QMM_Assignment3

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#Loading the package

```
library(Matrix,warn.conflicts = FALSE)
library(lpSolve,warn.conflicts = FALSE)
```

#constructing the problem's matrix

```
trans_matrix <- matrix(c(22,14,30,600,100,
                         16,20,24,625,120,
                         80,60,70,"-","210/220"),ncol=5,nrow=3,byrow = TRUE)
colnames(trans_matrix) <- c("Warehouse1","Warehouse2","Warehouse3",
                            "Production Cost","Production Capacity")
rownames(trans_matrix) <- c("PlantA","PlantB","Monthly Demand")
trans_matrix <- as.table(trans_matrix)
trans_matrix
```

```
##                Warehouse1 Warehouse2 Warehouse3 Production Cost
## PlantA         22         14         30         600
## PlantB         16         20         24         625
## Monthly Demand 80         60         70         -
##                Production Capacity
## PlantA         100
## PlantB         120
## Monthly Demand 210/220
```

```
new.trans_matrix <- matrix(c(622,614,630,0,100,
                             641,645,649,0,120,
                             80,60,70,10,220),ncol=5,nrow=3,byrow=TRUE)

colnames(new.trans_matrix) <- c("Warehouse1","Warehouse2","Warehouse3",
                                "Dummy","Production Capacity")
rownames(new.trans_matrix) <- c("PlantA","PlantB","Monthly Demand")
trans_matrix <- as.table(new.trans_matrix)
trans_matrix
```

```
##                Warehouse1 Warehouse2 Warehouse3 Dummy Production Capacity
## PlantA                622        614        630     0                 100
## PlantB                641        645        649     0                 120
## Monthly Demand         80         60         70    10                 220
```

#The cost Matrix which I have created is shown below:

```
costs<-matrix(c(622,614,630,0,
                641,645,649,0),nrow = 2, byrow = TRUE)
costs
```

```
##      [,1] [,2] [,3] [,4]
## [1,]  622  614  630    0
## [2,]  641  645  649    0
```

#On the Production Capacity side of the matrix, the following values are present:

```
row.rhs<-c(100,120)
row.signs<-rep("<=",2)
```

#The matrix's values on the Production Capacity side of the row are as follows: #To identify the dummy variable in this case, we used the double variable 10 at the end as well as the values from the matrix's column side. The following production capacities exist:

```
col.rhs<-c(80,60,70,10)
col.signs<-rep(">=",4)
```

#In this chunk, we are going to use the LP Transport Command to run the code

```
lptrans<-lp.transport(costs,"min",row.signs,row.rhs,col.signs,col.rhs )
lptrans$solution
```

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

```
lptrans$objval
```

```
## [1] 132790
```

SUMMARY:

Minimize is the objective function: TC=622x11+614x12+630x13+641x21+645x22+649x23

Subject to Constraints:

Subject to Non-Negativity Constraints: xij=0,where i=1,2 and j=1,2,3

CONCLUSION:

Based on the code above, we may deduce that the answer is Z=132790. The matrix's values on the Production Capacity side of the row are as follows:

Following are the results for each variable in the two plants:

The fourth variable, 10x24, is referred to as the "throw away variable" And represents the warehouse 2 from plant A (60x12), the warehouse 3 from plant A (40x13), and the warehouse 1 from plant B (80x21).
