Assignment-6

TILAK KUMAR BONALA

2022-11-20

###Formulating AP-hub lp model problem

Objective function

min: 775x1 + 800x2 + 800x3 + 800x4 + 800x5 + 775x6 + 750x7; # Constraints 0 x1 + 1x2 + 1x3 + 1x4 + 1x5 + 1x6 + 0x7 >= 18; 0 x1 + 0x2 + 1x3 + 1x4 + 1x5 + 1x6 + 1x7 >= 27; 1 x1 + 0x2 + 0x3 + 1x4 + 1x5 + 1x6 + 1x7 >= 22; 1 x1 + 1x2 + 0x3 + 0x4 + 1x5 + 1x6 + 1x7 >= 26; 1 x1 + 1x2 + 1x3 + 0x4 + 0x5 + 1x6 + 1x7 >= 25; 1 x1 + 1x2 + 1x3 + 1x4 + 0x5 + 0x6 + 1x7 >= 21; 1 x1 + 1x2 + 1x3 + 1x4 + 1x5 + 0x6 + 0x7 >= 19; x1 > 0; x2 > 0; x3 > 0; x4 > 0; x5 > 0;
x6 > 0; x7 > 0; int x1, x2, x3, x4, x5, x6, x7;

```
library(lpSolveAPI)
Workers <- read.lp("C:/Users/Hello/Downloads/Assign_6_11.lp")
Workers
```

```
## Model name:
##             x1   x2   x3   x4   x5   x6   x7
## Minimize   775  800  800  800  800  775  750
## Sunday       0    1    1    1    1    1    0  >=  18
## Monday       0    0    1    1    1    1    1  >=  27
## Tuesday      1    0    0    1    1    1    1  >=  22
## Wednesday    1    1    0    0    1    1    1  >=  26
## Thursday     1    1    1    0    0    1    1  >=  25
## Friday       1    1    1    1    0    0    1  >=  21
## Saturday     1    1    1    1    1    0    0  >=  19
## Kind       Std  Std  Std  Std  Std  Std  Std
## Type       Int  Int  Int  Int  Int  Int  Int
## Upper      Inf  Inf  Inf  Inf  Inf  Inf  Inf
## Lower        0    0    0    0    0    0    0
```

#Solving Ap Hub lp model to find optimal numnber of workers in facility.

```
solve(Workers)
```

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

```
get.objective(Workers)
```

```
## [1] 25675
```

```
get.variables(Workers)
```

```
## [1]  2  4  5  0  8  1 13
```

##25675 is the total cost for workers

```
shift_workers <- matrix(c(0,4,5,0,8,1,0,0,0,5,0,8,1,13,2,0,0,0,8,1,13,2,4,0,0,8,1,13,2,4,5,0,0,1,13,2,3
row.names(shift_workers) <- c('Sun','Mon','Tues','Wed','Thur','Fri','Sat')
colnames(shift_workers)<- c('Sun/Mon','Mon/Tues','Tues/Wed','Wed/Thur','Thur/Fri','Fri/Sat','Sat/Sun')
shift_workers
```

```
##      Sun/Mon Mon/Tues Tues/Wed Wed/Thur Thur/Fri Fri/Sat Sat/Sun
## Sun        0        4        5        0        8       1       0
## Mon        0        0        5        0        8       1      13
## Tues       2        0        0        0        8       1      13
## Wed        2        4        0        0        8       1      13
## Thur       2        4        5        0        0       1      13
## Fri        2        3        4        0        0       0      13
## Sat        2        4        5        0        8       0       0
```

```
#Optimal solution to minimizes the total wage expense according to shift of workers in the factory in a
```

```
rowSums(shift_workers)
```

```
##  Sun  Mon Tues  Wed Thur  Fri  Sat
##   18   27   24   28   25   22   19
```

```
#Total of workers according the scheduled shift in  each day to minimize the total cost of  wage expens
```