The Transportaion Model

Avinash Ravipudi

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Heart is attempting to reduce expenses at both plant A and plant B, including shipping and manufacturing costs. However, its supply exceeds its demand, thus we must create a dummy destination, in this example a warehouse, to absorb the 10 unit demand discrepancy in order to achieve a workable solution.

Objective function : Min(622 x11 + 614 x12 + 630 x13 + 641 x21 + x645 x22 + 649 x23).

Variables: X11 = number of AEDs made and sent from plant A to warehouse 1. X12 = number of AEDs made and sent from plant A to warehouse 2. X13 = number of AEDs made and sent from plant A to warehouse 3. X14 = number of AEDs made and sent from plant A to fake warehouse 4. X21 = number of AEDs made and sent from plant B to warehouse 1. X22 = number of AEDs manufactured and sent from plant B to warehouse 2. X23 = number of AEDs made and sent from plant B to warehouse 3. X24 = number of AEDs made and sent from plant B to fake warehouse 4.

```
library(lpSolveAPI)
x <- read.lp("Heart_Data.lp")
x
```

```
## Model name:
##            x11   x12   x13   x21   x22   x23   x14   x24
## 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
```

Constraints: Plant A capacity constraint: x11 + x12 +x13 +x14 =100, Plant B capacity constraint: x21 +x22 +x23 +x24= 120, Warehouse 1 Demand constraint: x11+ x21 =80, Warehouse 2 Demand Constraint: x12 + x22 = 60, Warehouse 3 Demand constraint: x13 + x23 = 70, Warehouse 4 Demand constraint: x14 + x24 =10

```
solve(x)
```

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

#Total Cost Of Shipping and production

```
get.objective(x)   #Total costs of shipping and production = $132790
```

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

#Variables

```
get.variables(x)   #x11= 0, x12=60, x13=40 , x21= 80, x22= 0, x23= 30, x14,
0, x24 =10, total AEDs to be produced in Plant A= 100, and 110 in Plant B
```

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