Quantitative Management Assignment-2

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```
#install.packages("lpSolve")
library("lpSolve") #Activating the lpSolve Package
```

Further going down in order to solve the problem we need to define the objective, constraints, direction and constants

Objective Function

The Objective function of $Max \quad Z = 420(B_1L+B_2L+B_3L)+360(B_1M+B_2M+B_3M)+300(B_1S+B_2S+B_3S)$

$$Subject \ to$$
$$B_1L + B_1M + B_1S \leq 750$$
$$B_2L + B_2M + B_2S \leq 900$$
$$B_3L + B_3M + B_3S \leq 450$$

\

$$20B_1L + 15B_1M + 12B_1S \leq 13000$$
$$20B_2L + 15B_2M + 12B_2S \leq 12000$$
$$20B_3L + 15B_3M + 12B_3S \leq 5000$$

\

$$B_1L + B_2L + B_3L \leq 900$$
$$B_1M + B_2M + B_3M \leq 1200$$
$$B_1S + B_2S + B_3S \leq 750$$

Non Negativity Constraints

$$B_1L, B_2L, B_3L, B_1M, B_2M, B_3M, B_1S, B_2S, B_3S \geq 0$$

The constraints for

$$B_1L + B_1M + B_1S + 0B_2L + 0B_2M + 0B_2S + 0B_3L + 0B_3M + 0B_3S \leq 750$$
$$0B_1L + 0B_1M + 0B_1S + B_2L + B_2M + B_2S + 0B_3L + 0B_3M + 0B_3S \leq 900$$
$$0B_1L + 0B_1M + 0B_1S + 0B_2L + 0B_2M + 0B_2S + B_3L + B_3M + B_3S \leq 450$$
$$20B_1L + 15B_1M + 12B_1S + 0B_2L + 0B_2M + 0B_2S + 0B_3L + 0B_3M + 0B_3S \leq 13000$$
$$0B_1L + 0B_1M + 0B_1S + 20B_2L + 15B_2M + 12B_2S + 0B_3L + 0B_3M + 0B_3S \leq 12000$$
$$0B_1L + 0B_1M + 0B_1S + 0B_2L + 0B_2M + 0B_2S + 20B_3L + 15B_3M + 12B_3S \leq 5000$$
$$B_1L + 0B_1M + 0B_1S + B_2L + 0B_2M + 0B_2S + B_3L + 0B_3M + 0B_3S \leq 900$$
$$0B_1L + B_1M + 0B_1S + 0B_2L + B_2M + 0B_2S + 0B_3L + B_3M + 0B_3S \leq 1200$$
$$0B_1L + 0B_1M + B_1S + 0B_2L + 0B_2M + B_2S + 0B_3L + 0B_3M + B_3S \leq 750$$

The Objective Function

```
f.obj <- c(420,360,300,420,360,300,420,360,300)
```

The Constraints

```
f.con <- matrix(c(1,1,1,0,0,0,0,0,0,
                  0,0,0,1,1,1,0,0,0,
                  0,0,0,0,0,0,1,1,1,
                  20,15,12,0,0,0,0,0,0,
                  0,0,0,20,15,12,0,0,0,
                  0,0,0,0,0,0,20,15,12,
                  1,0,0,1,0,0,1,0,0,
                  0,1,0,0,1,0,0,1,0,
                  0,0,1,0,0,1,0,0,1), nrow = 9, byrow=T)
```

The Direction of the constraints

```
f.dir <- c('<=',
           '<=',
           '<=',
           '<=',
           '<=',
           '<=',
           '<=',
           '<=',
           '<=')
```

The constants for right hand side values

```
f.rhs <- c(750,900,450,13000,12000,5000,900,1200,750)
```

The lp function to solve the problem basing the objective function

```
lp('max',f.obj,f.con,f.dir,f.rhs)
```

```
## Success: the objective function is 708000
```

The lp function of the values for the variables

```
lp('max',f.obj,f.con,f.dir,f.rhs)$solution
```

```
## [1] 350.0000 400.0000   0.0000   0.0000 400.0000 500.0000   0.0000 133.3333
## [9] 250.0000
```