

integer_programming

sai sree pulimamidi

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```
library(lpSolveAPI)
ap_hub <- read.lp("C:/Users/sudhakar/Desktop/IP.lp")
solve(ap_hub)
```

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

```
get.objective(ap_hub)
```

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

```
get.variables(ap_hub)
```

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

Given

```
Weekday_vs_workers= matrix(data=c("SUNDAY","MONDAY","TUESDAY","WEDNESDAY","THURSDAY","FRIDAY","SATUARDAY",
Dayoff_vs_wage= matrix(data=c("Sunday and Monday","Monday and Tuesday","Tuesday and Wednesday","Wednesday and Thursday",
Dayoff_vs_wage
```

```
##      [,1]      [,2]
## [1,] "Sunday and Monday" "775"
## [2,] "Monday and Tuesday" "800"
## [3,] "Tuesday and Wednesday" "800"
## [4,] "Wednesday and Thursday" "800"
## [5,] "Thursday and Friday" "800"
## [6,] "Friday and Satuarday" "775"
## [7,] "Satuarday and Sunday" "750"
```

```
Weekday_vs_workers
```

```
##      [,1]      [,2]
## [1,] "SUNDAY" "18"
## [2,] "MONDAY" "27"
## [3,] "TUESDAY" "22"
## [4,] "WEDNESDAY" "26"
## [5,] "THURSDAY" "25"
## [6,] "FRIDAY" "21"
## [7,] "SATUARDAY" "19"
```

Let Number of Workers in a shift are $x_1, x_2, x_3, x_4, x_5, x_6, x_7$

Hence Objective Function is to minimize the number off workers in the week. There-Fore Min: $775x_1 + 800x_2 + 800x_3 + 800x_4 + 800x_5 + 800x_6 + 800x_7$

Constraints are $x_2 + x_3 + x_4 + x_5 + x_6 \geq 18$; $x_3 + x_4 + x_5 + x_6 + x_7 \geq 27$; $x_1 + x_4 + x_5 + x_6 + x_7 \geq 22$; $x_1 + x_2 + x_5 + x_6 + x_7 \geq 26$; $x_1 + x_2 + x_3 + x_6 + x_7 \geq 25$; $x_1 + x_2 + x_3 + x_4 + x_7 \geq 21$; $x_1 + x_2 + x_3 + x_4 + x_5 \geq 19$;

The minimum cost is 25,675 dollors

Number of workers available on Sunday is 19,

Monday is 27,

Tuesday is 24,

Wednesday is 28,

Thursday is 25,

Friday is 24,

Saturday is 20.