

# Practical - 1

Q.1 A company name Freship Beverages Pvt. Ltd is considering launching a new organic energy drink for green fuel Targeted at health conscious urban youth. the management must decide whether to launch green fuel or to not launch it if they launch it there is a 70% chance the product will be successful leading a profit of Rs 1 Lakh and there is 30% chance it will fail, casting a loss of 40,000 Rs due to marketing and production cost. If they do not launch there is no profit or loss what should the company decided?

→ Decision : 1) To launch 2) No to launch

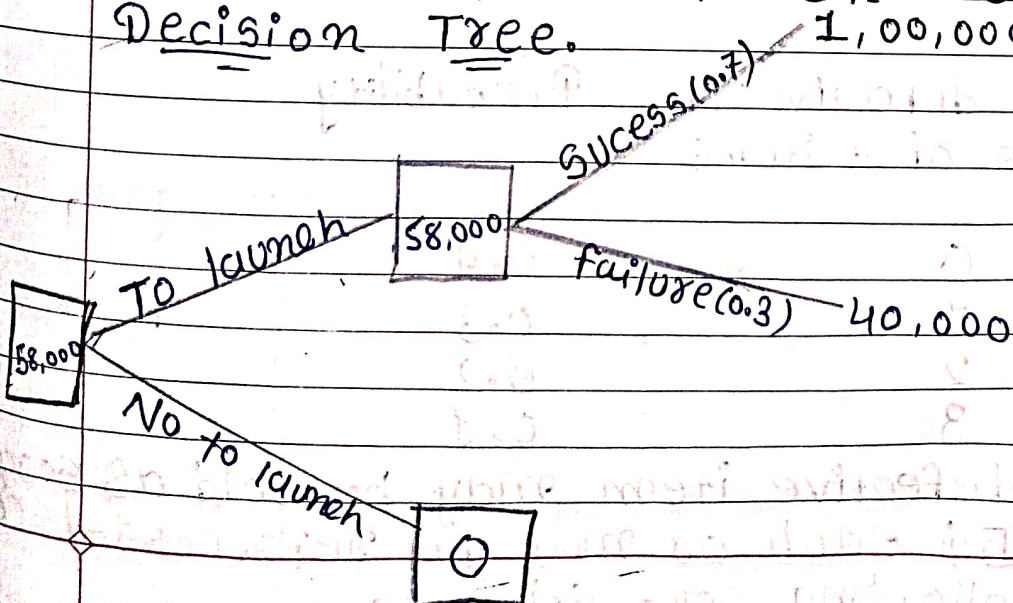
Option 1 → To launch

$P(\text{success}) = 0.7 \rightarrow \text{gain profit 1 lakh}$

$P(\text{failure}) = 0.3 \rightarrow \text{gain Loss 40,000 Rs}$

Option 2 → No to launch = 0

Decision Tree.



$$\begin{aligned}\text{Expected Value is progress is launch} \\ &= 0.7 \times 100,000 - 0.3 \times 40,000 \\ &= \boxed{58,000}\end{aligned}$$

Since the expected monetary value of launching green fuel is 58,000 Rs thus the company should go ahead and launch the new drink.

Q.2 A product is manufactured by a certain Automatic machine in batches of three items. The selling price is 10\$ and the production cost is 5\$ per item before each batch is produced the machine may be adjusted by a skilled ~~man~~ machine by a cost of 6\$ per batch. If machine is so adjusted there will be no defectives in the batch. If it is not adjusted some items may be defective (on the basis) of the past experience the probability dist<sup>n</sup> of the no. of the defective is estimated as follows

No. of defective in batches of 3 items	Probability
0	0.4
1	0.3
2	0.2
3	0.1

The defective item may be sold as scrap for 5\$ each or may be reprocessed at the following cost schedule.

No. of defective items	Total Reprocessing Cost \$
1	6
2	10
3	12

Reprocess items can be sold as good items  
Should the machine be adjusted before each batch is produced?

→ Decision to make:

1) Adjust the machine 2) Not Adjust the machine  
Given,

Selling price per item (SP) = \$10

Product cost per item (PC) = \$5

Adjustment cost per batch = \$6

(only if machine is adjusted)  
Scrap value per item = \$5 (SP)

Net Profit :- (Adjusted machine)

$$\begin{aligned} & \text{Revenue} - P.C - A.C \\ &= 30 - 3 \times 5 - 6 \\ &= \$9 \end{aligned}$$

Net Profit (0 defective with unadjusted machine)

$$\begin{aligned} &= 3 \times 10 - (3 \times 5) \\ &= 30 - 15 = \boxed{15} \end{aligned}$$

Net Profit (1 defective and Reprocessed)

$$\begin{aligned} &= 30 - 15 - 6 \\ &= \$9 \end{aligned}$$

Net profit (1 def. and scrapped)

$$= (2 \times 10) + 5 (\text{defective}) - 15$$

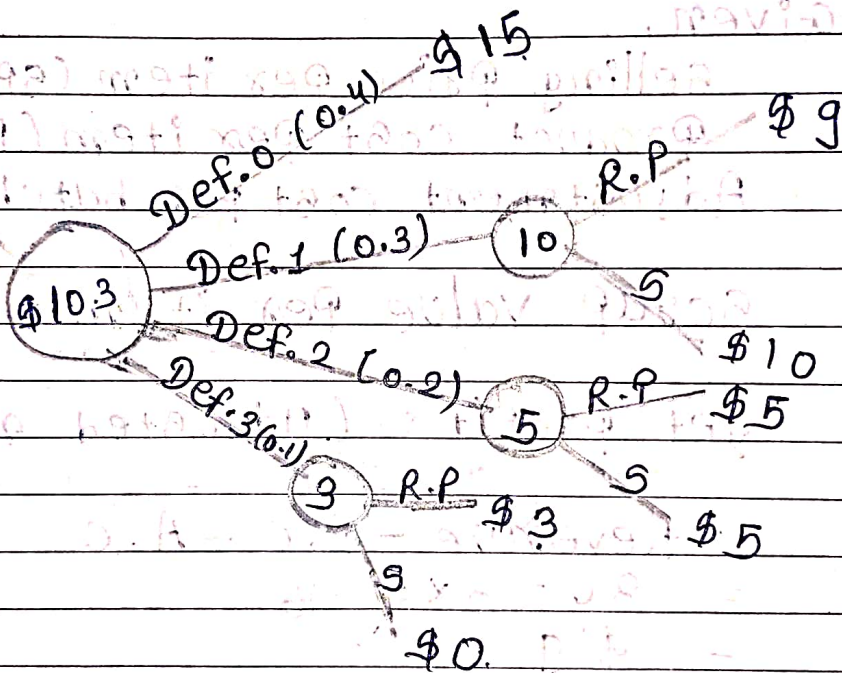
$$= 20 + 5 - 15 = \boxed{10}$$

\$9

Adjust

\$10.3

Not Adjusted



Expected profit when machine is unadjusted

$$= \boxed{\$10.3}$$

Conclusion :- Since the profit of adjusted machine is \$9 and the profit of unadjusted machine is 10.3\$ we

Obtain the optimal strategy to remain (keep) the machine unadjusted. Also if two or fewer items are defective used scraping and if more than 2 defective occurs used R-P.

Q.3 During the summer month vendex operates a concession at river park selling ice-cream, candy, hotdogs, soft drinks etc. It employs young people of high school age who are hired as a group. By the day, \$500 per day on week days business is fairly stable. If the weather is good the days revenue is 2000\$ if there is rain the day's revenue drops to 500\$ at this time of the year, the rain tends to occur every 10 days. The cost of the products sold is approximately 30% of the revenue rent, maintenances taxes the manager's salary and other fixed cost amount to about 400\$. Each day a forecast is available of next day's weather. vendex could use that forecast to decide whether to open or closed tomorrow.

Unfortunately this forecast are not always accurate as the following shows.

Actual weather	Rain	No Rain	Total
Rain	0.13	0.07	0.20
No Rain	0.02	0.78	0.80
Total	0.15	0.85	1

Assuming that it is reasonable to use this joint relative frequencies probabilities the question are

- Should vendex take advantage of weather forecast?
- How much the weather forecast works?

→ Decision to make : 1) Open the shop  
 2) Remain closed  
 Given,

Labour cost = \$ 500

cost of product =  $0.3 \times \text{Revenue}$

Maintenance cost = \$ 400

Revenue (if shop is open and not rain)  
 = \$ 2000

Revenue (if shop is open and rain)  
 = \$ 500

cost of product (open and not rain)  
 = \$ 600

cost of product (open and rain)  
 = \$ 150

Option 1 : Open the shop

$$\text{Rain} \rightarrow \text{Net Profit} = 500 - \underset{\substack{\uparrow \\ Lc}}{500} - \underset{\substack{\uparrow \\ Pc}}{150} - \underset{\substack{\uparrow \\ Mc}}{400} = -550$$

$$\text{No Rain} \rightarrow \text{Net Profit} = 2000 - 500 - 600 - 400 - 550 = \$500$$

