Module 6 - The Transportation Model

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Problem formulation

/* Objective function */

min: 622 x11 + 614 x12 + 630 x13 + 641 x21 + 645 x22 + 649 x23;

/* Constraints */

x11 + x12 + x13 <= 100;

x21 + x22 + x23 <= 120;

x11 + x21 = 80;

x12 + x22 = 60;

x13 + x23 = 70;

Load library

```
library(lpSolveAPI)
```

Load the problem formulation lp file

```
x <- read.lp("transportation_assignment.lp")
```

Solve the transportation problem

```
solve(x)
```

```
## [1] 0
```

Objective and variable values

```
get.objective(x)
```

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

```
get.variables(x)
```

```
## [1]  0 60 40 80  0 30
```

Add variable and constraint names

```
ColNames <- c("PlantA_WH1","PlantA_WH2","PlantA_WH3","PlantB_WH1","PlantB_WH2","PlantB_WH3")
RowNames <- c("PlantA_capacity","PlantB_capacity","WH1_demand","WH2_demand","WH3_demand")
dimnames(x) <- list(RowNames,ColNames)
```

Print out the model with column and row names

```
x
```

```
## Model name:
##                  PlantA_WH1  PlantA_WH2  PlantA_WH3  PlantB_WH1  PlantB_WH2  PlantB_WH3
## Minimize                622         614         630         641         645         649
## PlantA_capacity           1           1           1           0           0           0  <=  100
## PlantB_capacity           0           0           0           1           1           1  <=  120
## WH1_demand                1           0           0           1           0           0   =   80
## WH2_demand                0           1           0           0           1           0   =   60
## WH3_demand                0           0           1           0           0           1   =   70
## Kind                    Std         Std         Std         Std         Std         Std
## Type                   Real        Real        Real        Real        Real        Real
## Upper                   Inf         Inf         Inf         Inf         Inf         Inf
## Lower                     0           0           0           0           0           0
```

Recommendation

Plant A should produce 100 units and ship 60 to Warehouse 2 and 40 to Warehouse 3

Plant B should produce 110 units and ship 80 to Warehouse 1 and 30 to Warehouse 3

This leaves production slack available of 10 units in Plant B

The production and transportation costs will be $132,790 per month