The Transportaion Model

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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