Assignment 3

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Let W,H be the variables of products for plant A and plant B

W1 = products from plant A to warehouse1

W2 = products from plant A to warehouse2

W3 = products from plant A to warehouse3

H1 = products from plant B to warehouse1

H2 = products from plant B to warehouse2

H3 = products from plant B to warehouse3

Since, the supply and demand are not equal we will use dummy to equalize both of them.

W4 = products from plantA to dummy

H4 = products from plantB to dummy

The objective function is:

Z = (600+22)W1+(625+16)H1+(600+14)W2+(625+20)H2+(600+30)W3+(625+24)H3+(0)W4+(0)H4

Z = (622)W1+(641)H1+(614)W2+(645)H2+(630)W3+(649)H3+(0)W4+(0)H4

Supply Constraints:

W1+W2+W3+W4 = 100

H1+H2+H3+H3 = 120

Demand Constraints:

a1+a2 = 80

b1+b2 = 60

c1+c2 = 70

Non-negative Constraints:

W1,W2,W3,H1,H2,H3 >= 0

Installing the packages

```
library(lpSolve)
library(lpSolveAPI)
```

```r
#Objective function matrix
objfn <- matrix(c(622,614,630,0,
                  641,645,649,0),nrow = 2, byrow = TRUE)
#Giving the names for rows and columns
rownames(objfn) <- c("Plant A","Plant B")
colnames(objfn) <- c("Warehouse 1", "Warehouse 2", "Warehouse 3", "Dummy")
objfn
```

```
##         Warehouse 1 Warehouse 2 Warehouse 3 Dummy
## Plant A         622         614         630     0
## Plant B         641         645         649     0
```

```r
#Giving signs for the rows and columns
row.dir <- rep("=", 2)
col.dir <- rep("=", 4)
```

```r
#Rhs coefficients
row.rhs <- c(100,120)
col.rhs <- c(80,60,70,10)
```

```r
#Solving using lp.transport function
lpsolve <- lp.transport(objfn,"min",row.dir,row.rhs,col.dir,col.rhs)
lpsolve
```

```
## Success: the objective function is 132790
```

```r
#Decision variable values
lpsolve$solution
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    0   60   40    0
## [2,]   80    0   30   10
```

Results

Out of 100 units Plant A ships 0 units to Warehouse 1, 60 units to Warehouse 2, and 40 units to Warehouse 3.

Out of 120 units Plant B ships 80 units to Warehouse 1, 0 units to Warehouse 2, 30 units to Warehouse 3 and 10 units to the dummy.