LP Model Assignment 1

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```
knitr::opts_chunk$set(echo = TRUE)
```

#LP 2 Model Problem 1

```
table=matrix(c(3,45,"$32",2,40,"$24"),ncol=3,byrow=TRUE)
#specify the row and column names
colnames(table)=(c('Material','Labour(Min)','Profit'))
rownames(table)=(c('collegiates','Minis'))
table
```

```
##             Material Labour(Min) Profit
## collegiates "3"      "45"        "$32"
## Minis       "2"      "40"        "$24"
```

Suppose The number of Collegiate bags

$$B_c$$

The number of Mini bags

$$B_m$$

The labour hours for Collegiate

$$L_c$$

The labour hours for Minis

$$L_m$$

(1)The decision variable are

$$B_c, B_m, L_c \quad and \quad L_m$$

(2)The objective function is

$$Max \quad Z = 32B_c + 24B_m$$

(3)Constraints Material constraints:

$$3B_c + 2B_m <= 5000$$

Sales forecast constraint:

$$B_c <= 1000 \quad B_m <= 1200$$

(4)Mathematical formula:

$$L_c + L_m <= 1400$$

problem 2

Suppose Let Plant 1 be

$$= P1$$

Let Plant 2 be

$$= P2$$

Let Plant 3 be

$$= P3$$

Let Plant 1 Large be

$$= P1_L$$

Let Plant 1 Medium be

$$= P1_M$$

Let Plant 1 Small be

$$= P1_S$$

Let Plant 2 Large be

$$= P2_L$$

Let Plant 2 Medium be

$$= P2_M$$

Let Plant 2 Small be

$$= P2_S$$

Let Plant 3 Large be

$$= P3_M$$

Let Plant 3 Medium be

$$= P3_S$$

Let Plant 3 Small be

$$= P3_S$$

(a) The decision variables are:

$$P1, P2, P3, P1_L, P1_M, P1_S, P2_L, P2_M, P2_S, P3_L, P3_M, P3_S$$

(b) The objective function:

$$Max \quad Z = 420P1 + 360P2 + 300P3$$

(c) Constraints: Capacity constraints:

$$P1_L + P1_M + P1_S \leq 750$$

$$P2_L + P2_M + P2_S \leq 900$$

$$P3_L + P3_M + P3_S \leq 450$$

Storage space constraints:

$$20P1_L + 15P1_M + 12P1_S \leq 13000$$

$$20P2_L + 15P2_M + 12P2_S \leq 12000$$

$$20P3_L + 15P3_M + 12P3_S \leq 5000$$

Sales constraint:

$$P1_L + P2_L + P3_L \leq 900$$

$$P1_M + P2_M + P3_M \leq 12000$$

$$P1_S + P2_S + P3_S \leq 750$$

Percentage to avoid layoff:

$$((P1_L + P1_M + P1_S)/750) * 100$$

$$((P2_L + P2_M + P2_S)/900) * 100$$

$$((P3_L + P3_M + P3_S)/450) * 100$$