



Business Management Toolkit

6. DECISION TREE (SL&HL)

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6. Decision Tree - Objectives - Syllabus links



- It is recommended that it is introduced and taught to the students in Unit 1 (Recommended chapters any 1.3.-1.6.)
- Decision trees could also be used in Unit 5 (Location decisions)

6. Decision tree

Decision tree= a diagram that sets out the options connected with a decision and the outcomes and economic returns that may result.

- No technique can eliminate the risk involved in taking decisions, but managers can help themselves greatly if they adopt a logical approach to decision-making. One method of considering all the options available and the chance of them occurring is known as decision trees.
- A decision tree is a diagram which represents three main features of a decision:
 1. All the options open to a manager.
 2. The different possible outcomes resulting from these options.
 3. The chances of these outcomes occurring.
- The manager can minimise the risk involved with the use of a decision tree.



6. Features of a decision tree

1. **Decision Point:** Points where decisions have to be made. They are represented by squares.
1. **Outcomes:** Points where there are different possible outcomes in a decision tree are represented by circles called **chance nodes**.
1. **Probability or Chance:** The likelihood of possible outcomes happening is represented by probabilities.
1. **Expected Values:** This is the financial outcome of a decision, which is based on the predicted profit and loss of an outcome and the probability of that outcome occurring.

Exam tip! Always drawn from left to right BUT calculations start from right to left!



6. Decision Tree - Steps

1. **Draw the decision tree** based on the data you have. Start from left with a decision node (square) and then towards the right the branches and chance nodes (circles).

Tip! There are case studies where you will need to draw more than one decision nodes (in the cases you have sub-decisions to be made) there will be more than one decision nodes on the decision tree!

1. **Add the data** and review the decision tree.
2. **Do the calculations** as in the worked example. Show all your working!
3. **Choose which is the best option** based on your results and **show it on the decision tree** (see second graph of worked example).
4. **Tip!** Remember to add the key (see second graph of example)

Decision

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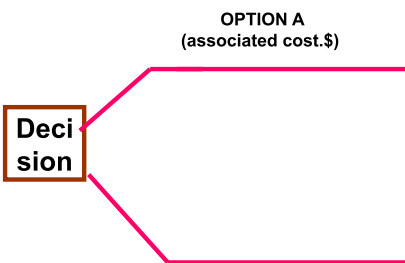
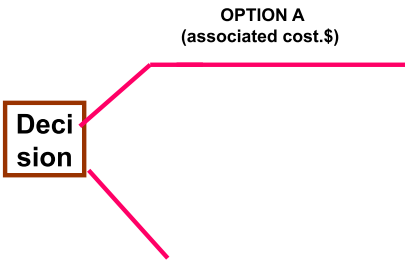
Decision

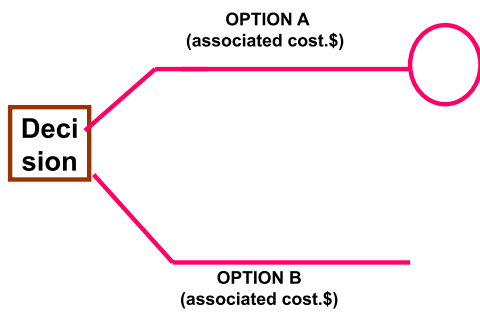
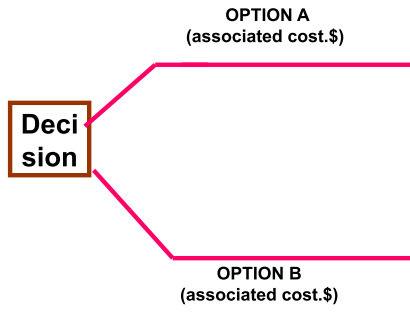


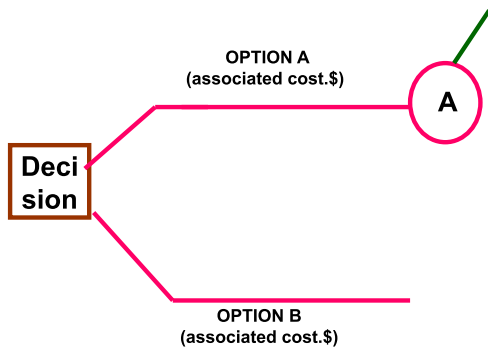
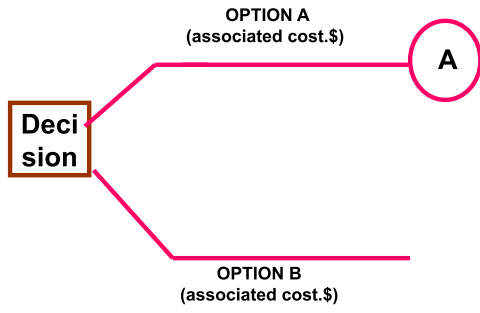
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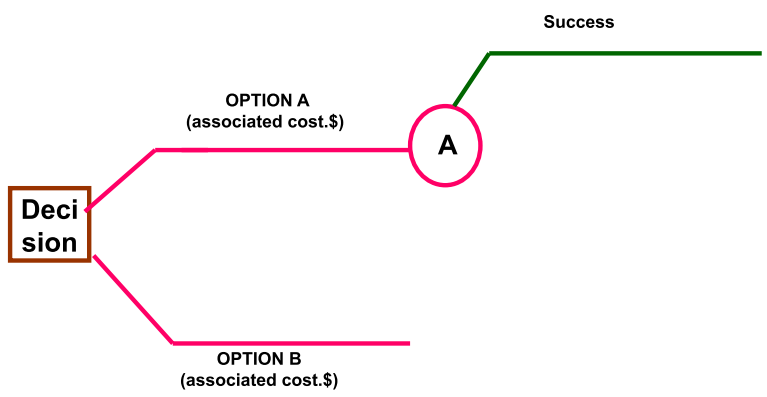
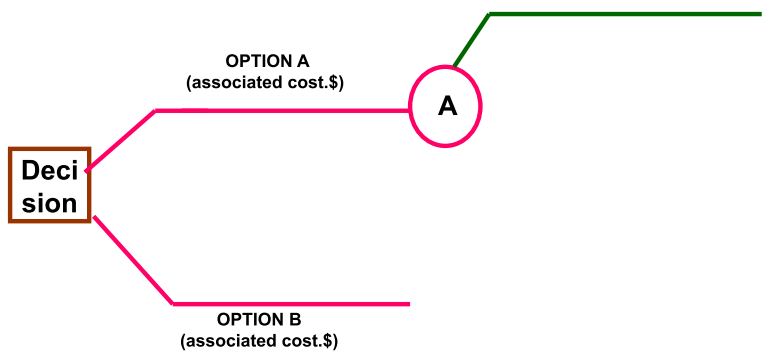
OPTION A
(associated cost.\$)

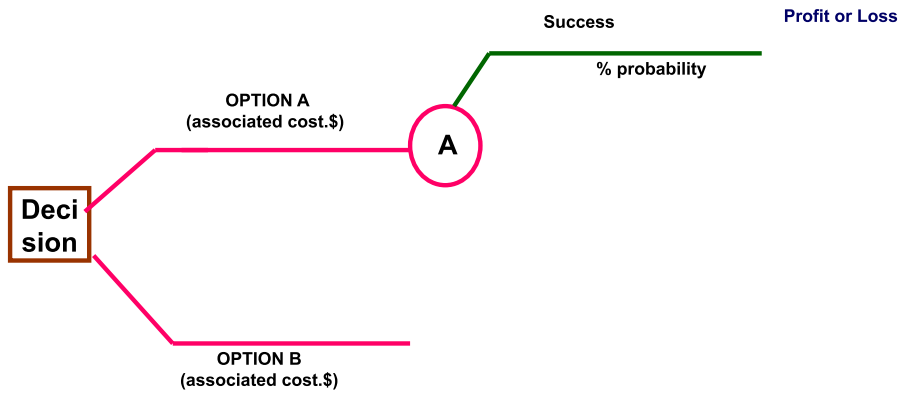
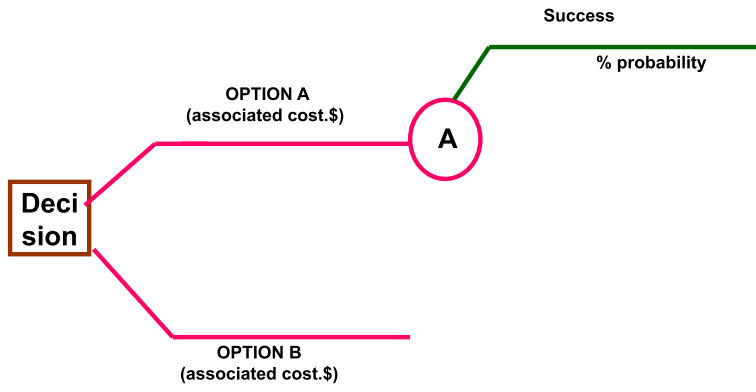


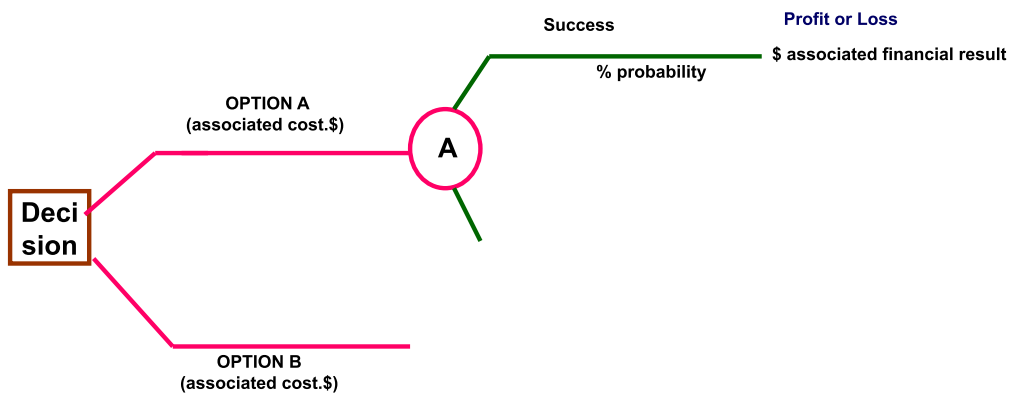
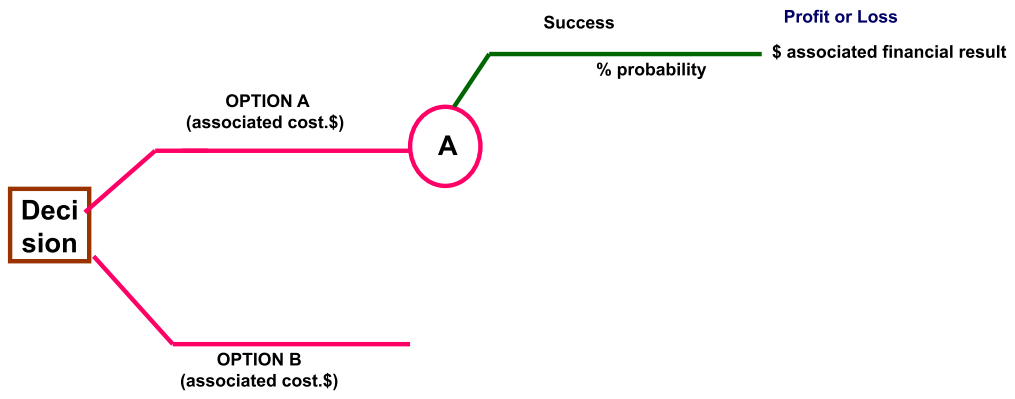


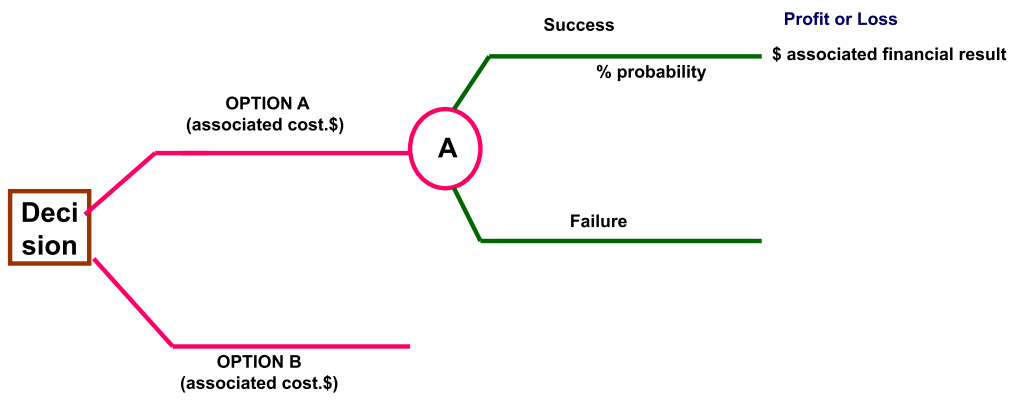
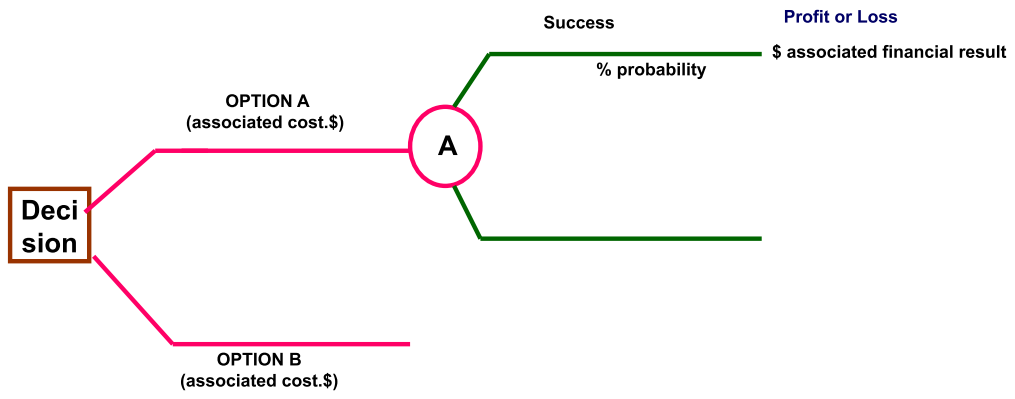


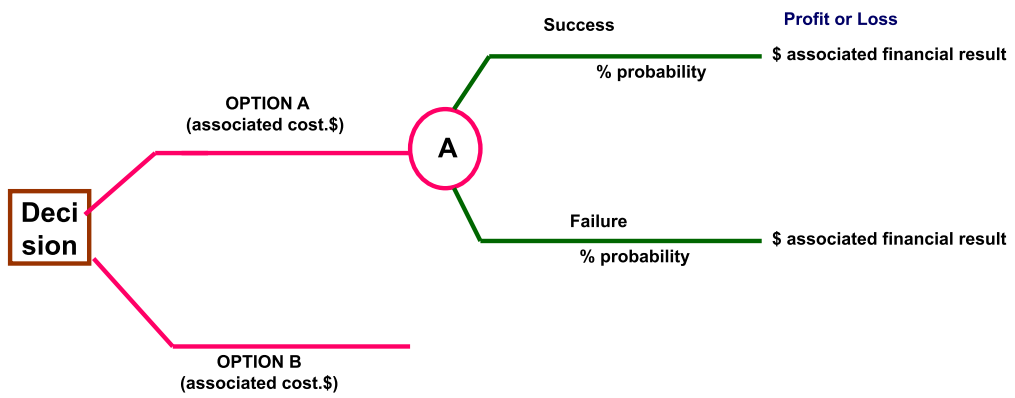
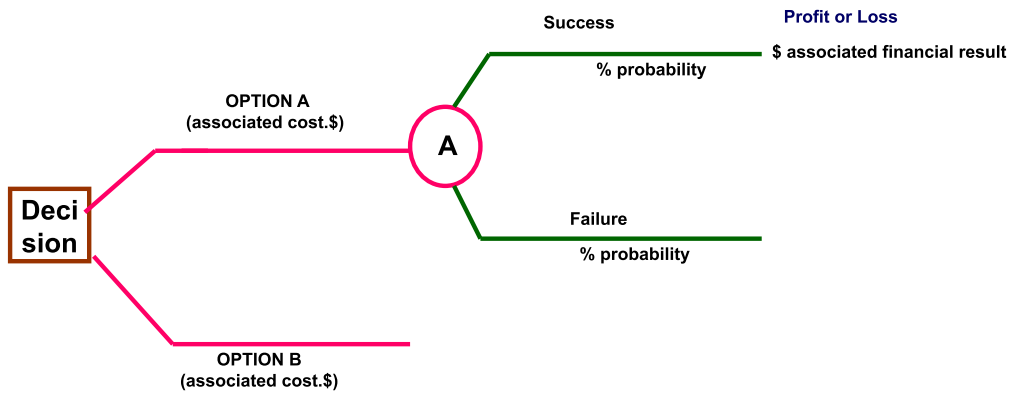


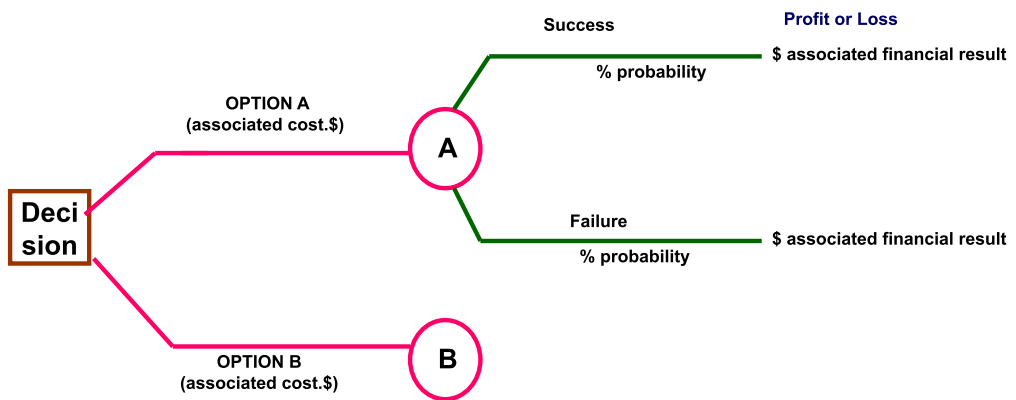
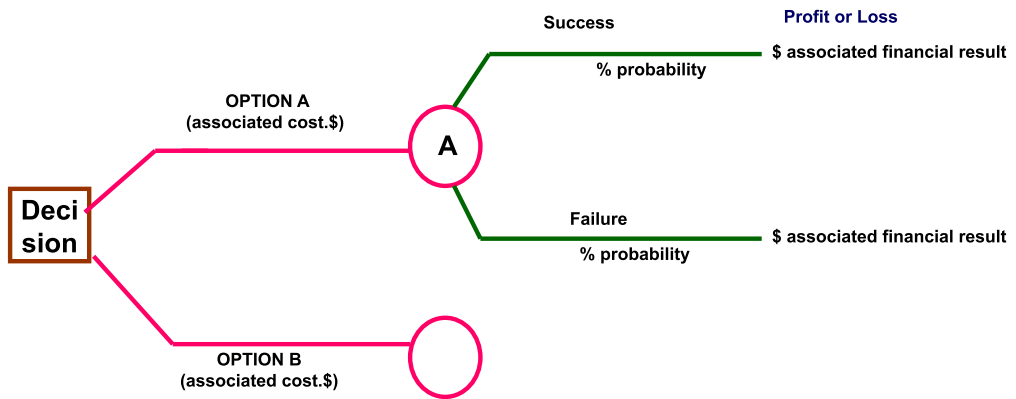


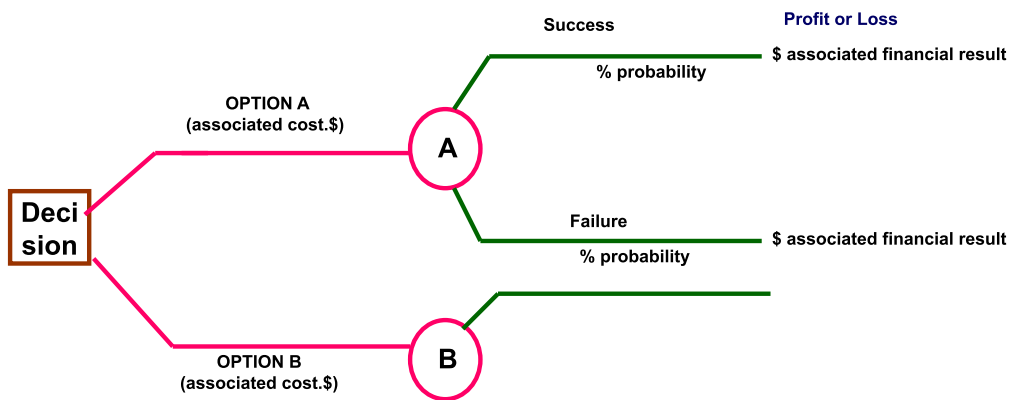
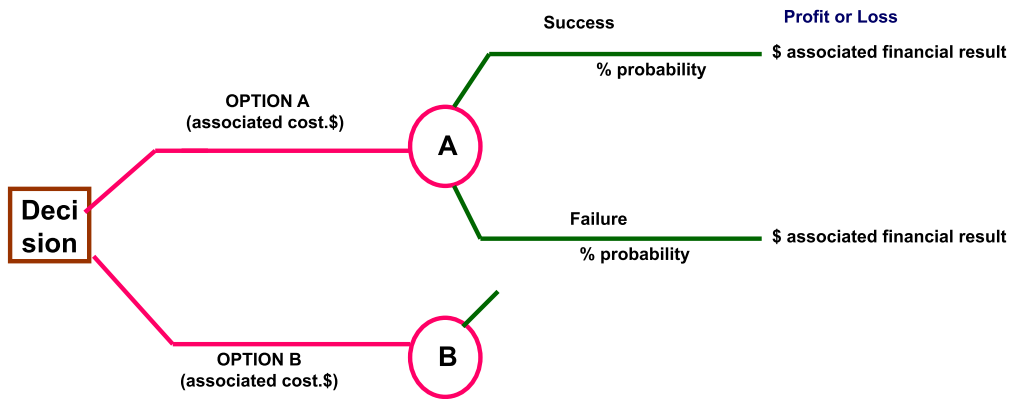


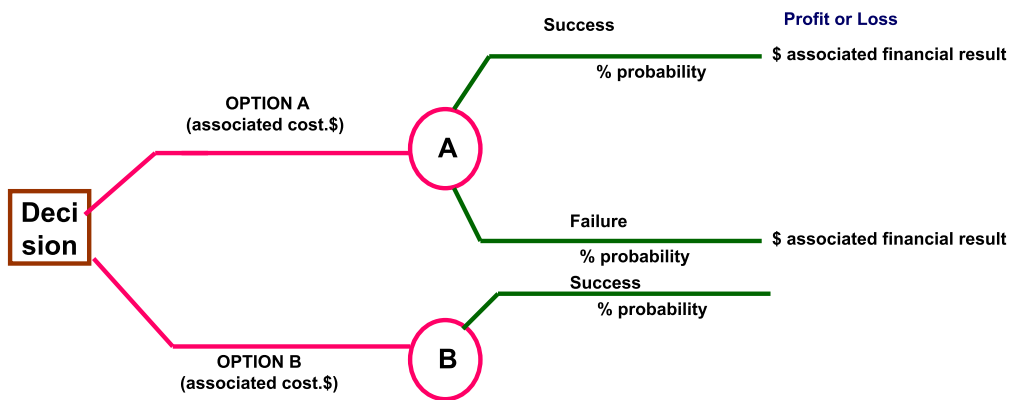
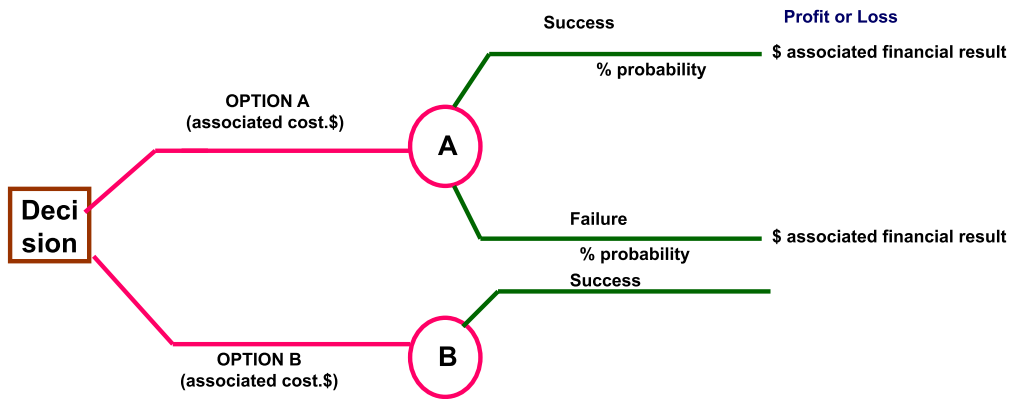


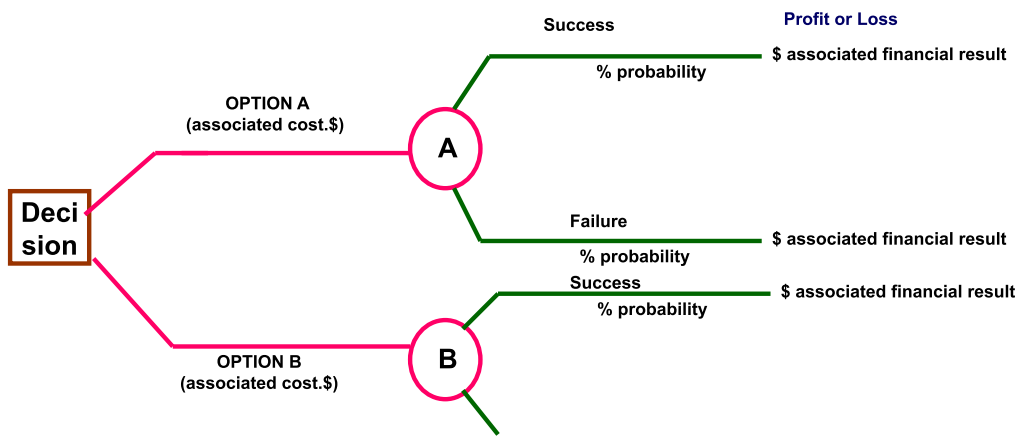
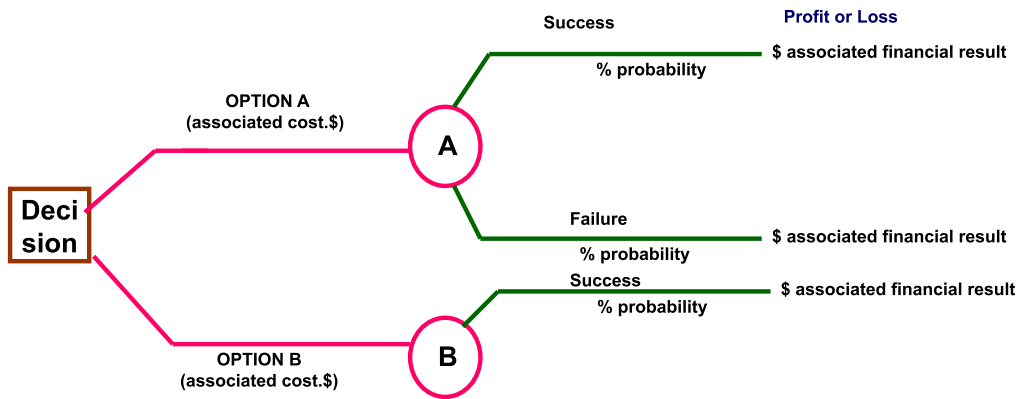


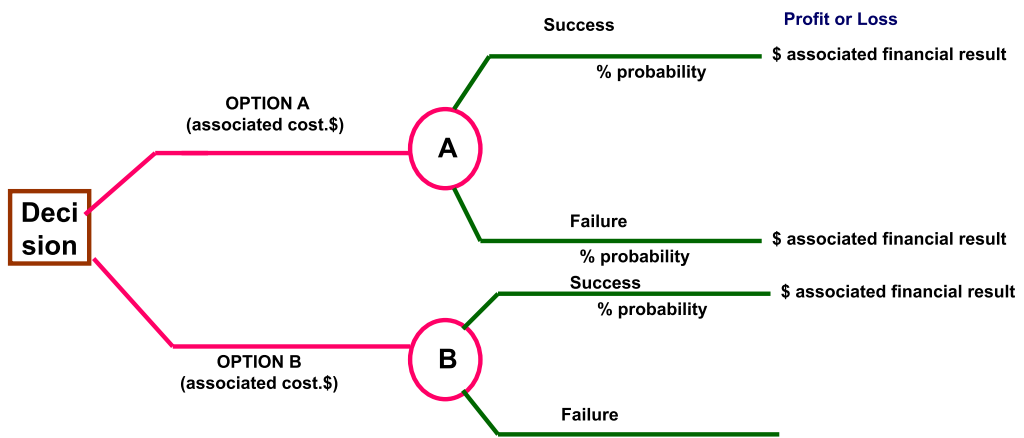
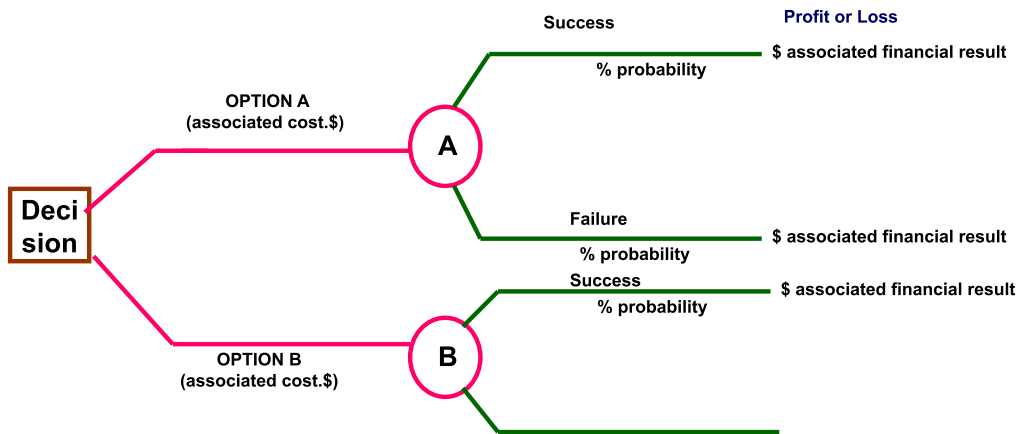


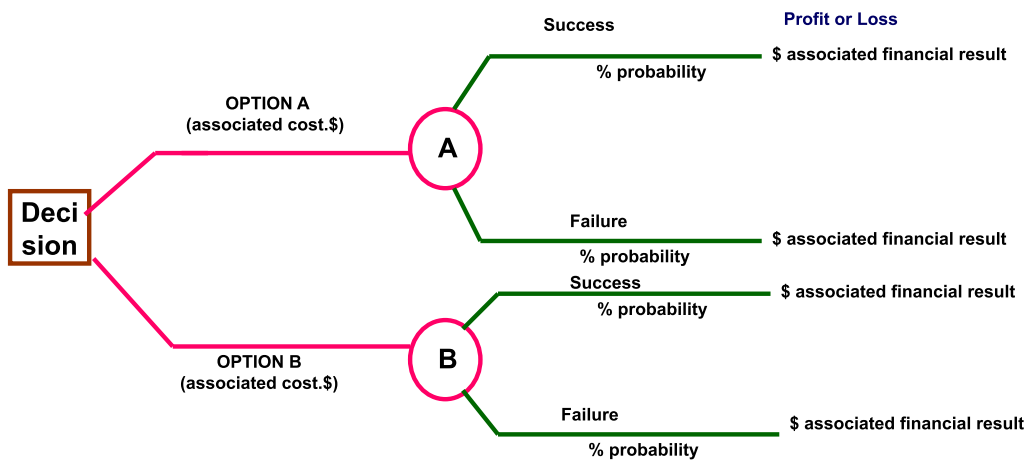
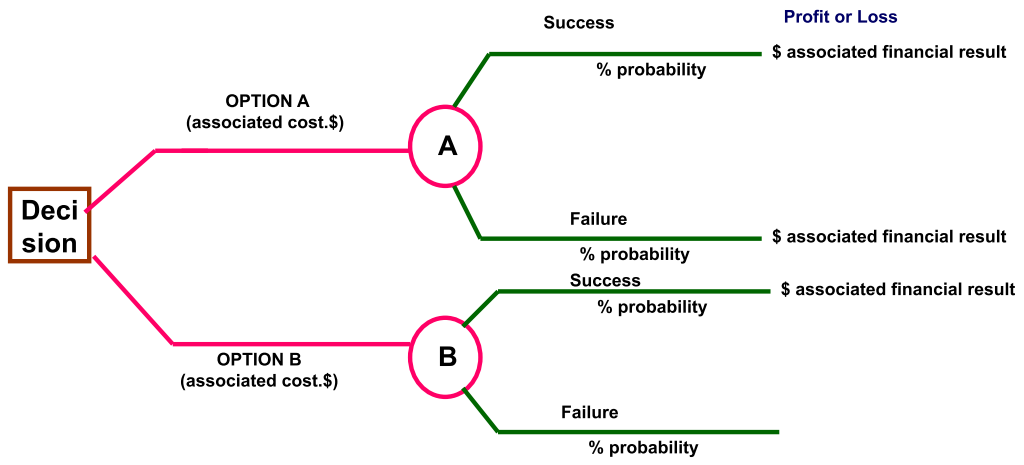


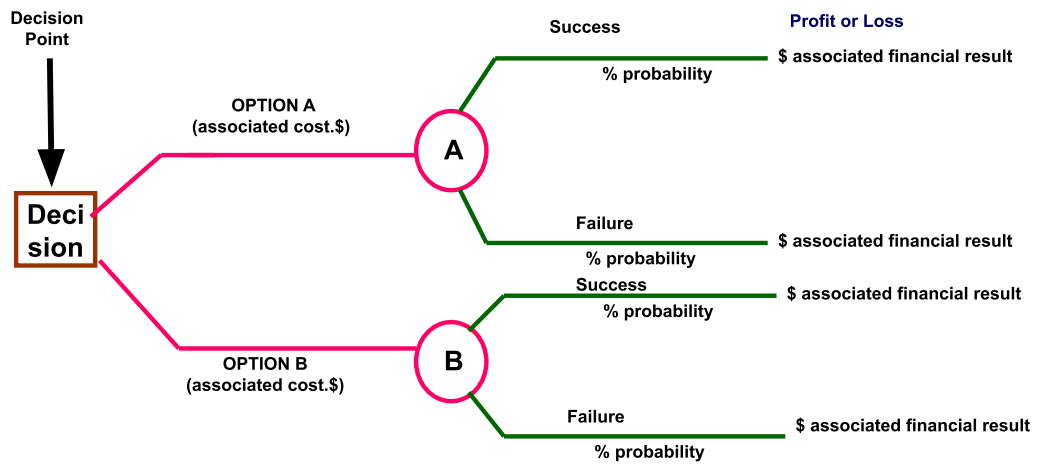
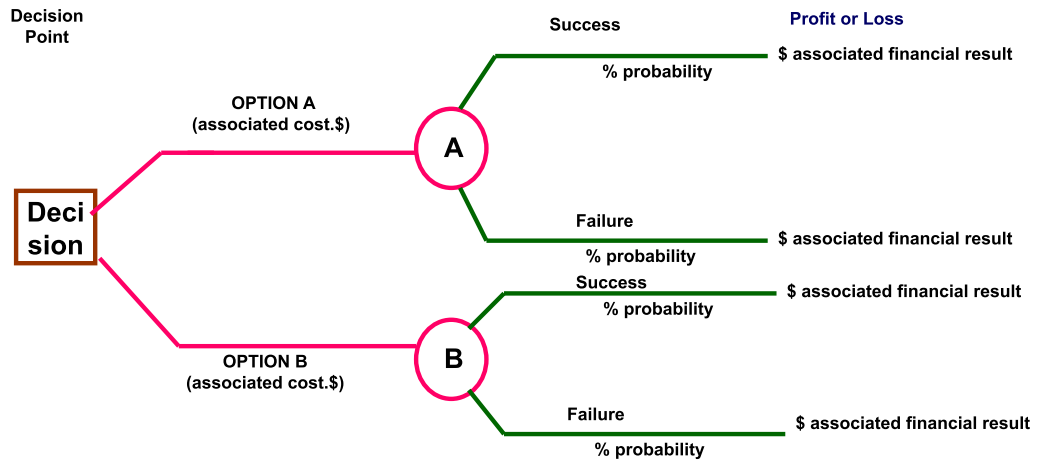


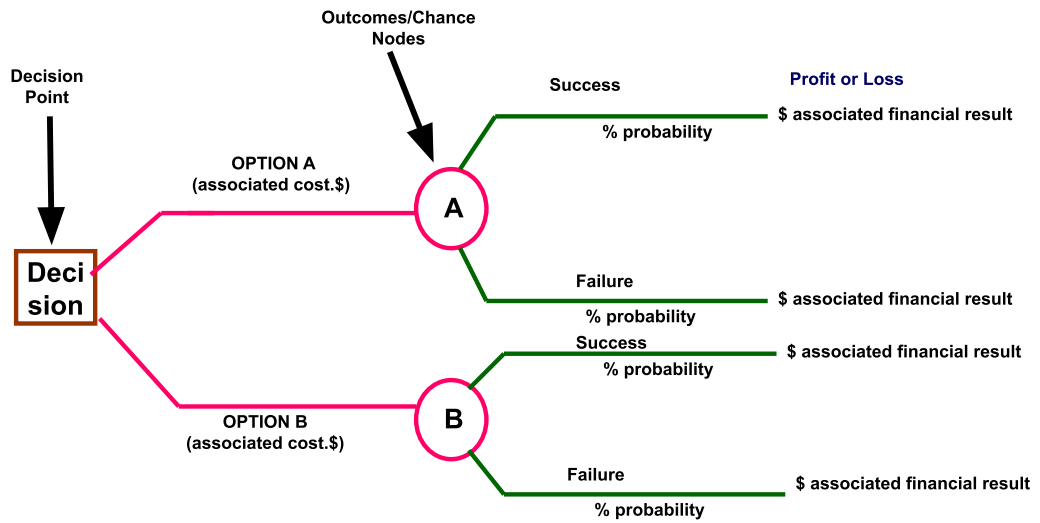
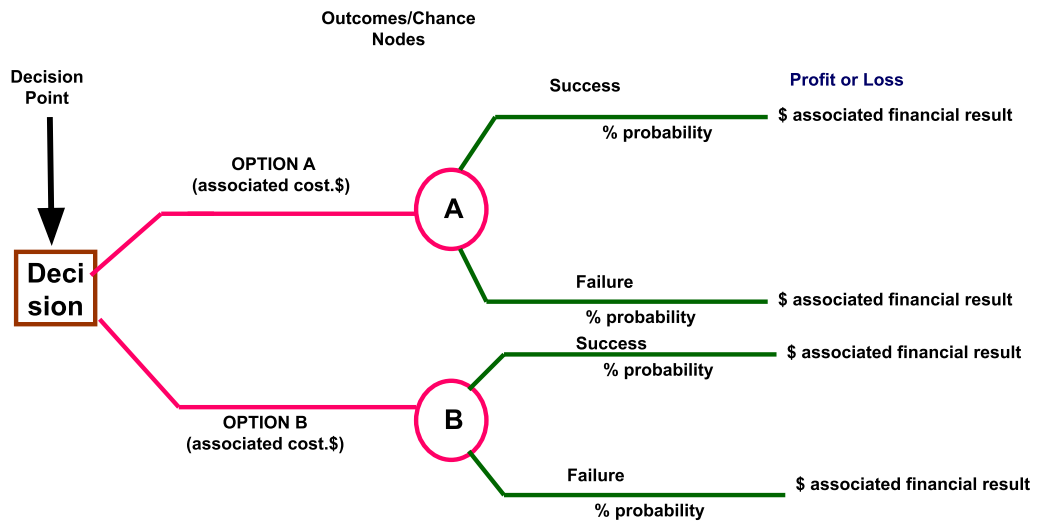


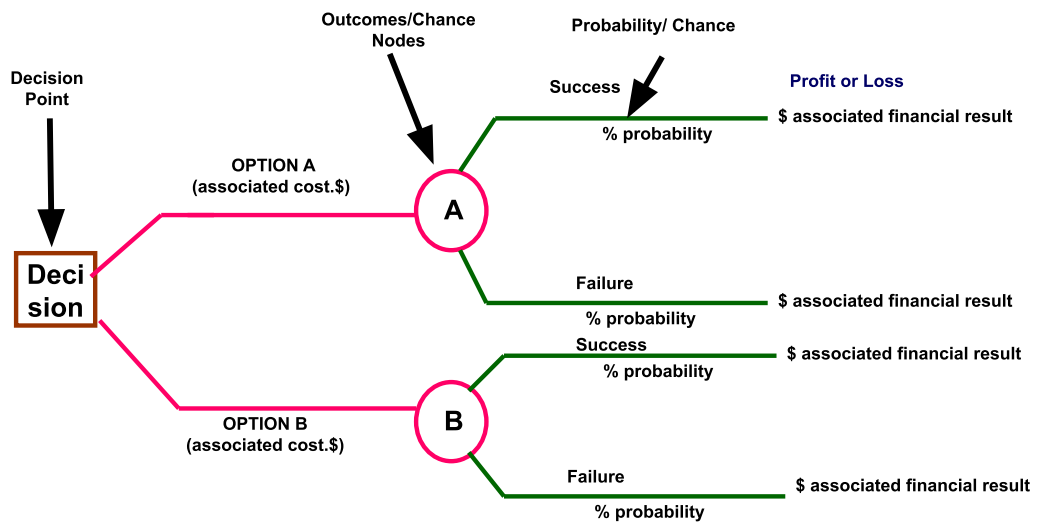
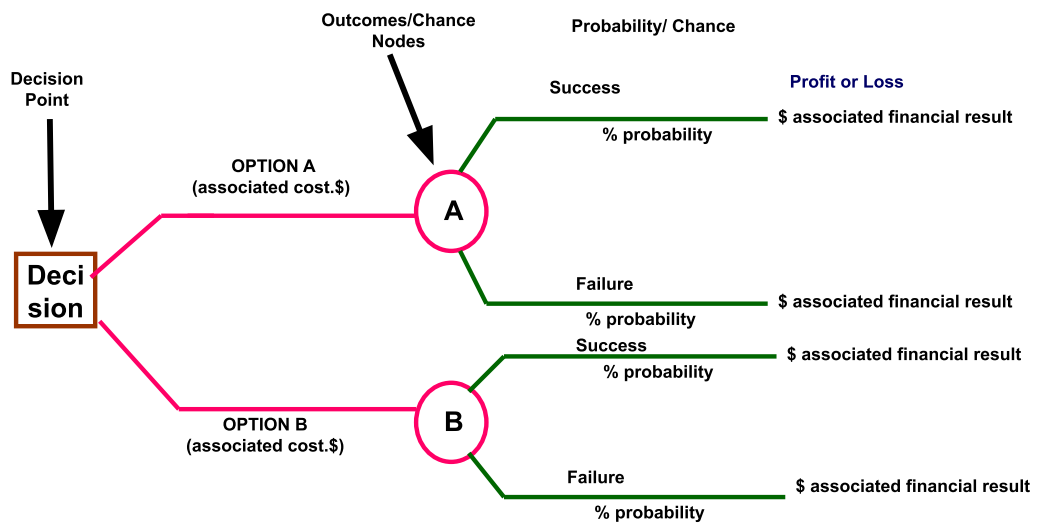


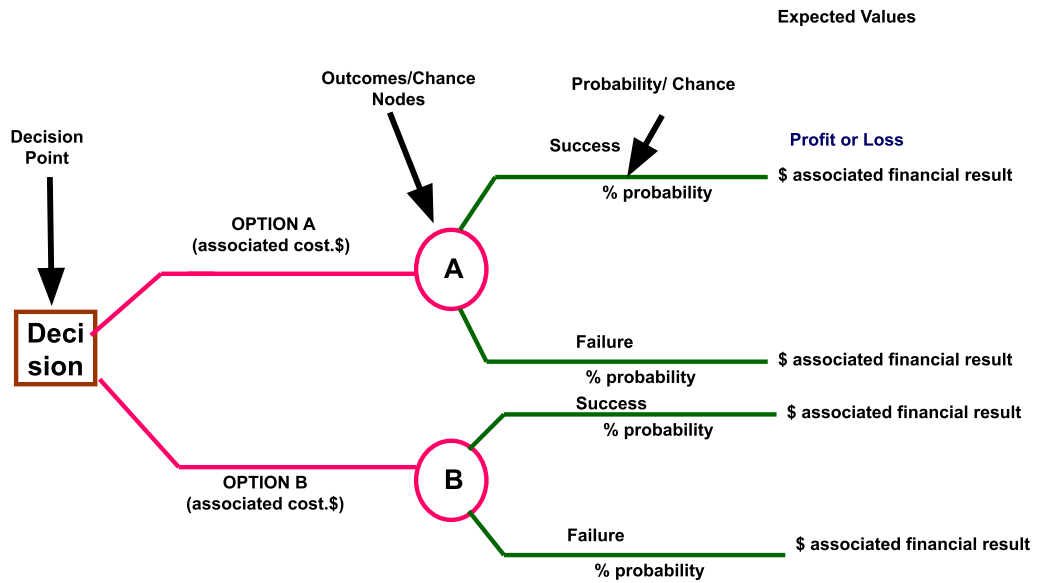




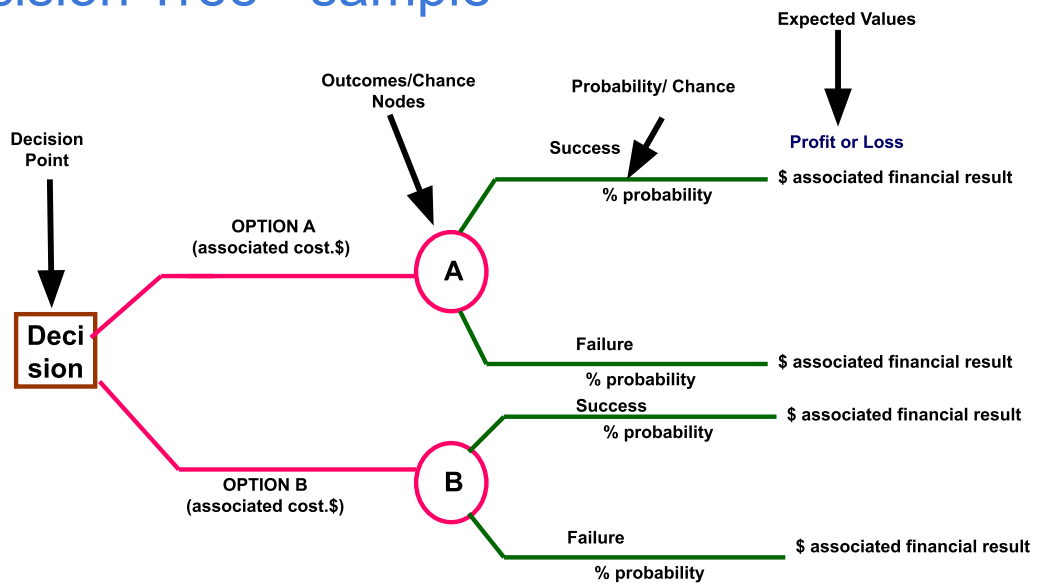




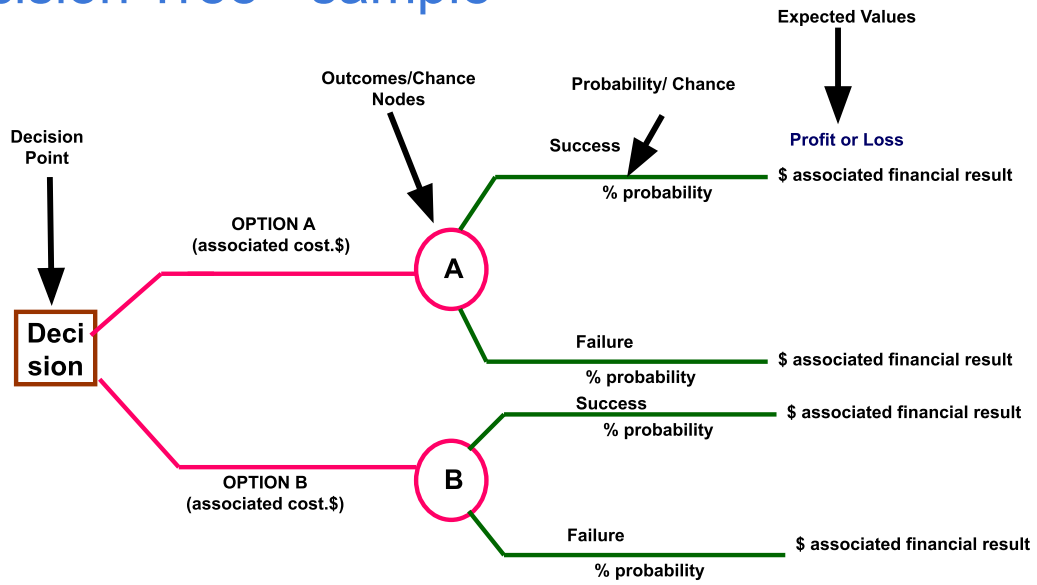




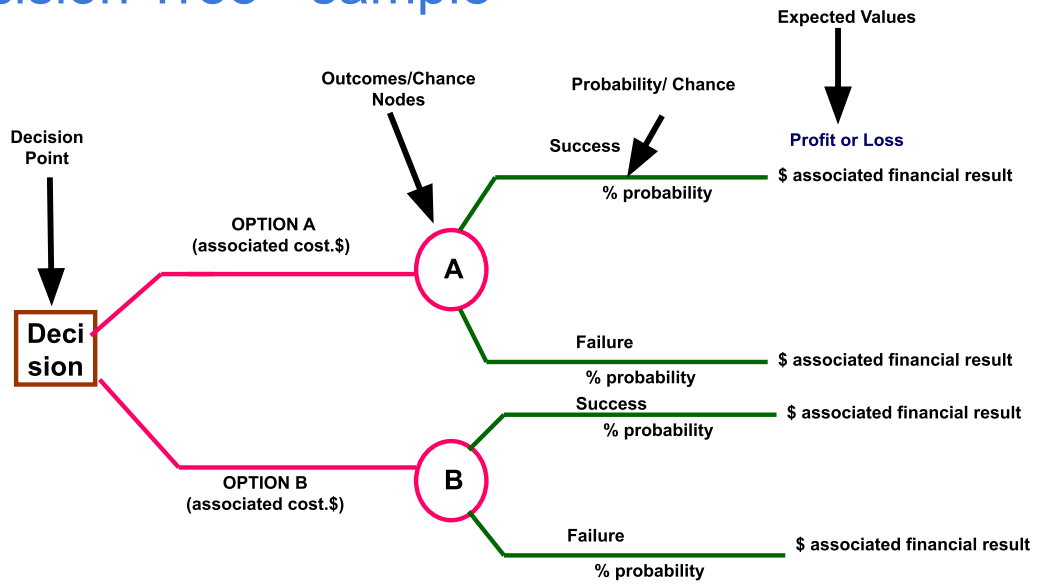
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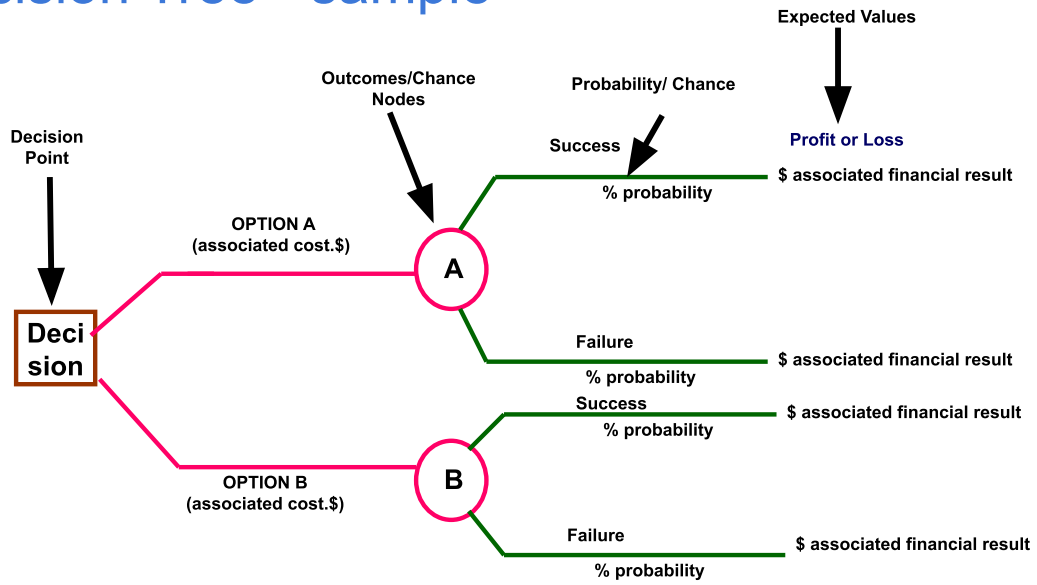
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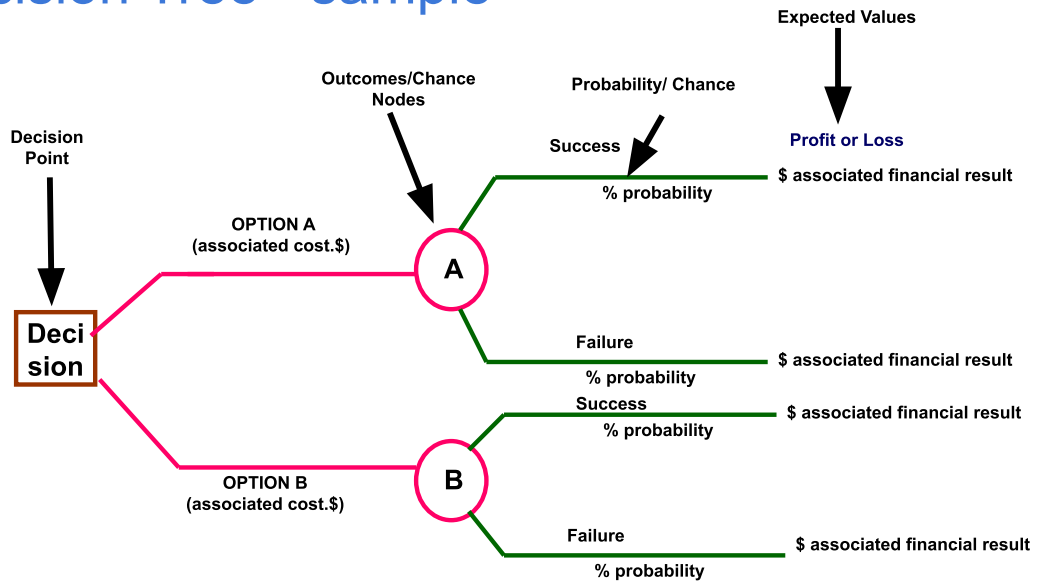
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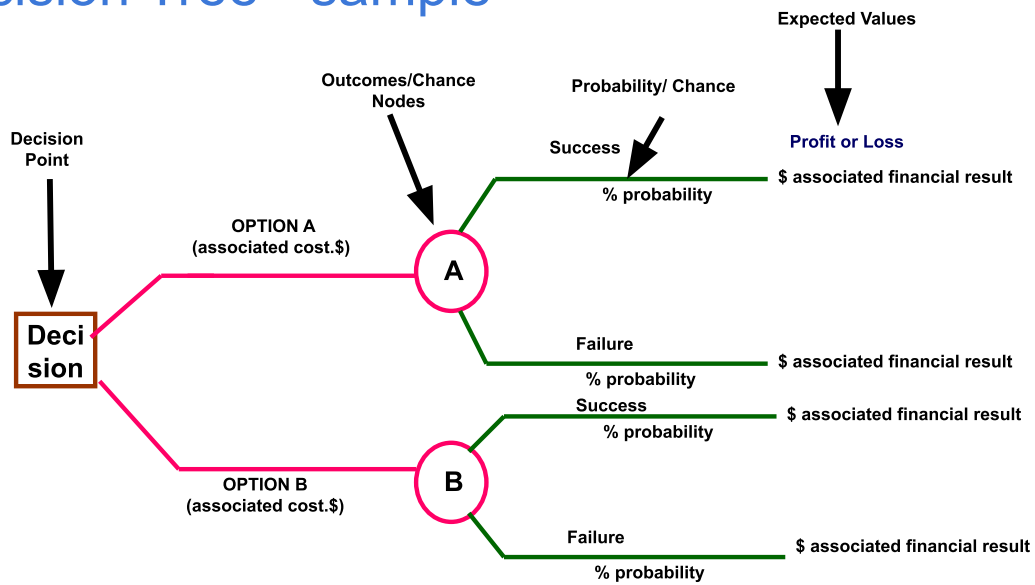
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6. Decision Tree - sample



6. Decision tree - example



AllFurniture Ltd. is a big company selling furniture globally. The company is considering either to retain an existing advertising campaign or begin a new one based on the following data:

Options	Cost (in mil.\$)	Probability	Economic outcome (in mil.\$)
Launch new campaign	0.4	Success 20%	15
		Failure 80%	-2
Retain old campaign	0.5	Success 40%	7
		Failure 60%	-1

Which Option is best based on a decision tree?

6. Decision Tree - example

EXAMPLE

6. Decision Tree - example

EXAMPLE

6. Decision Tree - example

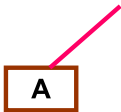
EXAMPLE

A

6. Decision Tree - example

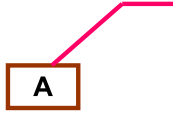
EXAMPLE

A



6. Decision Tree - example

EXAMPLE



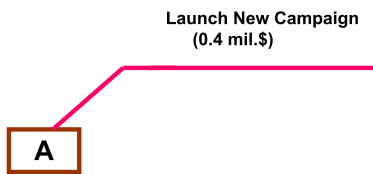
6. Decision Tree - example

EXAMPLE



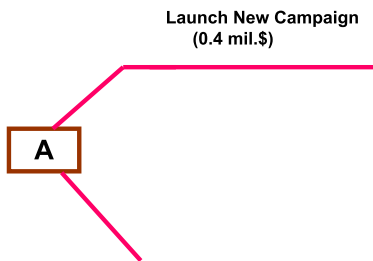
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EXAMPLE



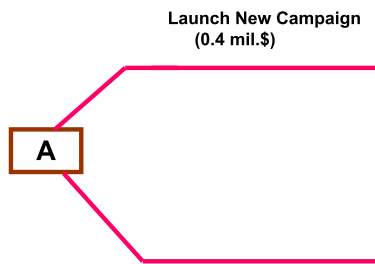
6. Decision Tree - example

EXAMPLE



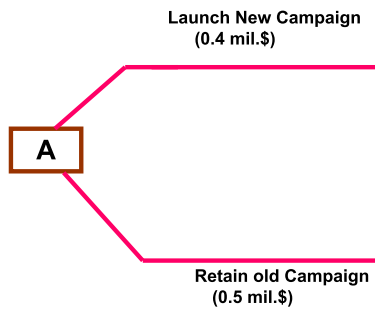
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EXAMPLE



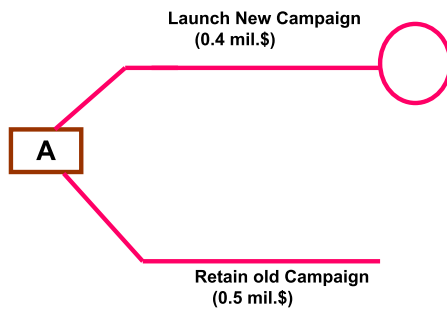
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EXAMPLE



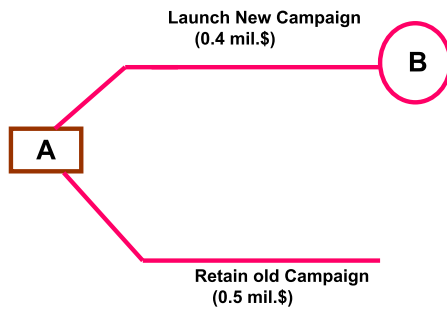
EXAMPLE

6. Decision Tree - example



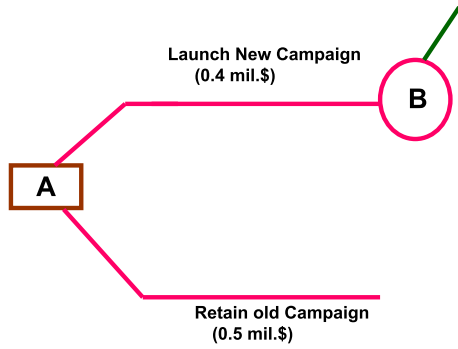
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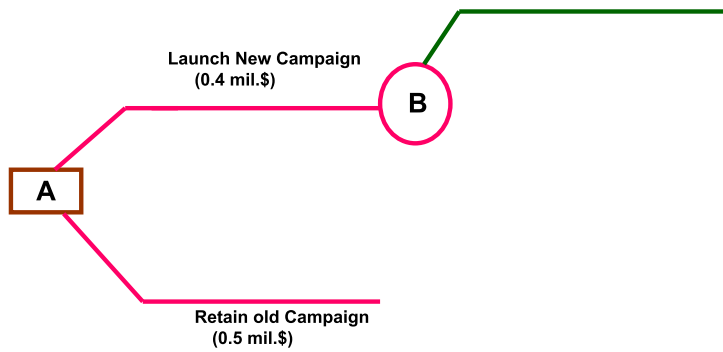
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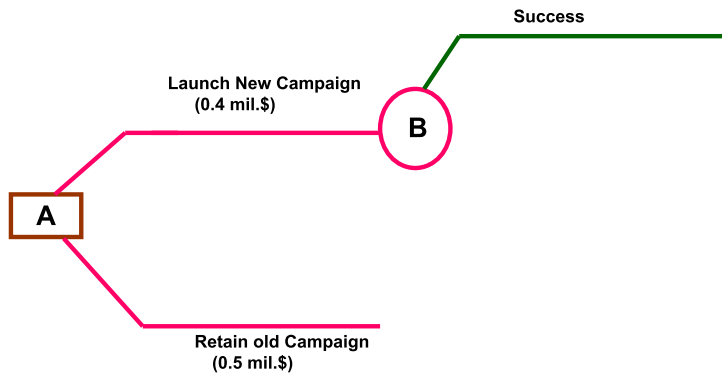
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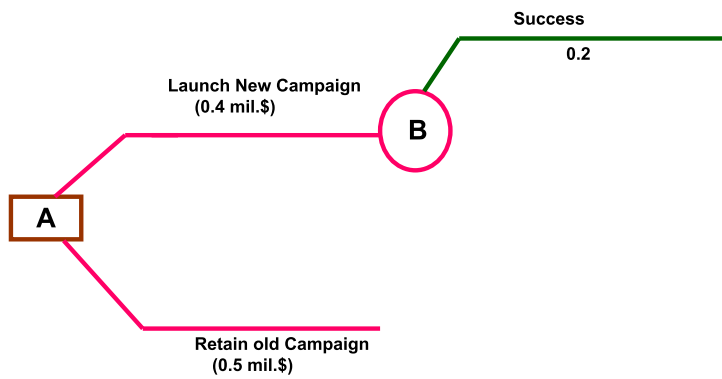
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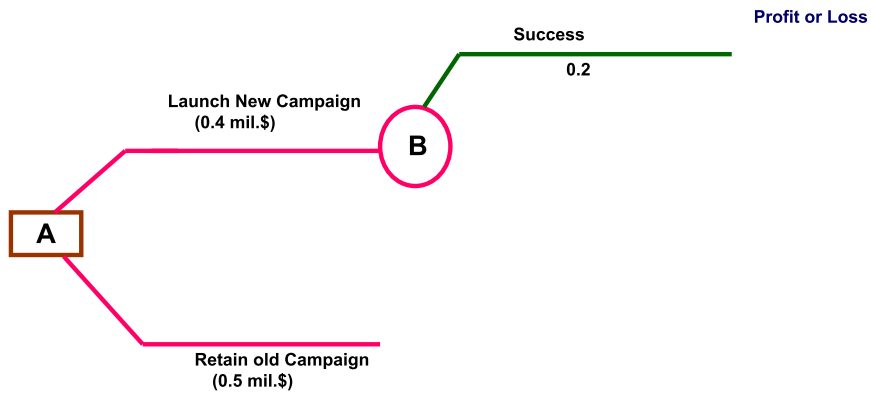
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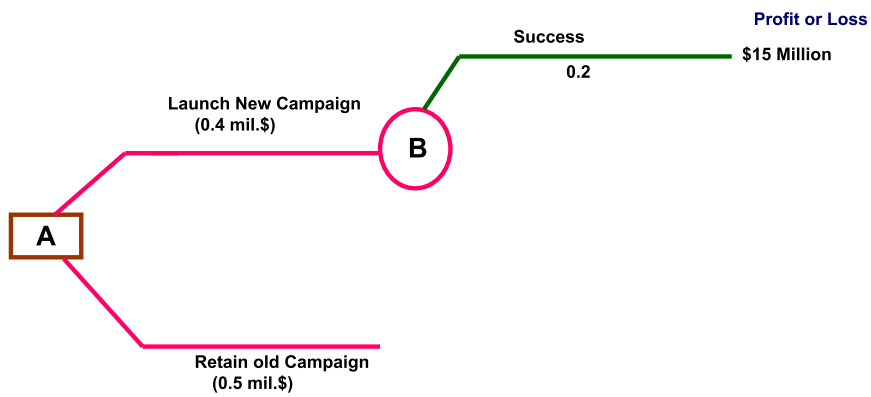
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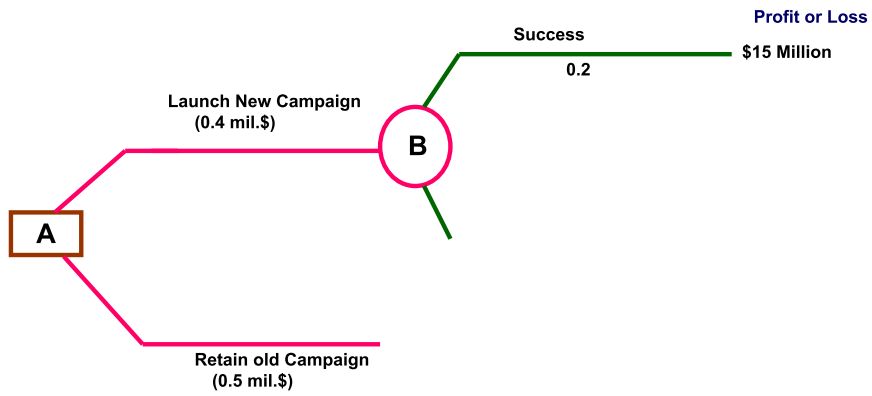
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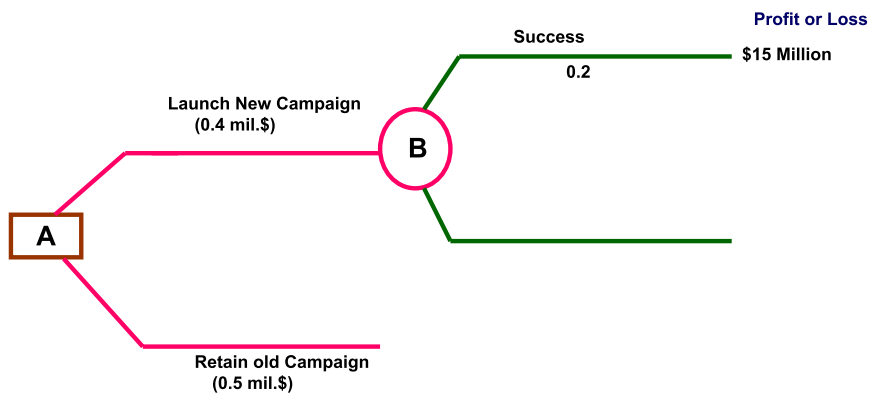
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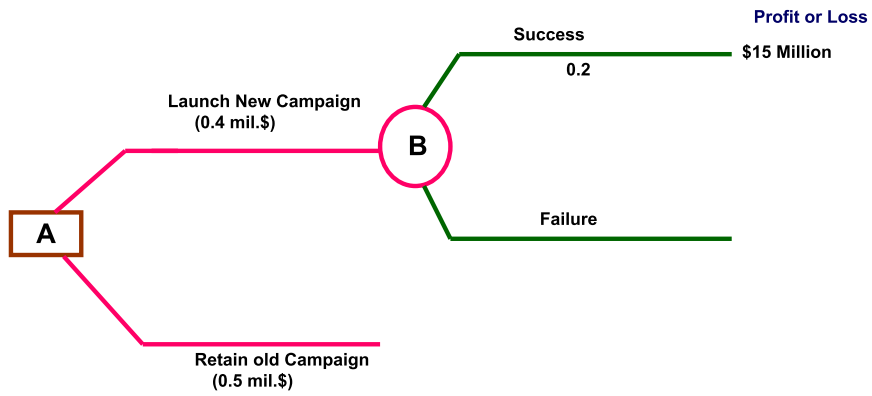
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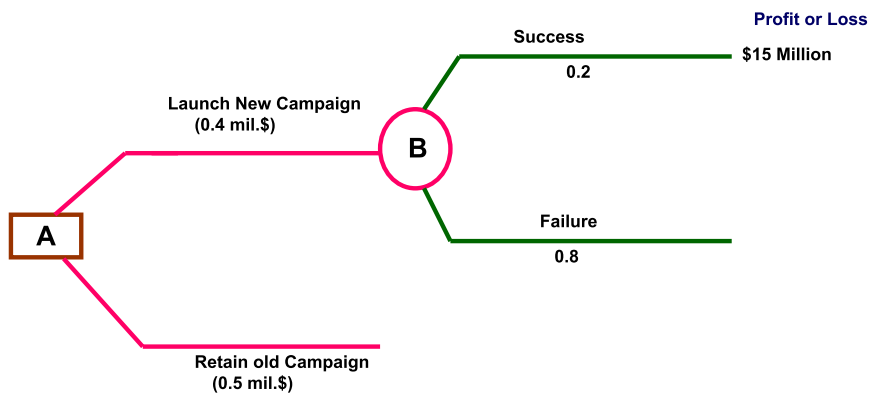
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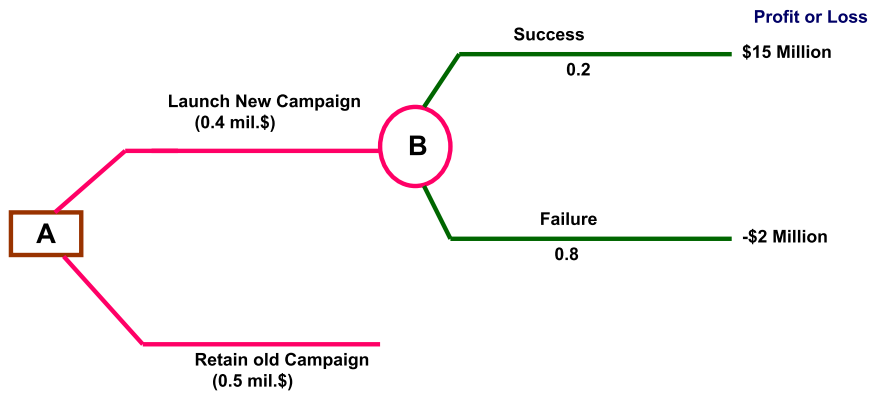
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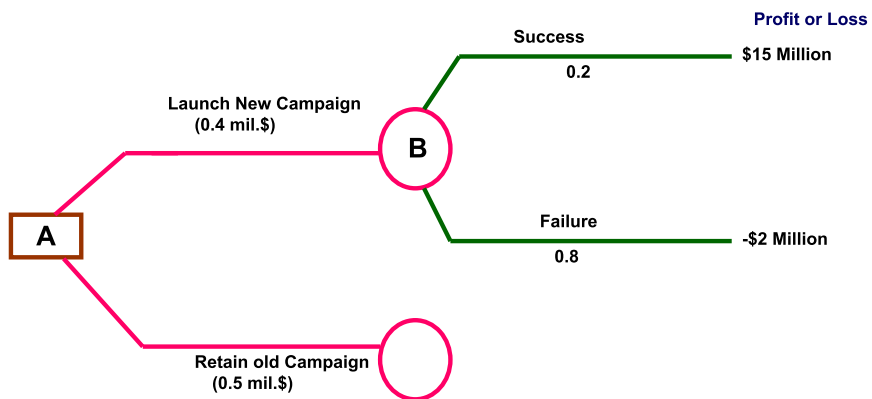
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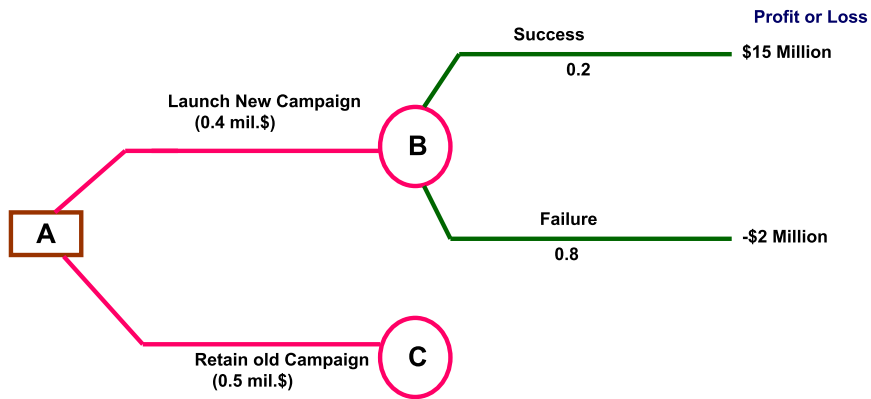
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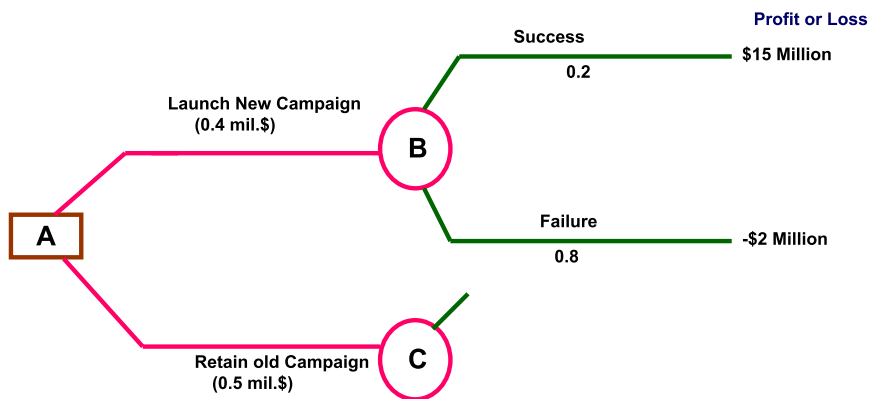
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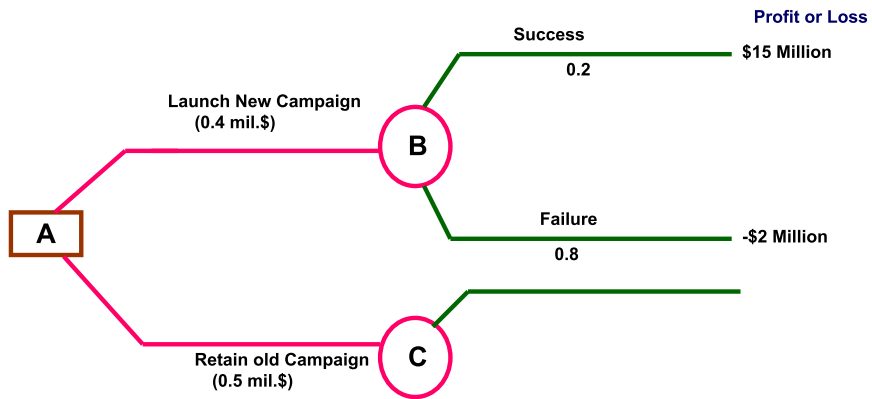
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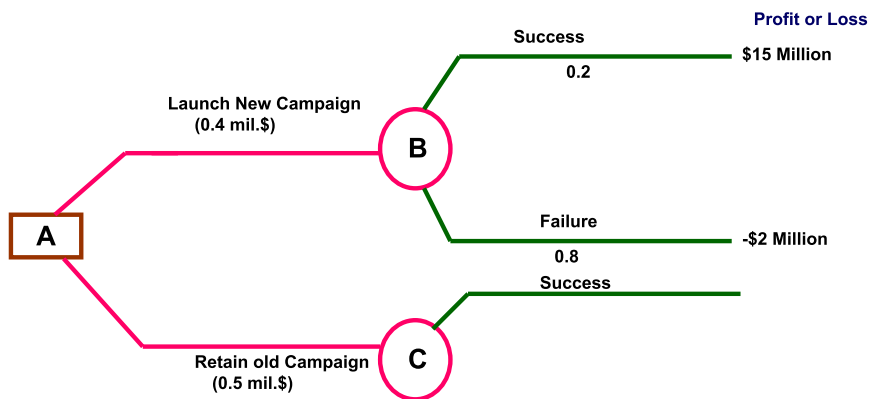
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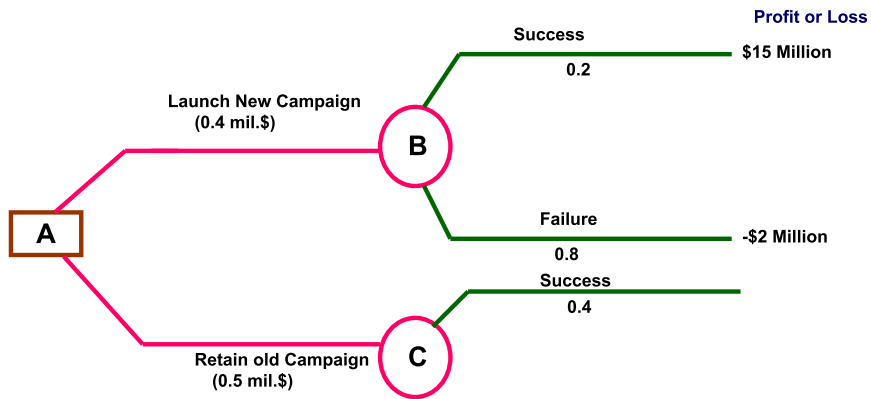
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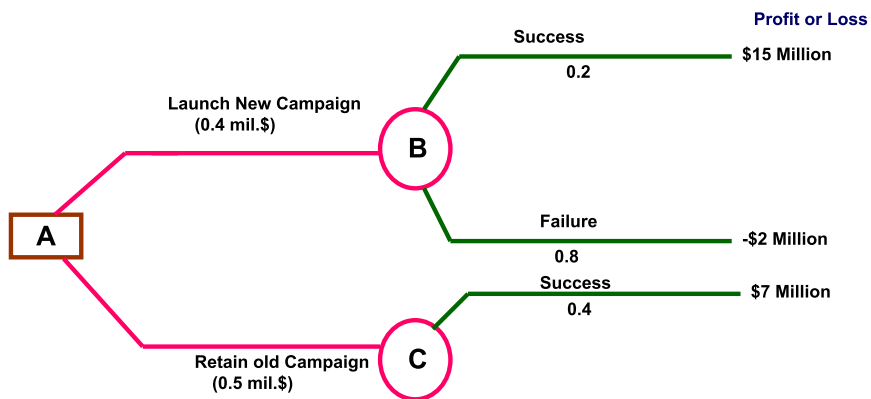
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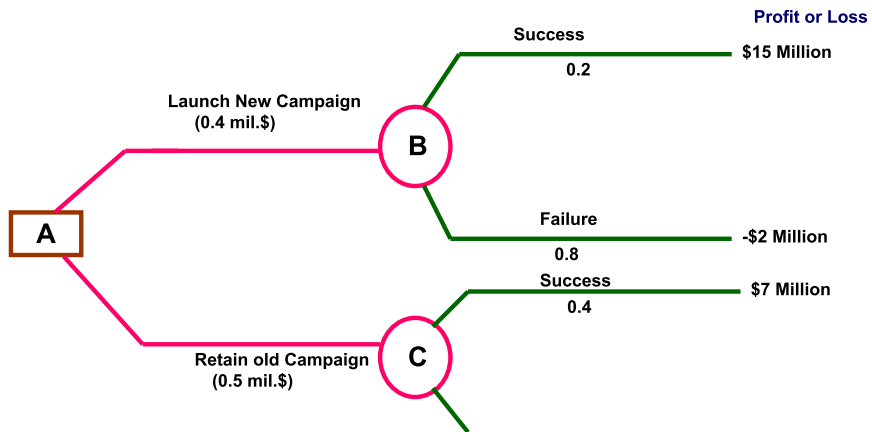
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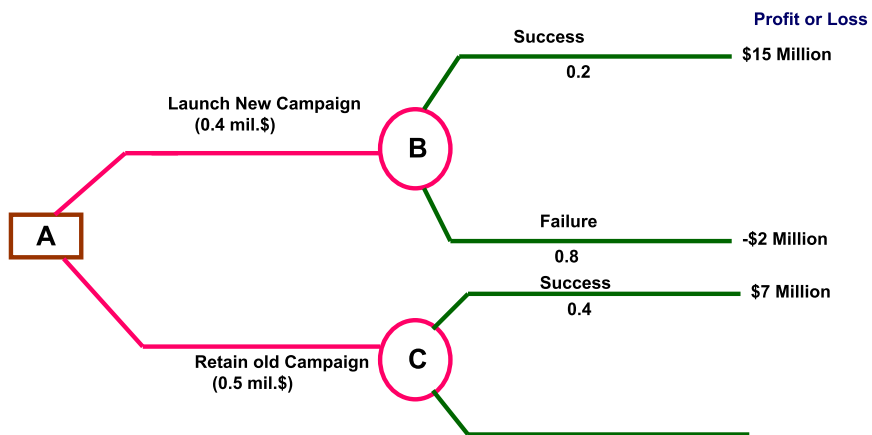
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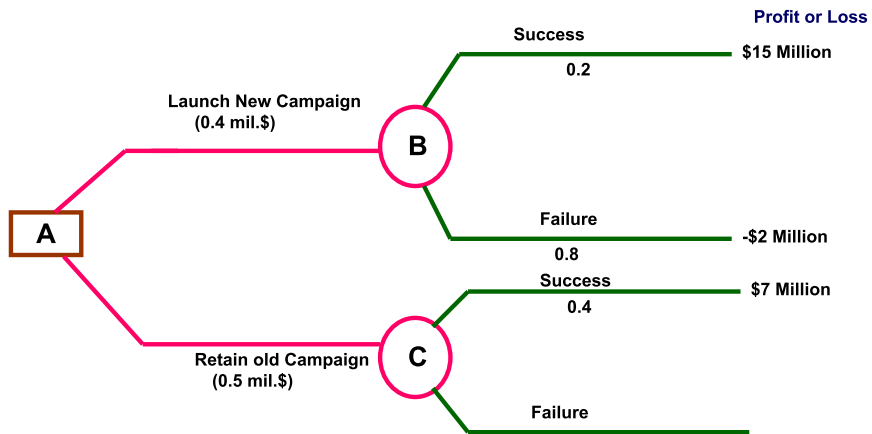
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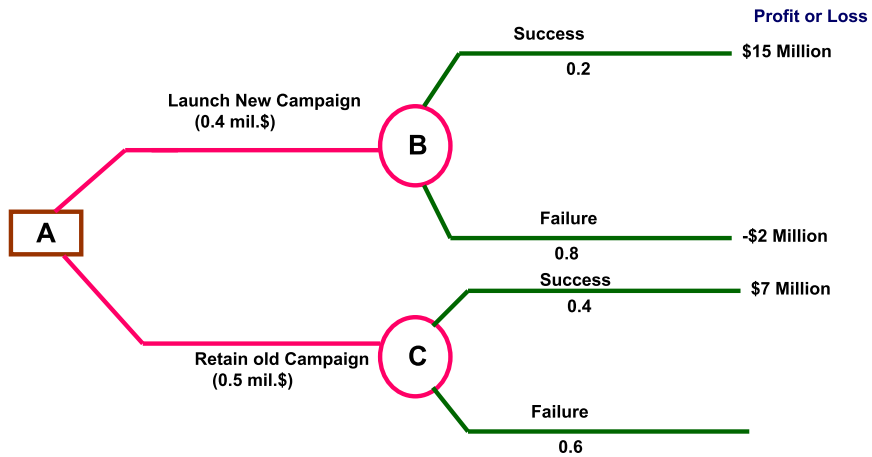
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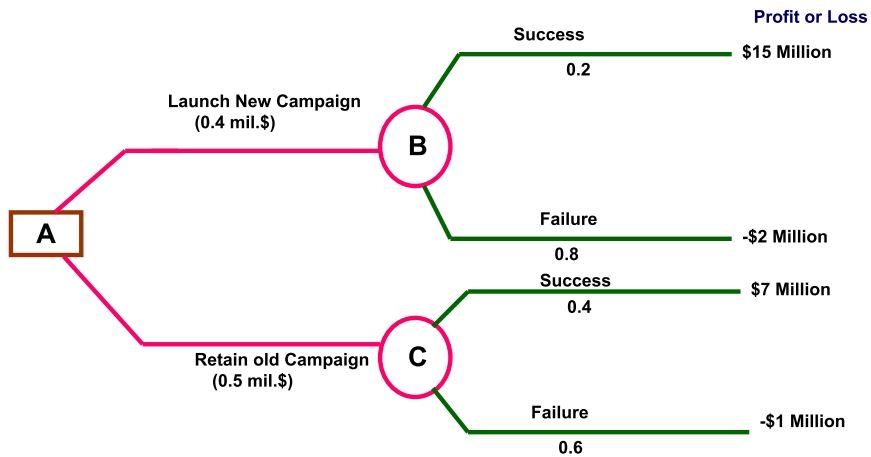
EXAMPLE

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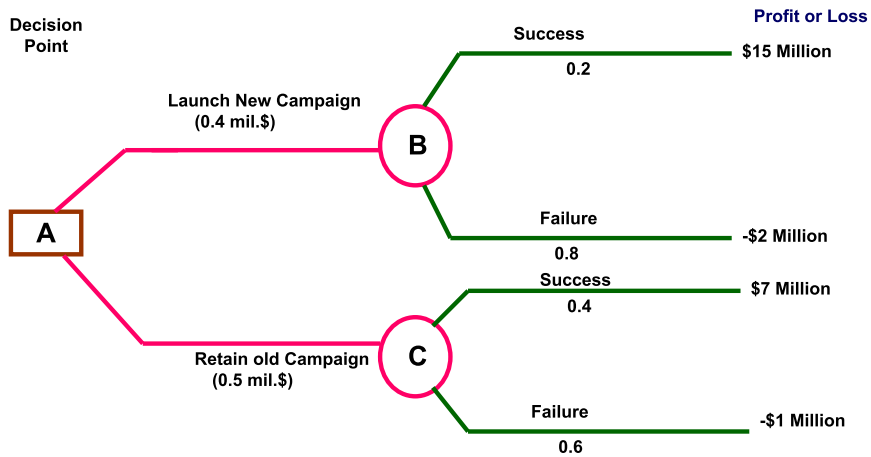
EXAMPLE

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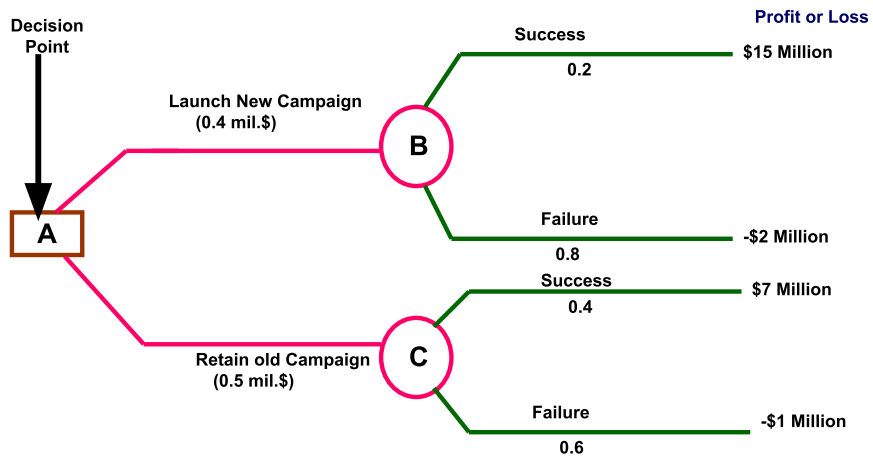
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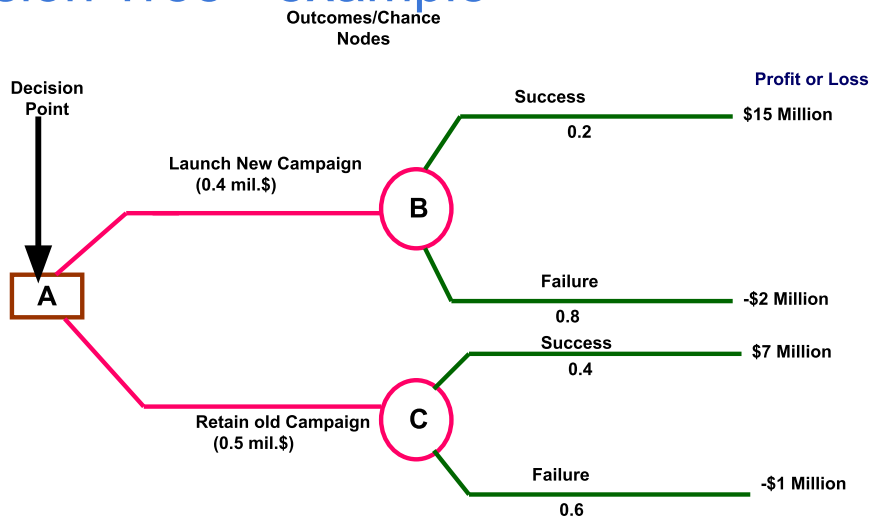
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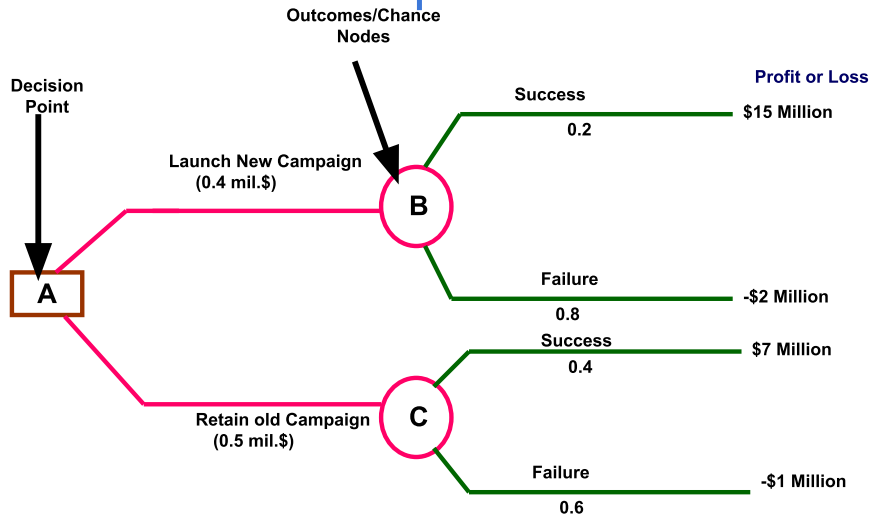
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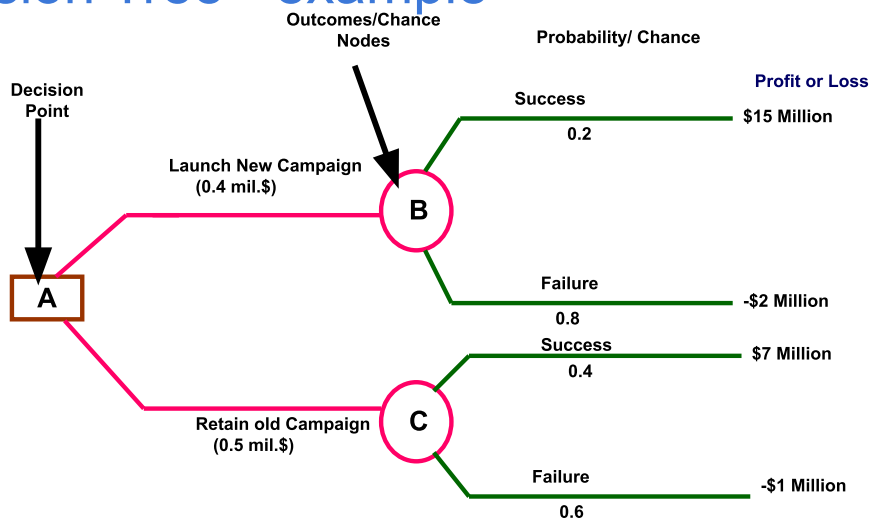
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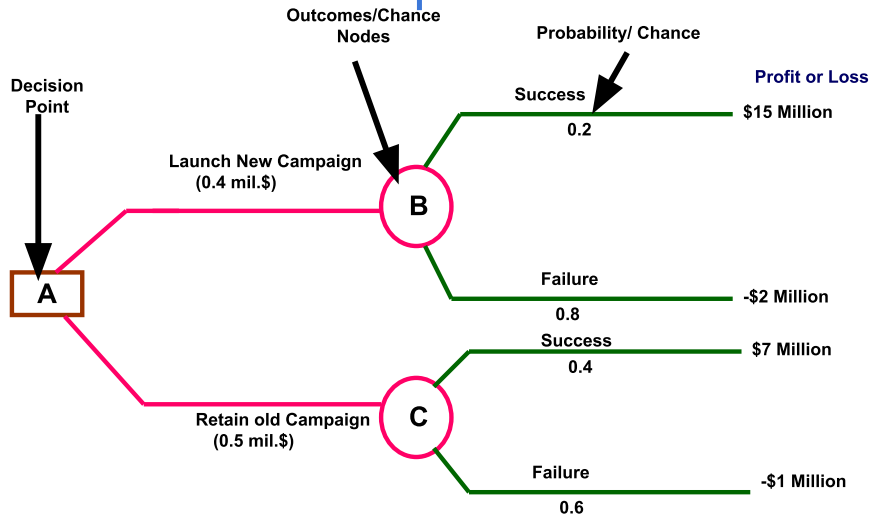
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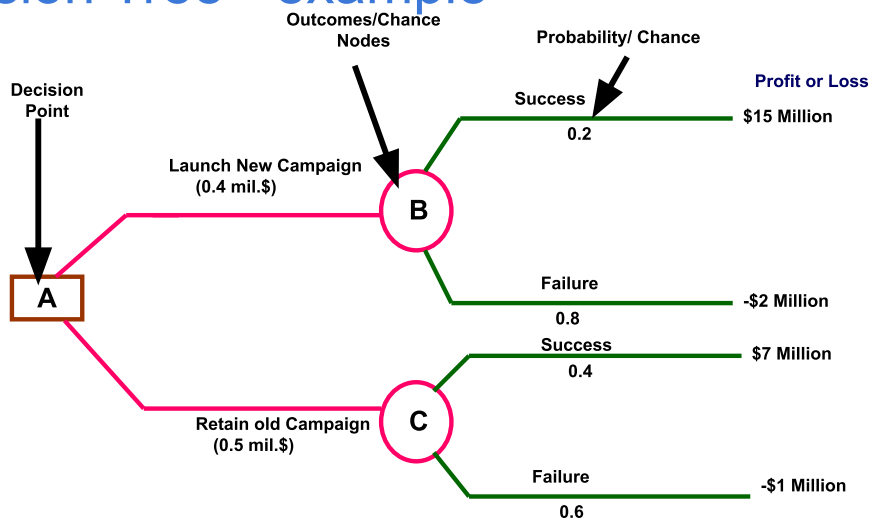
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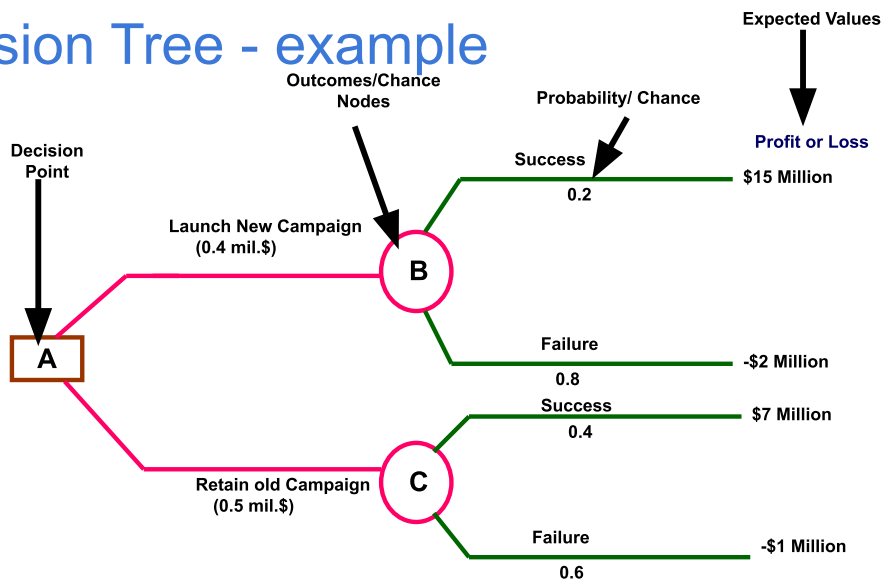


EXAMPLE

6. Decision Tree - example



6. Decision Tree - example



EXAMPLE

6. Example - Calculating the Expected Value

Tip! Calculations start from right to left!

Expected Value = (Probability of an event occurring X Expected Results) - Cost

1. Calculating the expected Value of the new campaign

$$\begin{aligned} \text{Expected Value} &= 0.2 \times \$15\text{m} + 0.8 \times (-\$2\text{m}) - \$0.4\text{m} \\ &\text{(Probability) (Expected Profit) + (Probability) (Expected Profit) - (Cost)} \\ &= \$3\text{m} - \$1.6\text{m} - \$0.4\text{m} \\ &= \$1\text{m} \end{aligned}$$



2. Calculating the expected Value of retaining current campaign

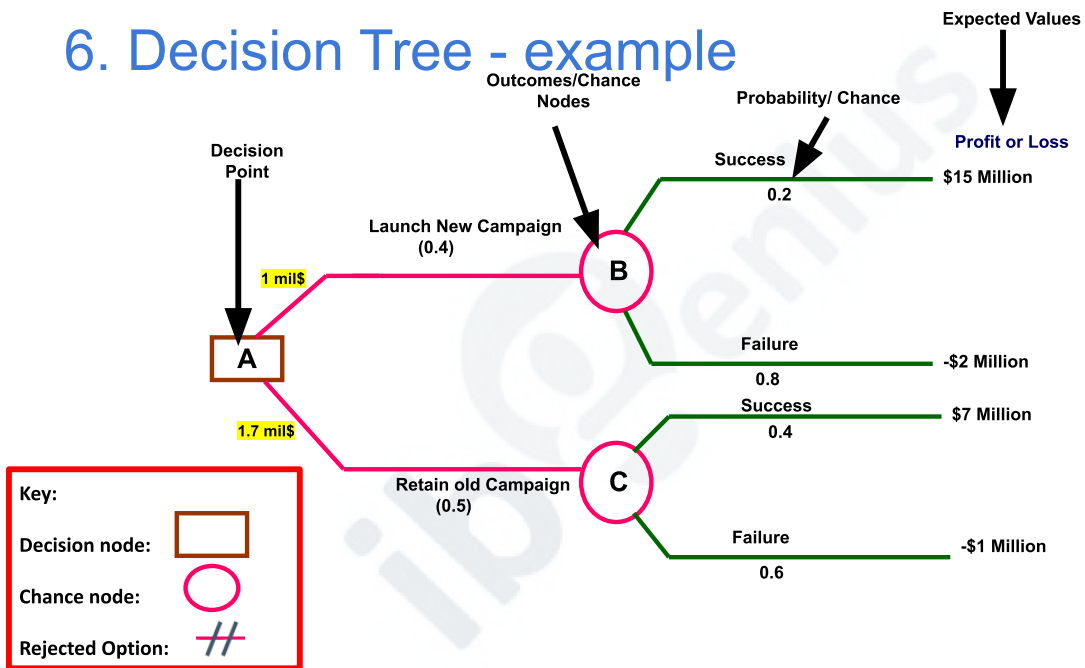
$$\begin{aligned} \text{Expected Value} &= 0.4 \times \$7\text{m} + 0.6 \times (-\$1\text{m}) - \$0.5 \\ &= \$2.8\text{m} - \$0.6\text{m} - \$0.5\text{m} \\ &= \$1.7\text{m} \end{aligned}$$

Which of the 2 options is more profitable according to the decision tree?

Answer: The one with the highest expected value, Option 2 retain current campaign

EXAMPLE

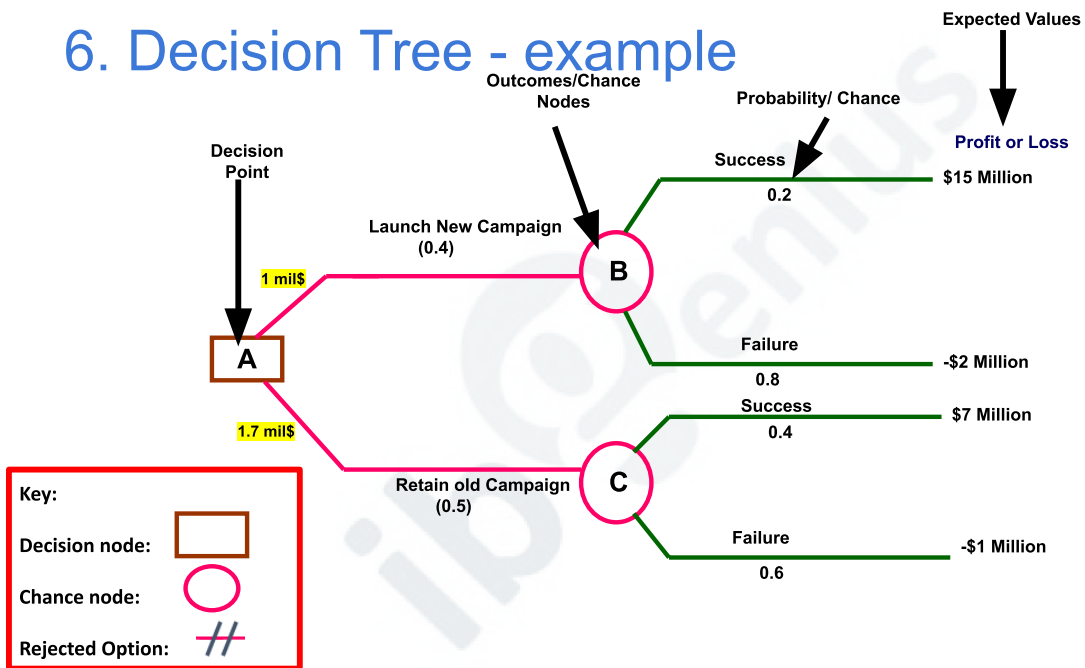
6. Decision Tree - example



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EXAMPLE

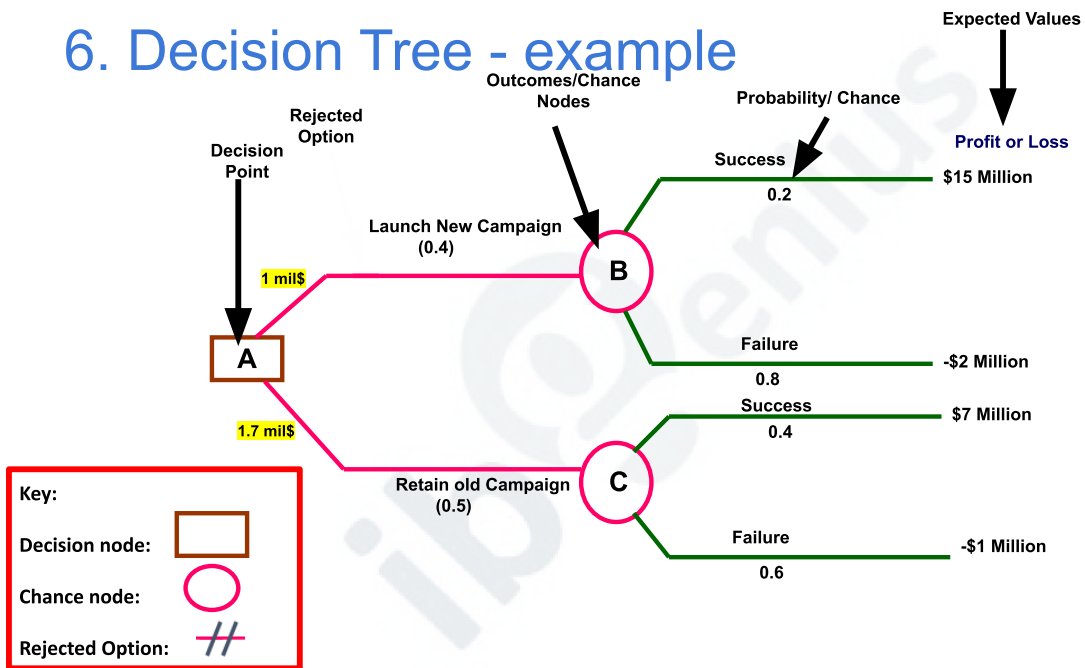
6. Decision Tree - example



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EXAMPLE

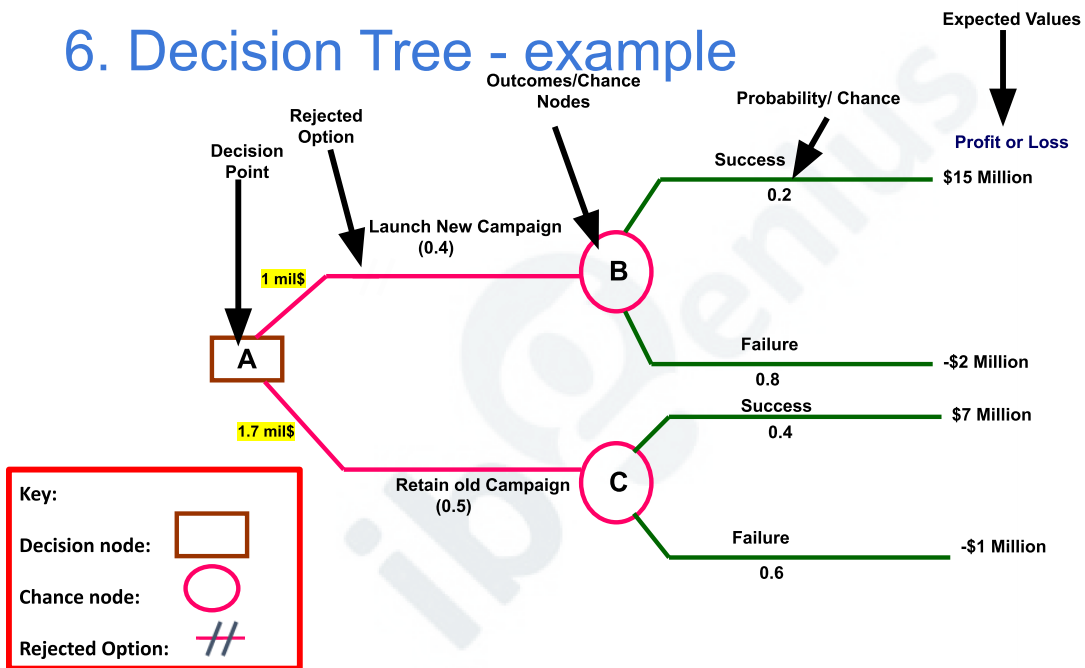
6. Decision Tree - example



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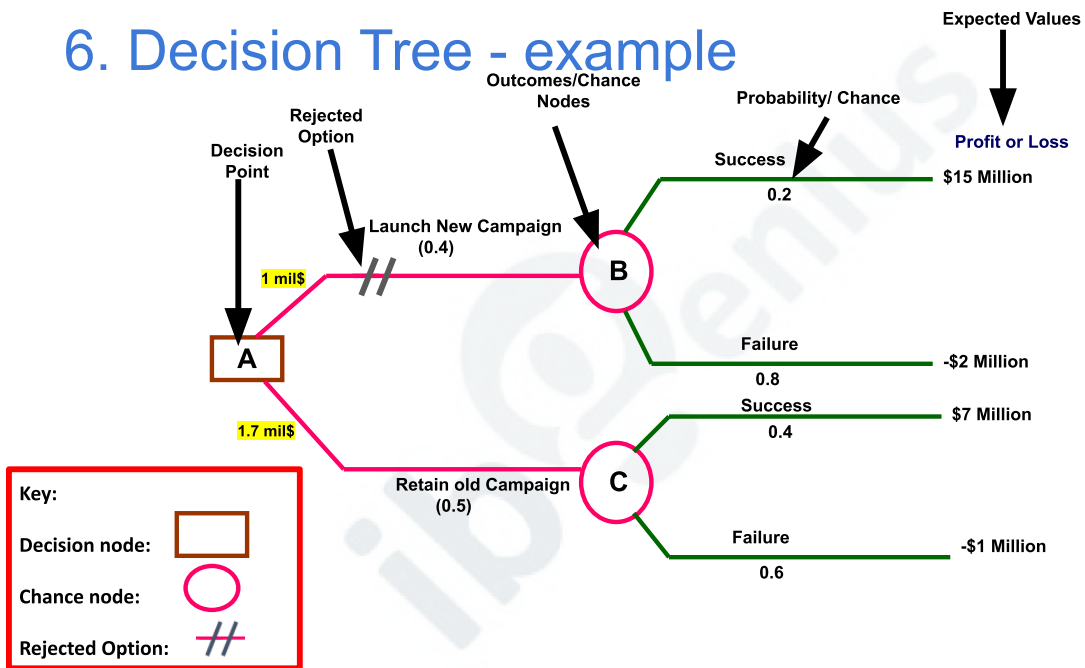
EXAMPLE

6. Decision Tree - example



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6. Decision Tree - example



6. Decision Tree

Advantages	Disadvantages
<ul style="list-style-type: none"> • Gives clear answer to a complex decision • Easy and flexible to use • Simple and visual representation 	<ul style="list-style-type: none"> • Data of outcome are only forecasts • External factors may change • Probabilities are only estimates based on past data but circumstances may change • Qualitative factors are not taken into consideration

Are you ready for the quizz?

- Do the quiz in the **ibGenius** platform
- You need **70%** to pass!
- Then you are ready to move on to the next **Business Management Tool!**



References

Books

Stimpson, Peter, and Alex Smith. *Business Management for the IB Diploma: Coursebook with Cambridge Elevate Enhanced Edition (2 Years)*. Cambridge University Press, 2018.

Hoang, Paul. *Business Management Study & Revision Guide: for the IB Diploma*. Hodder Education, 2016.

Muchena, Martin Mwenda, et al. *IB Business Management*. Oxford University Press, 2014.

Links

- <https://www.mindtools.com/dectree.html>
- https://www.mindtools.com/pages/article/newTED_06.htm

Images: [pexels.com](https://www.pexels.com)

