assignment 4

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23/10/2021

setting working directory and loading packages

```
setwd("C:/Users/pavankumar pendela/Desktop/MSBA/Quantiative management
Dr.Wu/assignment 4")
library(lpSolve)
library(lpSolveAPI)

lpec <- make.lp(5,6)
set.objfn(lpec, c(622,614,630,641,645,649))
lp.control(lpec, sense = "min")

## $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] "minimize"
##
## $simplextype
## [1] "dual"   "primal"
##
## $timeout
## [1] 0
##
## $verbose
## [1] "neutral"
```

```
# Production Capacity Constraints:
set.row(lpec, 1, c(1,1,1), indices = c(1,2,3))
set.row(lpec, 2, c(1,1,1), indices = c(4,5,6))
# Warehouse demand Constraints:
set.row(lpec, 3, c(1,1), indices = c(1,4))
set.row(lpec, 4, c(1,1), indices = c(2,5))
set.row(lpec, 5, c(1,1), indices = c(3,6))
# Setting the rhs values
rhs <- c(100,120,80,60,70)
set.rhs(lpec, rhs)
# Setting the constraint type
set.constr.type(lpec, c("<=","<=","=","=","="))
```

```
# boundary condiiton for the decision variables
set.bounds(lpec, lower = rep(0, 6))
# Set the names of the rows (constraints) and columns (decision variables)
lp.rownames <- c("Plant A capacity", "Plant B capacity", "warehouse 1
demand", "warehouse 2 demand", "Warehouse 3 Demand")
lp.colnames <- c("PlantA to warehouse1", "PlantA to warehouse2", "PlantA to
warehouse3", "PlantB to warehouse1", "PlantB to warehouse2", "Plant B to
warehouse3")
dimnames(lpec) <- list(lp.rownames, lp.colnames)

# Return the linear programming object to ensure the values are correct
lpec

## Model name:
##                      PlantA to warehouse1   PlantA to warehouse2   PlantA
to warehouse3   PlantB to warehouse1   PlantB to warehouse2  Plant B to
warehouse3
## Minimize                              622                    614
630                    641                    645                    649
## Plant A capacity                        1                      1
1                      0                      0                      0  <=
100
## Plant B capacity                        0                      0
0                      1                      1                      1  <=
120
## warehouse 1 demand                      1                      0
0                      1                      0                      0   =
80
## warehouse 2 demand                      0                      1
0                      0                      1                      0   =
60
## Warehouse 3 Demand                      0                      0
1                      0                      0                      1   =
70
## Kind                                  Std                    Std
Std                    Std                    Std                    Std
## Type                                 Real                   Real
Real                   Real                   Real                   Real
## Upper                                 Inf                    Inf
Inf                    Inf                    Inf                    Inf
## Lower                                   0                      0
0                      0                      0                      0

write.lp(lpec, filename = "assignment 4 lp", type = "lp")
```

Solve the linear program

```
solve(lpec)

## [1] 0
```

“0” is the optimal solution for the problem

```
get.objective(lpec)
```

```
## [1] 132790
```

1,32,790 is the production cost based on the given values

```
get.variables(lpec)
```

```
## [1]  0 60 40 80  0 30
```

Plant A Units Shipped to warehouse 1: 0 units Plant A Units Shipped to warehouse 2: 60 units Plant A Units Shipped to warehouse 3: 40 units Plant B Units Shipped to warehouse 1: 80 units Plant B Units Shipped to warehouse 2: 0 units Plant B Units Shipped to warehouse 3: 30 units