Assignment 4 Quantitative Management Modelling

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###1)Heart Start produces automated external defibrillators (AEDs) in each of two different plants (A and B). The unit production costs and monthly production capacity of the two plants are indicated in the table below. The AEDs are sold through three wholesalers. The shipping cost from each plant to the warehouse of each wholesaler along with the monthly demand from each wholesaler are also indicated in the table. How many AEDs should be produced in each plant, and how should they be distributed to each of the three wholesaler warehouses so as to minimize the combined cost of production and shipping?

```
    Unit Shipping Cost                          Unit                 Monthly
    Warehouse 1   Warehouse 2   Warehouse 3   ProductionCost
ProductionCapacity
```

Plant A $22 $14 $30 $600 100

Plant B $16 $20 $24 $625 120

Monthly 80 60 70 Demand

Using Library lpSolve

```
library('lpSolveAPI')
```

Reading the LP file.

```
H_Start <- read.lp("heart1.lp");
H_Start
```

```
## Model name:
##            XA1   XA2   XA3   XB1   XB2   XB3   XAD   XBD
## Minimize   622   614   630   641   645   649     0     0
## R1           1     1     1     0     0     0     1     0  =  100
## R2           0     0     0     1     1     1     0     1  =  120
## R3           1     0     0     1     0     0     0     0  =   80
## R4           0     1     0     0     1     0     0     0  =   60
## R5           0     0     1     0     0     1     0     0  =   70
## R6           0     0     0     0     0     0     1     1  =   10
## Kind       Std   Std   Std   Std   Std   Std   Std   Std
## Type      Real  Real  Real  Real  Real  Real  Real  Real
## Upper      Inf   Inf   Inf   Inf   Inf   Inf   Inf   Inf
## Lower        0     0     0     0     0     0     0     0
```

Solving the LP.

```
solve(H_Start)
```

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

Computing the objective function value.

```
get.objective(H_Start)
```

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

Computing the values of decision variables.

```
get.variables(H_Start)
```

```
## [1]  0 60 40 80  0 30  0 10
```

Computing the values of constraints.

```
get.constraints(H_Start)
```

```
## [1] 100 120  80  60  70  10
```