Assignment

Linear Programming

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1.) $P(C, M) = 32C + 24M$

P = Total profit as a function.
C = No. of bags collegiate
M = No. of bags minis

$0 \leq C \leq 1000, \quad 0 \leq M \leq 1200$

Total Nylon = 5000 sqft.

Total labor hours = $35 \times 40 = 1400$ hr

↙ No. of available labors

↘ No. of hours each labor work

C → requires 3 sqft nyloon.

M → requires 2 sqft nylon.

$$3C + 2M \leq 5000$$

C → each unit it takes 45 min $\Rightarrow \frac{45}{60} = \frac{3}{4}$

M → each unit it takes 40 min $\rightarrow \frac{40}{60} = \frac{2}{3}$

$$\frac{3}{4}C + \frac{2}{3}M \leq 1400$$

Constraints :- $3C + 2M \leq 5000$

$$\frac{3}{4}C + \frac{2}{3}M \leq 1400$$

The amount of material we have to work with each week and how many labor hours each week.

Decision Variables:- P :- Total profit

C :- No. of collegiate bags

M :- No. of bags minis

Objective function:- Maximize profit

$$P(C,M) = 32C + 24M$$

Where C, M are variables. Since we can't make negative backpack both C, M are greater than 0.

having Saler limit $0 \leq C \leq 1000$

$0 \leq M \leq 1200$.

2.) Decision Variables :-

Let Nij be no. of units of size

N = No. of Unit

i = No. of plant (1, 2, 3)

j = holds the plant of Small, medium, large.

P = has to be maximized.

Objective function :-

$$P = 420(N_1L + N_2L + N_3L) + 360(N_2M + N_2M + N_3M) +$$

$300(N_1S + N_2S + N_3S)$

Constraints :-

Capacity limits :-

$N_{1L} + N_1M + N_1S \leq 750 \rightarrow$ Plant 1

$N_{2L} + N_2M + N_2S \leq 900 \rightarrow$ Plant 2

$N_3L + N_3M + N_3S \leq 450 \rightarrow$ Plant 3

Storage limits :-

$20N_{1L} + 15N_{1M} + 12N_{1S} \leq 13000$

$20N_{2L} + 15N_2M + 12N_2S \leq 12000$

$20N_3L + 15N_3M + 12N_3S \leq 5000$

Sales forecast :-

$N_1L + N_1M + N_1S \leq 900$

$N_2L + N_2M + N_2S \leq 1200$

$N_3L + N_3M + N_3S \leq 750$

Percentage to avoid layoff :- $\frac{N_1L + N_1M + N_1S}{750} \times 100$

$= \frac{N_2L + N_2M + N_2S}{900} \times 100$

$= \frac{N_3L + N_3M + N_3S}{750} \times 100$