1. Decision Variables

The Number of collegiate (N) and mini (R) bags generated every week are the choice variables in the presented issue. It follows that there are two decision variables.

Objective Function

The objective function can be understood as maximising profits. According to the problem, N makes a unit profit of 32$ and R makes a profit of 24$.

Maximize, $Y = 32N + 24R$

The problem has two constraints:

Resource Constraint:

Back savers receives 5000 sqft of nylon from their source. Each week, 3 sqft are needed for each N, where as each R needs 2 sqft.

$$3N + 2R \leq 5000$$

Time Constraint:

Each N needs 45 minutes of labor to earn a profit of 32$ while each R needs 40 minutes to earn a profit of 24.35$ workers at back savers put in 40 hours a week of work each

Here, $35 * 40 = 1400$ (labor hours)

$$45N + 40R <= 84000 \text{ (labor mins)}$$

LP Problem Formulation in Mathematics:

Maximise, $Y = 32N + 24R$

Constraints,

$$N <= 1000, \quad N >= 0$$

$$R <= 1200, \quad R >= 0$$

$$3N + 2R <= 5000$$

$$45N + 40R <= 84000$$

2. Decision Variables:

The decision variables in the given problem are

No. of units (A)

No. of plants (N)

Holds branch plants large, small, medium (R)

Thus, these aspects that influence decision-making

Objective Function:

We can interpret the objective function as maximising the profits. As given in the problem

Maximize, $M = ?$

$$M = 420 \, (A_1{}^2 + A_2{}^2 + A_3{}^2) + 360 \, (A_1 m + A_2 m + A_3 m)$$

$$+ 300 \, (A_1 s + A_2 s + A_3 s)$$

Constraints

$$A_1{}^2 + A_2{}^2 + A_3{}^2 <= 750$$

$$A_1 m + A_2 m + A_3 m <= 900$$

$$A_1 s + A_2 s + A_3 s <= 450$$

Storage limits

$$20 A_1^2 + 15 A_1 m + 12 A_1 s \leq 13000$$

$$20 A_2^2 + 15 A_2 m + 12 A_2 s \leq 12000$$

$$20 A_3^2 + 15 A_3 m + 12 A_3 s \leq 5000$$

Sales forcast indicates per day

$$A_1^2 + A_1 m + A_1 s <= 900$$

$$A_2^2 + A_2 m + A_2 s <= 1200$$

$$A_3^2 + A_3 m + A_3 s <= 750$$

Percentage avoid layoff

$$A_1^2 + A_1 m + A_1 s / 750 * 100$$

$$A_2^2 + A_2 m + A_2 s / 900 * 100$$

$$A_3^2 + A_3 m + A_3 s / 450 * 100$$