QUANTITATIVE Management Modelling Assignment 2

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###Installing the library

library(lpSolveAPI)

###Setting the work directory

setwd("~/Desktop/SEMESTER 2/QUANT MANAGEMENT")

### Creating a linear programming object with 0 constraints and 9 decision variables

lpmodel1 <- make.lp(0, 9)  
lpmodel1

## Model name:   
## a linear program with 9 decision variables and 0 constraints

### Creating the objective function. since we need to maximize profit, change the sense to max.

set.objfn(lpmodel1, c(420, 360, 300, 420, 360, 300, 420, 360, 300))

### As we need to maximize profit, we need to change the sense to maximum.

lp.control(lpmodel1,sense='max')

## $anti.degen  
## [1] "none"  
##   
## $basis.crash  
## [1] "none"  
##   
## $bb.depthlimit  
## [1] -50  
##   
## $bb.floorfirst  
## [1] "automatic"  
##   
## $bb.rule  
## [1] "pseudononint" "greedy" "dynamic" "rcostfixing"   
##   
## $break.at.first  
## [1] FALSE  
##   
## $break.at.value  
## [1] 1e+30  
##   
## $epsilon  
## epsb epsd epsel epsint epsperturb epspivot   
## 1e-10 1e-09 1e-12 1e-07 1e-05 2e-07   
##   
## $improve  
## [1] "dualfeas" "thetagap"  
##   
## $infinite  
## [1] 1e+30  
##   
## $maxpivot  
## [1] 250  
##   
## $mip.gap  
## absolute relative   
## 1e-11 1e-11   
##   
## $negrange  
## [1] -1e+06  
##   
## $obj.in.basis  
## [1] TRUE  
##   
## $pivoting  
## [1] "devex" "adaptive"  
##   
## $presolve  
## [1] "none"  
##   
## $scalelimit  
## [1] 5  
##   
## $scaling  
## [1] "geometric" "equilibrate" "integers"   
##   
## $sense  
## [1] "maximize"  
##   
## $simplextype  
## [1] "dual" "primal"  
##   
## $timeout  
## [1] 0  
##   
## $verbose  
## [1] "neutral"

# Adding the constraints

add.constraint(lpmodel1, c(1, 1, 1, 0, 0, 0, 0, 0, 0), "<=", 750)  
add.constraint(lpmodel1, c(0, 0, 0, 1, 1, 1, 0, 0, 0), "<=", 900)  
add.constraint(lpmodel1, c(0, 0, 0, 0, 0, 0,1, 1, 1), "<=", 450)  
add.constraint(lpmodel1, c(20, 15, 12, 0, 0, 0, 0, 0, 0), "<=", 13000)  
add.constraint(lpmodel1, c(0, 0, 0, 20, 15, 12, 0, 0, 0), "<=", 12000)  
add.constraint(lpmodel1, c(0, 0, 0, 0, 0, 0, 20, 15, 12), "<=", 5000)  
add.constraint(lpmodel1, c(1, 1, 1, 0, 0, 0, 0, 0, 0), "<=", 900)  
add.constraint(lpmodel1, c(0, 0, 0, 1, 1, 1, 0, 0, 0), "<=", 1200)  
add.constraint(lpmodel1, c(0, 0, 0, 0, 0, 0, 1, 1, 1), "<=", 750)  
add.constraint(lpmodel1, c(6, 6, 6, -5, -5, -5, 0, 0, 0), "=", 0)  
add.constraint(lpmodel1, c( 3, 3, 3, 0, 0, 0, -5, -5, -5), "=", 0)

set.bounds(lpmodel1, lower = c(0, 0, 0, 0, 0, 0, 0, 0, 0), columns = c(1, 2,3,4,5,6,7,8,9))

# Setting variable names and name the constraints for identifying the variables and constraints

Rows <- c("CCon1", "CCon2", "CCon3", "SCon1", "SCon2", "SCon3", "S1Con1", "S1Con2", "S1Con3", "%C1", "%C2")  
  
Columns <- c("A1Large", "A1Medium", "A1Small", "A2Large", "A2Medium", "A2Small", "A3Large", "A3Medium", "A3Small")  
  
dimnames(lpmodel1) <- list(Rows, Columns)

lpmodel1

## Model name:   
## a linear program with 9 decision variables and 11 constraints

write.lp(lpmodel1, filename = "Quantsassignment2.lp", type = "lp")

solve(lpmodel1)

## [1] 0

get.objective(lpmodel1)

## [1] 696000

get.variables(lpmodel1)

## [1] 516.6667 177.7778 0.0000 0.0000 666.6667 166.6667 0.0000 0.0000  
## [9] 416.6667