Assignment6

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```
library(lpSolveAPI)
```

```
ap <- read.lp("ap.lp")
print(ap)
```

```
## 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
```

```
Workers <- matrix(c("Sunday","Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday",18,27,2

colnames(Workers) <- c("Day", "Workers")

as.table(Workers)
```

```
##   Day       Workers
## A Sunday    18
## B Monday    27
## C Tuesday   22
## D Wednesday 26
## E Thursday  25
## F Friday    21
## G Saturday  19
```

Package handlers at AP are guaranteed a five-day work week with two consecutive days off. The base wage for the handlers is $750 per week. Workers working on Saturday or Sunday receive an additional $25 per day.

```
Days_off_and_wages <- matrix(c(1,2,3,4,5,6,7,
                               "Sunday and Monday","Monday and Tuesday", "Tuesday and Wednesday", "Wedn

colnames(Days_off_and_wages) <- c("Shift", "Days_off", "Wage")

as.table(Days_off_and_wages)
```

```
##   Shift Days_off               Wage
## A 1     Sunday and Monday      $775
## B 2     Monday and Tuesday     $800
## C 3     Tuesday and Wednesday  $800
## D 4     Wednesday and Thursday $800
## E 5     Thursday and Friday    $800
## F 6     Friday and Saturday    $775
## G 7     Saturday and Sunday    $750
```

```
solve(ap)
```

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

```
#Objective function (Total cost)

get.objective(ap)
```

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

Total cost to the firm after keeping total wage expense as low as possible while ensuring that there are sufficient workers available each day is $25,675

```
#Variables (No of workers available each day)

get.variables(ap)
```

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

Findings:

No.of workers in shift1 = 2 No.of workers in shift2 = 4 No.of workers in shift3 = 5 No.of workers in shift4 = 0 No.of workers in shift5 = 8 No.of workers in shift6 = 1 No.of workers in shift7 = 13

Here, Workers available to work each day in terms of the objective function and constraints:

Workers on Sunday: x2+x3+x4+x5+x6 >= 18; Workers on Monday: x3+x4+x5+x6+x7 >= 27; Workers on Tuesday: x4+x5+x6+x7+x1 >= 22; Workers on Wednesday: x5+x6+x7+x1+x2 >= 26; Workers on Thursday: x6+x7+x1+x2+x3 >= 25; Workers on Friday: x7+x1+x2+x3+x4 >= 21; Workers on Saturday: x1+x2+x3+x4+x5 >= 19;