amamidip\_2

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#Formulation of LP Problem

The objective function is Max z = *420(L1 +M1 +S1)+360(L2 +M2 +S2)+300(L3 +M3 +S3)* Subject to

*L1 +M1 +S1≤750*

*L2 +M2 +S2≤900*

*L3 +M3 +S3 ≤450*

*20L1 +15M1 +12S1 ≤ 13000*

*20L2 +15M2 +12S2 ≤ 12000*

*20L3 +15M3 +12S3 ≤ 5000*

*L1 +L2+L3 ≤900*

*M1+M2+M3≤1200*

*S1 +S2 +S3 ≤750*

Non-Negative Constraints

*L1, L2, L3, M1, M2, M3 , S1, S2 , S3 ≥ 0*

The above constraints can be written as follows

*L1 +M1 +S1+0L2+0M2+0S2+0L3 +0M3 +0S3 ≤750*

*0L1 +0M1 +0S1+ L2 +M2 +S2 + 0L3 +0M3 +0S3 ≤900*

*0L1 +0M1 +0S1+0L2+0M2+0S2+ L3 +M3 +S3 ≤450*

*20L1 +15M1 +12S1 +0L2+0M2+0S2+0L3 +0M3 +0S3 ≤13000*

*0L1 +0M1 +0S1+20L2 +15M2+12S2+0L3 +0M3 +0S3 ≤12000*

*0L1 +0M1 +0S1+0L2+0M2+0S2+20L3+15M3+12S3 ≤5000*

*L1 +0M1 +0S1+ L2+0M2+0S2+L3 +0M3 +0S3 ≤900*

*0L1 +M1 +0S1+0L2+M2+0S2+0L3 +M3 +0S3 ≤1200*

*0L1 +0M1 +S1+0L2+0M2+S2 +0L3+0M3+S3 ≤750*

#loading the required package  
library(lpSolve)

## Warning: package 'lpSolve' was built under R version 4.3.3

#Set up the objective function  
objective\_function <- c(420,360,300,420,360,300,420,360,300)  
confusion\_mat <- 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 =TRUE)

#Define the direction of inequality constraints  
f.direction <- c("<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=",  
 "<=")

# set up the right hand side coefficients (Constant)  
rhs\_coeffecients <- c(750,900,450,13000,12000,5000,900,1200,750)  
# Value of z  
lp("max", objective\_function, confusion\_mat, f.direction, rhs\_coeffecients)

## Success: the objective function is 708000

lp("max", objective\_function, confusion\_mat, f.direction, rhs\_coeffecients)$solution

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