# Integer programming

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Given

```
Weekday_vs_workers= matrix(data=c("SUNDAY","MONDAY","TUESDAY","WEDNESDAY","THURSDAY","FRIDAY","SATUARDA

Dayoff_vs_wage= matrix(data=c("Sunday and Monday","Monday and Tuesday","Tuesday and Wednesday","Wednesda

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 x1, x2, x3, x4, x5, x6, x7

Hence Objective Function is to minimize the number off workers in the week. There-Fore Min:775x1+800x2+800x3+800x4+80

Constraints are x2 + x3 + x4 + x5 + x6 >=18; x3 + x4 + x5 + x6 + x7 >=27; x1 + x4 + x5 + x6 + x7 >=22; x1 + x2 + x5 + x6 + x7 >=26; x1 + x2 + x3 + x6 + x7 >=25; x1 + x2 + x3 + x4 + x7 >=21; x1 + x2 + x3 + x4 + x5 >=19;

```
library(lpSolveAPI)

Sol <- read.lp("Integer_programming.lp")

solve(Sol)
```

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

```
get.objective(Sol)
```

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

```
get.variables(Sol)
```

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

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.