       .000000
 C     68  tOTKOST   BS   174000.0000      1.000000       .000000
 C     69  eNDRED01  BS      1.000000       .000000       .000000
 C     70  eNDRED02  UL      1.000000       .000000  -1020.000000
 C     71  eNDRED04  LL       .000000       .000000   5515.000000
 C     72  eNDRED05  LL       .000000       .000000   16495.00000
 C     73  eNDRED06  BS      1.000000       .000000       .000000
1      ! 0 = maximere preferanser, 1 = minimalisere kostnader.
1000   ! Stoerrelsen paa M som brukes for aa vekte funksjonene
1      ! 0 = oppgave 12.18, 1 = oppgave 12.19
```