

WeighIt Corporation- Assignment 3

Vamshee Deepak Goud Katta

10/11/2021

Weigelt Production

Reading the objective fn and constraints from lp file

```
library(lpSolveAPI)

lprec <- read.lp("vkatta_3.lp")

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"
```

Arranging the values in table with constraints against products

```
RowNames <- c("P1cap", "P2cap", "P3cap", "P1space", "P2space", "P3space", "LSales", "MSales", "SSales",
ColNames <- c("Large1", "Medium1", "Small1", "Large2", "Medium2", "Small2", "Large3", "Medium3", "Small3",
dimnames(lprec) <- list(RowNames, ColNames)
```

Solving the LP problem using the Solve() function

```
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
```

```
get.constraints(lprec)
```

```
## [1] 6.944444e+02 8.333333e+02 4.166667e+02 1.300000e+04 1.200000e+04
## [6] 5.000000e+03 5.166667e+02 8.444444e+02 5.833333e+02 -2.037268e-10
## [11] 0.000000e+00
```

Arranging the solution of the LP problem with variables against values

```
solution <- data.frame(ColNames, get.variables(lprec)) # Solution of the problem
colnames(solution) <- c("variable", "value")
solution
```

```
## variable value
## 1 Large1 516.6667
## 2 Medium1 177.7778
## 3 Small1 0.0000
## 4 Large2 0.0000
## 5 Medium2 666.6667
## 6 Small2 166.6667
## 7 Large3 0.0000
## 8 Medium3 0.0000
## 9 Small3 416.6667
```

Finding shadow prices and reduced cost of the solved LP problem

```
get.sensitivity.rhs(lprec) # Shadow Prices
```

```
## $duals
## [1] 0.00 0.00 0.00 12.00 20.00 60.00 0.00 0.00 0.00
## [10] -0.08 0.56 0.00 0.00 -24.00 -40.00 0.00 0.00 -360.00
## [19] -120.00 0.00
##
## $dualsfrom
## [1] -1.000000e+30 -1.000000e+30 -1.000000e+30 1.122222e+04 1.150000e+04
## [6] 4.800000e+03 -1.000000e+30 -1.000000e+30 -1.000000e+30 -2.500000e+04
## [11] -1.250000e+04 -1.000000e+30 -1.000000e+30 -2.222222e+02 -1.000000e+02
## [16] -1.000000e+30 -1.000000e+30 -2.000000e+01 -4.444444e+01 -1.000000e+30
##
```

```
## $dualstill
## [1] 1.000000e+30 1.000000e+30 1.000000e+30 1.388889e+04 1.250000e+04
## [6] 5.181818e+03 1.000000e+30 1.000000e+30 1.000000e+30 2.500000e+04
## [11] 1.250000e+04 1.000000e+30 1.000000e+30 1.111111e+02 1.000000e+02
## [16] 1.000000e+30 1.000000e+30 2.500000e+01 6.666667e+01 1.000000e+30
```

```
get.sensitivity.obj(lprec) # Reduced Cost
```

```
## $objfrom
## [1] 3.60e+02 3.45e+02 -1.00e+30 -1.00e+30 3.45e+02 2.52e+02 -1.00e+30
## [8] -1.00e+30 2.04e+02
##
## $objtill
## [1] 4.60e+02 4.20e+02 3.24e+02 4.60e+02 4.20e+02 3.24e+02 7.80e+02 4.80e+02
## [9] 1.00e+30
```

Reading Objective fn and Constraints from lp file

```
lprec.dual <- read.lp("vkatta_3.dual.lp")
lp.control(lprec, 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"

```

Solving Dual of the LP problem

```
solve(lprec.dual)
```

```
## [1] 0
```

```
get.objective(lprec.dual)
```

```
## [1] 698000
```

```
get.variables(lprec.dual)
```

```
## [1] 0.0 0.0 0.0 12.0 24.0 49.0 0.0 0.0 12.0 0.0 0.4
```

```
get.constraints(lprec.dual)
```

```
## [1] 420 360 336 480 360 300 680 435 300
```