jstadden_6

Jared Stadden

10/18/2020

Installing and loading packages:

```
#install.packages("lpSolveAPI")
library(lpSolveAPI)

## Warning: package 'lpSolveAPI' was built under R version 3.6.3
```

Reading lp file:

```
lprec <- read.lp("jstadden_6.lp")
lprec

## Model name:
##             x11   x12   x13   x21   x22   x23   x14   x24
## Minimize    622   614   630   641   645   649     0     0
## R1            1     1     1     0     0     0     1     0  =  100
## R2            0     0     0     1     1     1     0     1  =  120
## R3            1     0     0     1     0     0     0     0  =   80
## R4            0     1     0     0     1     0     0     0  =   60
## R5            0     0     1     0     0     1     0     0  =   70
## R6            0     0     0     0     0     0     1     1  =   10
## Kind        Std   Std   Std   Std   Std   Std   Std   Std
## Type       Real  Real  Real  Real  Real  Real  Real  Real
## Upper       Inf   Inf   Inf   Inf   Inf   Inf   Inf   Inf
## Lower         0     0     0     0     0     0     0     0
```

Because the supply does not equal the demand as required by the transportation problem, dummy variables were introduced (an imaginary Warehouse 4) so that we can achieve a feasible solution.

Solving lp:

```
solve(lprec)

## [1] 0
```

Value of 0 means solution was found

Objective value:

```
get.objective(lprec)

## [1] 132790
```

The minimum combined cost of production and shipping is $132,790

Decision variable values:

```r
get.variables(lprec)

## [1]  0 60 40 80  0 30  0 10
```

x11 = 0
x12 = 60
x13 = 40
x21 = 80
x22 = 0
x23 = 30
*the dummy variables don't actually get produced:
x14 = 0
x24 = 10

To minimize combined costs:
Plant A should produce x11 + x12 + x13 = 100 AEDs
Plant B should produce x21 + x22 + x23 = 110 AEDs
Warehouse 1 should receive x11 + x21 = 80 AEDs
Warehouse 2 should receive x12 + x22 = 60 AEDs
Warehouse 3 should receive x13 + x23 = 70 AEDs

Constraint RHS values:

```r
get.constraints(lprec)

## [1] 100 120  80  60  70  10
```