LP model

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## R Markdown

–>

#previously installed : install.packages("lpSolveAPI")  
# Check of Valid install : library(lpSolveAPI)

#Start of Weigelt Corp Problem  
library(lpSolveAPI)  
  
#Calls out no. of var to solve for 3 Plants each having 3 limitations of space, Cap, and storage  
lprec = make.lp(0, 9)  
# Max profit per the problem statement   
lp.control(lprec,sense='max')

## $anti.degen  
## [1] "fixedvars" "stalling"   
##   
## $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"

#Calls out leading coff. i.e. cost of backpacks   
set.objfn(lprec, c(420, 320, 300, 420, 320, 300, 420, 320, 300))  
  
#Plant 1 sq ft   
add.constraint(lprec, c(20,15,12,0,0,0,0,0,0), "<=", 13000)  
#Plant 2 sq ft  
add.constraint(lprec, c(0, 0, 0, 20, 15, 12, 0,0,0), "<=", 12000)  
#Plant 3 sq ft  
add.constraint(lprec, c(0, 0, 0, 0, 0, 0, 20, 15, 12), "<=", 5000)  
  
#Plant 1 Cap  
add.constraint(lprec, c(1, 1, 1, 0, 0, 0, 0, 0, 0), "<=", 750)  
#Plant 2 Cap  
add.constraint(lprec, c(0, 0, 0, 1, 1, 1, 0, 0, 0), "<=", 900)  
#Plant 3 Cap  
add.constraint(lprec, c( 0, 0, 0, 0, 0, 0, 1, 1, 1), "<=", 450)  
  
#Plant 1 Sales  
add.constraint(lprec, c(1, 1, 1, 0, 0, 0, 0, 0, 0), "<=", 900)  
#Plant 2 sq ft  
add.constraint(lprec, c(0, 0, 0, 1, 1, 1, 0, 0, 0), "<=", 1200)  
#Plant 3 sq ft  
add.constraint(lprec, c(0, 0, 0, 0, 0, 0, 1, 1, 1), "<=", 750)  
  
RowNames <- c("Plant1-sqft", "Plant2-sqft", "Plant3-sqft", "Plant1-Cap", "Plant2-Cap", "Plant3-Cap", "Plant1-Sales", "Plant2-Sales", "Plant3-Sales")  
ColNames <- c("P11", "P12", "P13", "P21", "P22", "P23", "P31", "P32", "P33")  
dimnames(lprec) = list(RowNames, ColNames)  
  
lprec

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

write.lp(lprec, filename = "Weigelt2.lp", type = "lp")

solve(lprec)

## [1] 0

get.objective(lprec)

## [1] 698000

get.variables(lprec)

## [1] 500.0000 0.0000 250.0000 150.0000 0.0000 750.0000 0.0000 0.0000  
## [9] 416.6667

# To get as close to the theo max given the limitations of each site the following should be followed for productiong

# P1 500 lg 000 med 250sm

# P2 150 lg 000 med 450sm

# P3 000 lg 000 med 416sm \* rounded down not to exceeed plant limits.