Assignment - 2 - Solving LP Using R

library("lpSolve") #Activating the lpSolve Package

## Warning: package 'lpSolve' was built under R version 4.3.2

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

Objective Function

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

Subject to the following constraints

Non Negativity Constraints

The above constraints can be written as below

Coefficients of the Objective Function

profit\_coefficients <- c(420,360,300,420,360,300,420,360,300)

Defining the Constraints

A <- 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)

Defining the Direction of the constraints

Direction <- c('<=',  
 '<=',  
 '<=',  
 '<=',  
 '<=',  
 '<=',  
 '<=',  
 '<=',  
 '<=')

Defining the constants i.e. the right hand side values

Righthandside <- 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

result<-lp('max',profit\_coefficients,A,Direction,Righthandside)

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

lp('max',profit\_coefficients,A,Direction,Righthandside)$solution

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