BACK SAVERS COMPANY

Rip-resistant nylon fabric = 5000sqft

Total working time =40 hours*60 minutes=2400 minutes

Total minutes the laborers to be work=2400 minutes*35 laborers=84000 minutes

Which means, the total hours =84000/60= 1400 hours

- ❖ **Decision Variable:** The decision variables are
                        Collegiate(B1)
                        Mini(B2)
- ❖ **Objective Function:** Profit maximation
                $Smax=32B1+24B2$
- ❖ **Constraints:** $B1<=1000$
                $B2<=1200$
- ❖ **Mathematical Formulation:**
                Subject to the restriction,
                        $3B1+2B2<=5000$ (Fabric)
                        $(3/4)B1+(2/3)B2<=1400$ (Time)
                               WHERE,
                               $B1,B2>=0$

> 45 minutes= 3/4 hour
>
> 45/60=0.75, which can be written as 3/4
>
> 40 minutes= 2/3 hour
>
> 40/60=0.66, which can be written as 2/3

WEIGELT CORPORATION

PLANTS	CAPACITY A+B+C	SALES A+B+C	STORAGE A+B+C	PROFIT A	B	C
1	750	900	13000	420	360	300
2	900	1200	12000	420	360	300
3	450	750	5000	420	360	300

> **Decision Variable:**

For Plant 1, $pA1$, $pB1$, and $pC1$;

For Plant 2, $pA2$, $pB2$, and $pC2$;

For Plant 3, $pA3$, $pB3$, and $pC3$.

And, A=Large

B=Medium

C=Small

LINEAR PROGRAMMING MODEL:

> **Objective Function:**

Our goal is to maximize (Smax) the overall profit:

Smax = $420pA1 + 420pA2 + 420pA3 + 360pB1 + 360pB2 + 360pB3 + 300pC1 + 300pC2 + 300pC3$ respectively.

> **Constraints:**

EXCESS CAPACITY:

Excess capacity for Plant 1: $pA1 + pB1 + pC1 <= 750$

Excess capacity for Plant 2: $pA2 + pB2 + pC2 <= 900$

Excess capacity for Plant 3: $pA3 + pB3 + pC3 <= 450$

RESTRICTION ON SALE PREDICTIONS:

Large sales prediction: $pA1 + pB2 + pC3 <= 900$

Medium sales prediction: $pA1 + pB2 + pC3 <= 1200$

Small sales prediction: $pA1 + pB2 + pC3 <= 750$

<u>STORAGE VOLUME:</u>

Storage volume in plant 1: $20pA1 + 15pB1 + 12pC1 <= 13000$

Storage area in plant 2: $20pA2 + 15pB2 + 12pC2 <= 12000$.

Storage space in plant 3: $20pA3 + 15pB3 + 12pC3 <= 5000$.

Given that each plant should consume an equal percentage of its production unit.

$900(pA1 + pB1 + pC1) - 750(pA2 + pB2 + pC2) = 0$

$450(pA2 + pB2 + pC2) - 900(pA3 + pB3 + pC3) = 0$

$450(pA1 + pB1 + pC1) - 750(pA3 + pB3 + pC3) = 0$

<u>NON-NEGATIVITY:</u>

$pA1, pA2, pA3, pB1, pB2, pB3, pC1, pC2, pC3 >= 0$:(non-Negativity)