QUANTITATIVE MANAGEMENT MODELING

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#installation("lpSolve")  
  
library("lpSolve") #Activation of lpSolve Package

To solve the problem we need to define the objective, constraints, direction and constants

Objective Function

$$\text{Objective function is to } Max \hspace{.3cm} Z = 420 (Q\_1+Q\_2+Q\_3) + 360 (M\_1+M\_2+M\_3) + 300 (P\_1+P\_2+P\_3)$$

$$

$$

Subject to the following constraints

Non Negativity Constraints

The above constraints can be written as below

Describing the Objective Function - f.obj

f.obj <- c(420,360,300,420,360,300,420,360,300)

Describing the Constraints - f.con

f.con <- matrix(c(1,1,1,0,0,0,0,0,0,  
 0,0,0,1,1,1,0,0,0,  
 0,0,0,0,0,0,1,1,1,  
 20,15,12,0,0,0,0,0,0,  
 0,0,0,20,15,12,0,0,0,  
 0,0,0,0,0,0,20,15,12,  
 1,0,0,1,0,0,1,0,0,  
 0,1,0,0,1,0,0,1,0,  
 0,0,1,0,0,1,0,0,1), nrow = 9, byrow=T)

Describing the Direction of the constraints - f.dir

f.dir <- c('<=',  
  
 '<=',  
  
 '<=',  
  
 '<=',  
  
 '<=',  
  
 '<=',  
  
 '<=',  
  
 '<=',  
  
 '<=')

Describing the constants i.e. the right hand side values - f.rhs

f.rhs <- c(750,900,450,13000,12000,5000,900,1200,750)

Calling the lp function to solve the problem basing the objective function i.e. to maximize the profits

lp('max',f.obj,f.con,f.dir,f.rhs)

## Success: the objective function is 708000

Calling the lp function again to get the values for the variables defined above

lp('max',f.obj,f.con,f.dir,f.rhs)$solution

## [1] 350.0000 400.0000 0.0000 0.0000 400.0000 500.0000 0.0000 133.3333  
## [9] 250.0000