QMM Assignment 2

Prerak Patel

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library(lpSolveAPI)

## Warning: package 'lpSolveAPI' was built under R version 4.0.3

# setwd("~/R\_KSU/Quant/Assignment2")

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

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

set.objfn(lprec, c(420,360, 300, 420, 360, 300, 420, 360, 300))  
lp.control(lprec, 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"

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

RowNames <- c("CapCon1", "CapCon2", "CapCon3", "StoCon1", "StoCon2", "StoCon3", "SalCon1", "SalCon2", "SalCon3", "%C1", "%C2")  
ColNames <- c("P1Large", "P1Medium", "P1Small", "P2Large", "P2Medium", "P2Small", "P3Large", "P3Medium", "P3Small")  
dimnames(lprec) <- list(RowNames, ColNames)  
  
lprec

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

write.lp(lprec, filename = "QMM\_Assignment2.lp", type = "lp")  
solve(lprec)

## [1] 0

get.objective(lprec)

## [1] 696000

get.variables(lprec)

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