LINDO (Linear, Interactive, Discrete Optimizer)

LINDO

LINDO   LINDO

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/   8

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MAX   Z = 3X$_E$ + 2X$_I$

ST   X$_E$ + 2X$_I$ ≤6

2X$_E$ + 2X$_I$ ≤8

-X$_E$ + X$_I$ ≤1

X$_I$ ≤2

X$_E$, X$_I$ ≥0
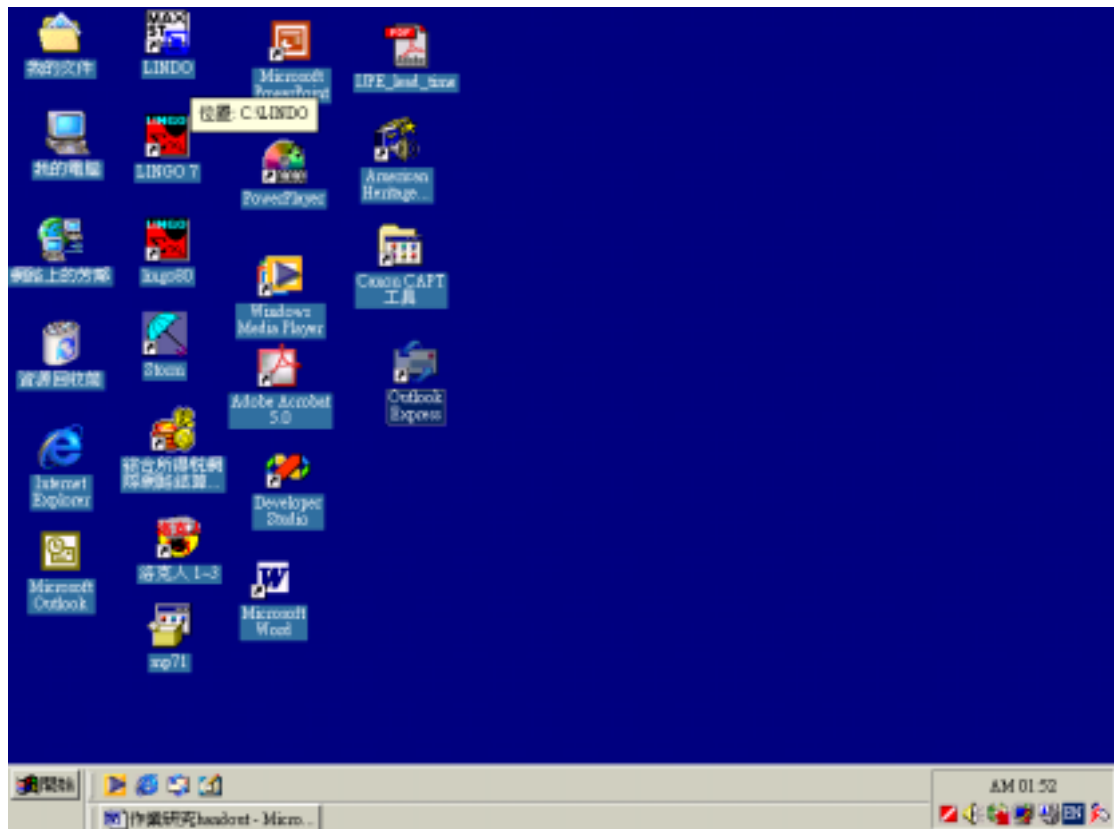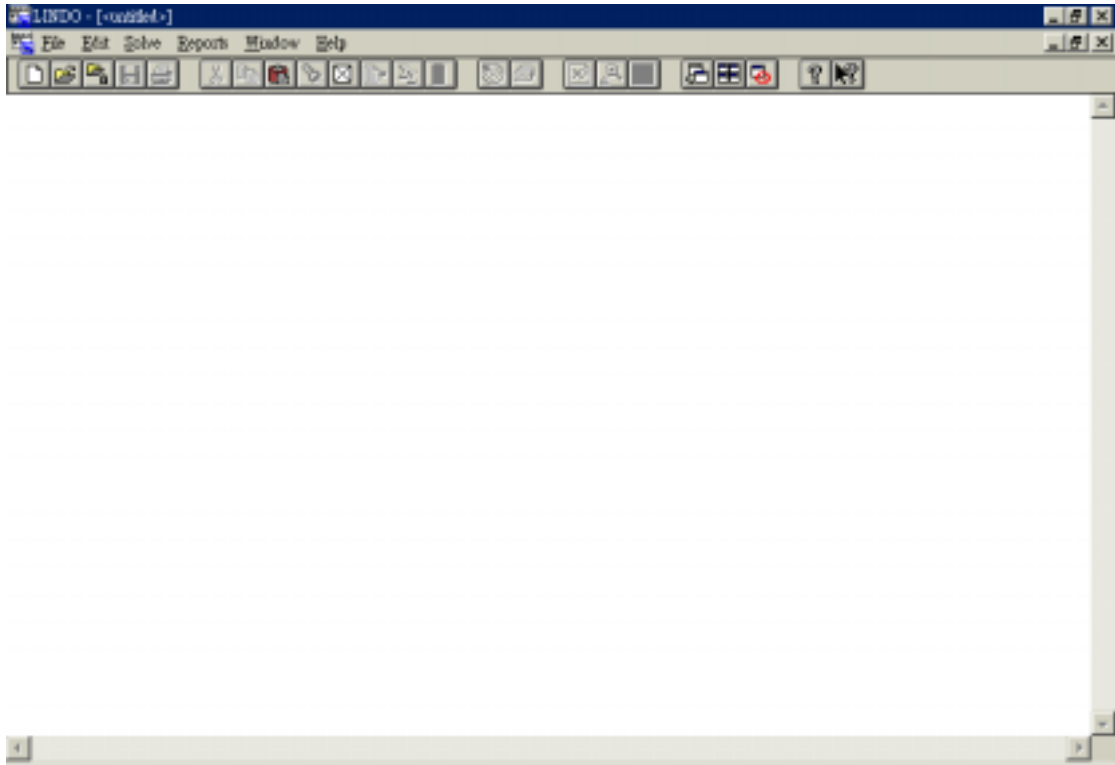
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```
max    3XE+2XI
st
XE+2XI<=6
2XE+XI<=8
-XE+XI<=1
XI<=2
END
```



```
MAX 3XE+2XI
st
XE+2XI<=6
2XE+XI<=8
-XE+XI<=1
XI<=2
END
```

LINDO - [<untitled>]

File Edit Solve Reports Window Help

```
MAX 3XE+2XI
st
XE+2XI<=6
2XE+XI<=8
-XE+XI<=1
XI<=2
END
```

LINDO

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Reports Window

```
LP OPTIMUM FOUND AT STEP        2

          OBJECTIVE FUNCTION VALUE

       1)      12.6666?

  VARIABLE          VALUE          REDUCED COST
       XE          3.333333          0.000000
       XI          1.333333          0.000000


      ROW   SLACK OR SURPLUS      DUAL PRICES
       2)          0.000000          0.333333
       3)          0.000000          1.333333
       4)          3.000000          0.000000
       5)          0.666667          0.000000

  NO. ITERATIONS=        2
```

)
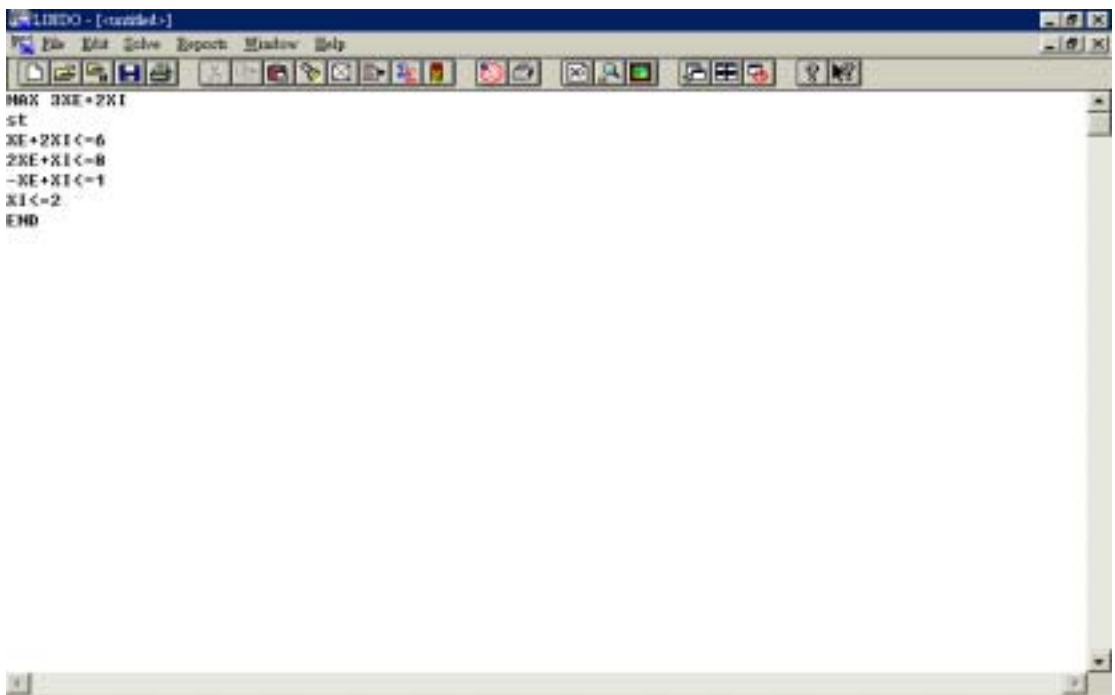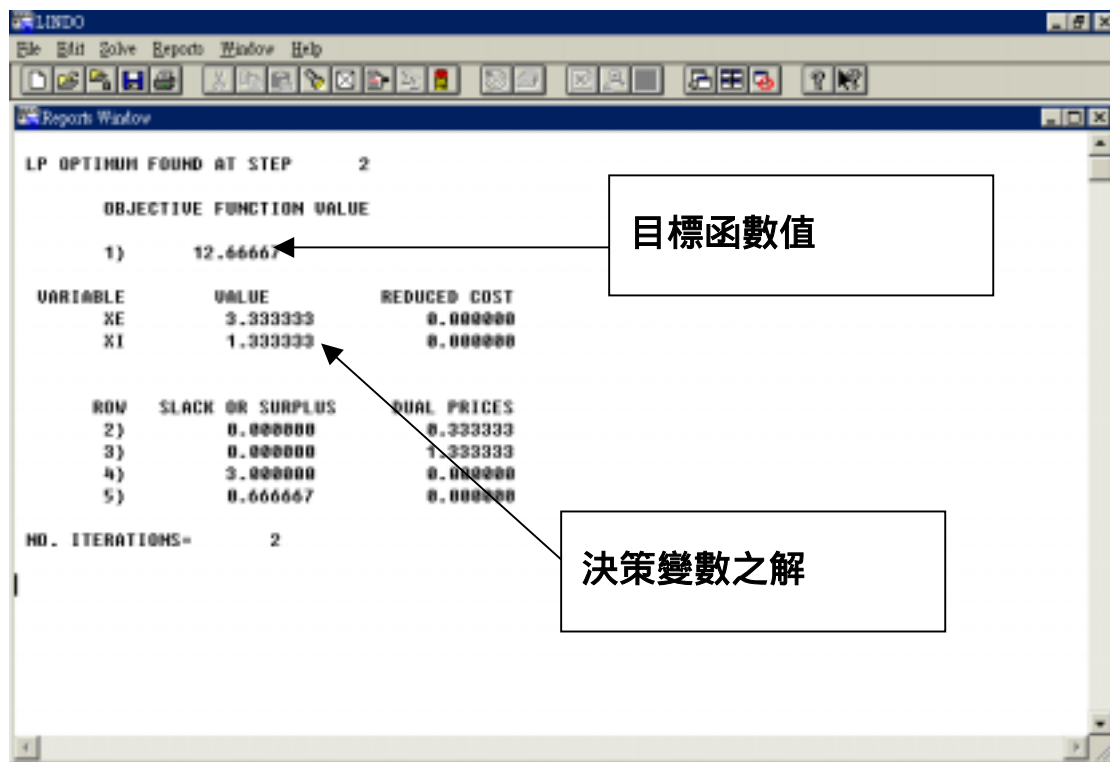
$$\text{Min} \quad Z = 4X_1 + 2X_2$$
$$\text{ST} \qquad 3X_1 + X_2 = 3$$
$$4X_1 + 3X_2 \geq 6$$
$$X_1 + 2X_2 \leq 4$$
$$X_1, \ X_2 \geq 0$$

```
min   4X1+X2
st
3X1+X2=3
4X1+3X2>=6
X1+2X2<=4
END
```

help

Schrage, L. *User's Manual for LINDO*. Palo Alto, Calif:Scientific Press, 1990

```
! A small staff scheduling model:
! Each employee works a 5 day day shift with two days off.
! A worker can be started any day of the week.   A worker earns
! $100 per week.
! X<day> = Number of  of employees we start on day <day>
MIN      100 XMON + 100 XTUE + 100 XWED + 100 XTHU + 100 XFRI
         + 100 XSAT + 100 XSUN
 SUBJECT TO
                 XWED + XTHU + XFRI  + XSAT + XSUN >=   18
   XMON                  + XTHU + XFRI  + XSAT + XSUN >=   16
   XMON + XTUE                  + XFRI  + XSAT + XSUN >=   15
   XMON + XTUE + XWED                   + XSAT + XSUN >=   16
   XMON + XTUE + XWED + XTHU                   + XSUN >=   19
   XMON + XTUE + XWED + XTHU + XFRI                   >=   14
          XTUE + XWED + XTHU + XFRI  + XSAT          >=   12
 END
! Solve the model. The objective should be $2200.
```

```
! A 3 warehouse, 4 customer transportation model:
! XWH<i>C<j> = amount shipped from warehouse <i> to customer
<j>
MIN    6 XWH1C1 + 2 XWH1C2 + 6 XWH1C3 + 7 XWH1C4
     +  4 XWH2C1 + 9 XWH2C2 + 5 XWH2C3 + 3 XWH2C4
     +  8 XWH3C1 + 8 XWH3C2 +   XWH3C3 + 5 XWH3C4
 SUBJECT TO
!  Demand constraints:
  XWH1C1 + XWH2C1 + XWH3C1 >=   15
  XWH1C2 + XWH2C2 + XWH3C2 >=   17
  XWH1C3 + XWH2C3 + XWH3C3 >=   22
  XWH1C4 + XWH2C4 + XWH3C4 >=   12
!  Supply constraints:
  XWH1C1 + XWH1C2 + XWH1C3 + XWH1C4 <=   30
  XWH2C1 + XWH2C2 + XWH2C3 + XWH2C4 <=   25
  XWH3C1 + XWH3C2 + XWH3C3 + XWH3C4 <=   21
 END
! Solve the model. The objective should be 161.




!  A shipping company wants to load a shipping container to maxmimize
!  the freight charges it can bill.  There is  a cubic space constraint
!  of 1000 sq ft, and a weight limit of 1200 pounds.
!     X<i> = 1 if parcel <i> in included in the container, else 0.
MAX 77 X1 + 6 X2 + 3 X3 + 6 X4 + 33 X5 + 13 X6 + 110 X7 + 21 X8 + 47 X9
SUBJECT TO
  774 X1 + 76 X2 +  22 X3 + 42 X4 + 21 X5 + 760 X6
     + 818 X7 + 62 X8 + 785 X9                         <=   1000
  67 X1 + 27 X2 + 794 X3 + 53 X4 + 234 X5 + 32 X6
     + 792 X7 + 97 X8 + 435 X9                         <=   1200
END
INT 9
! The best integer solution should have  an objective value of 170.
```

```
!  We want to decide how to place 7 songs on a record album so as to
!  maximize the number of songs on the "short" side of the album.  The
!  short side must contain no more than half the total music time. The
!  times by song are:
!
!     SONG:     1   2   3   4   5   6   7
!     TIME:     2   5   2   2   7   2   2
!
!  Y<i> = 1 if song <i> is assigned to short side, else 1
!
 MAX    Y1 +   Y2 +   Y3 +   Y4 +   Y5 +   Y6 +   Y7
 SUBJECT TO
       2 Y1 + 5 Y2 + 2 Y3 + 2 Y4 + 7 Y5 + 2 Y6 + 2 Y7 <= 11
 END
!
!  The Y's must be 0/1:
INT 7
!INT 7          7             0/1
!        7                  0/1
!    Y1  Y2  Y5  Y6  Y7   0/1        Y3  Y4
!
!INTE Y1
!INTE Y2
!INTE Y5
!INTE Y6
!INTE Y7
!GIN Y3
!GIN Y4

! Songs 1, 3, 4, 6, and 7 should appear on the short side.
```