




Decision Tree

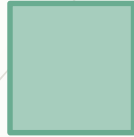
Chapter 49 BMT



Decision Tree

- Quantitative decision making tool
 - It represents different options that are available to a business in the decision making process, showing their possible outcomes of different strategic options
 - The manager makes the decision on the basis of net expected value of each decision. The option having higher net expected value will be the best option.
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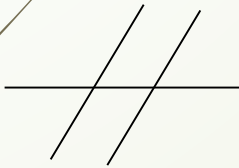
The elements of a decision tree (A Key)



decision node, i.e., a decision that needs to be made



probability node), i.e., the probable outcomes of different decisions



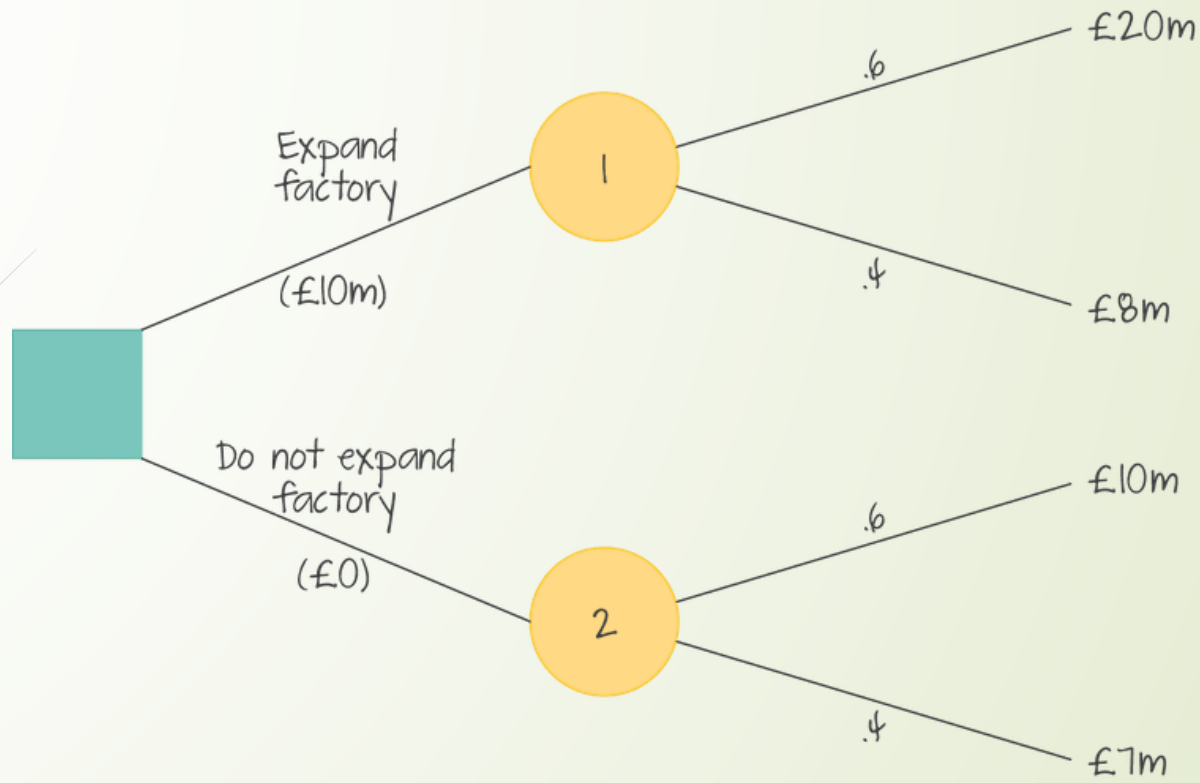
strike out lines) indicate the options that are rejected based on quantitative reasoning and logic.

Exam tip

When you draw a decision tree in an exam, you will be expected to provide a 'key' like this one, which explains the meaning of each of the shapes. A key is graded 1 mark. For a better representation of the diagram you should also number the probability nodes.

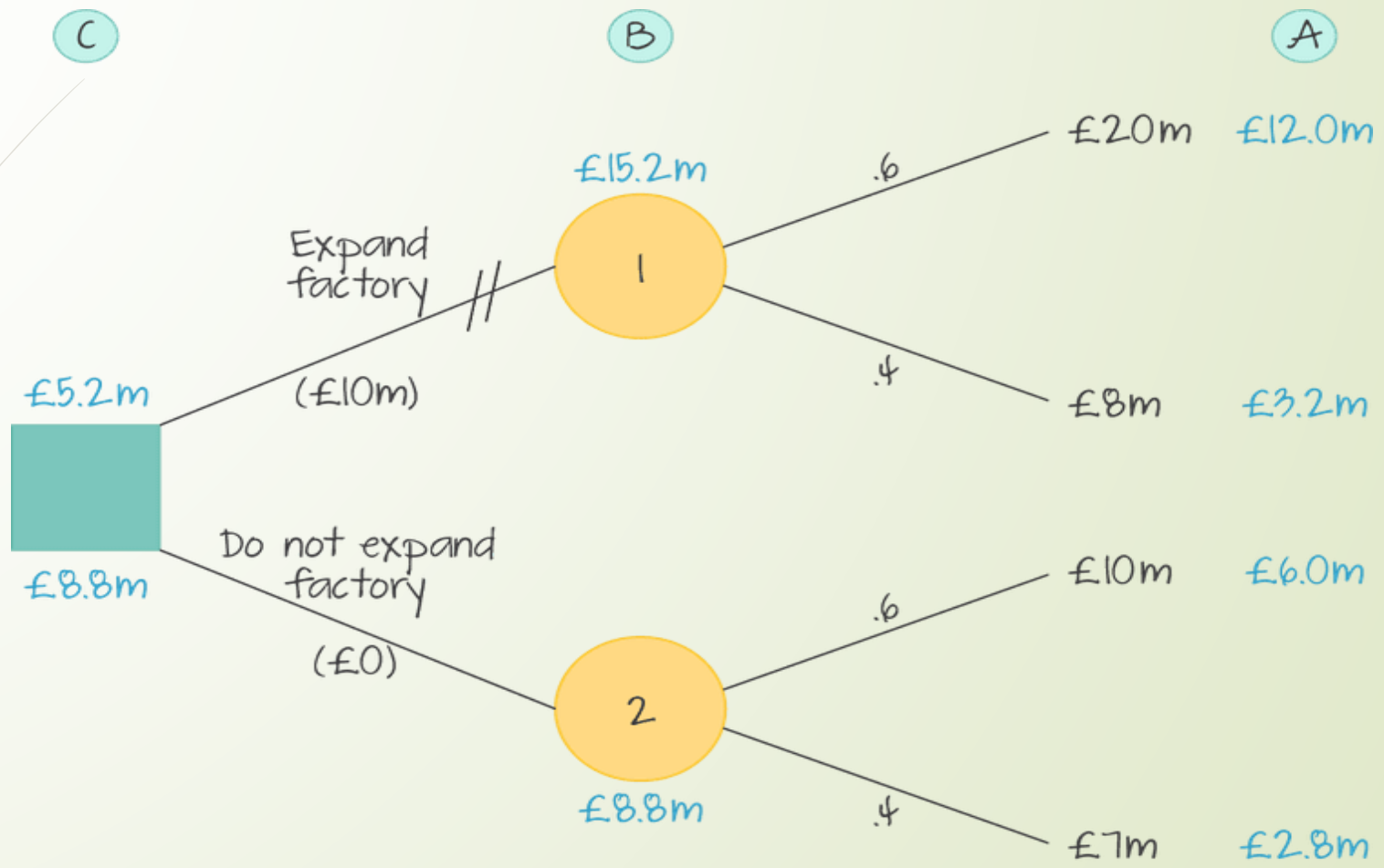
Class Practice: Imagine you run a business manufacturing machine components. Let's assume it would cost £10 million to enlarge your factory. The decision to be made is whether to expand the factory in England or not which further depends on the trade deal between EU and UK

Option	Trade deal (UK and EU)	Chance	Return (USD)	Cost (USD)
Expand the factory	Agree	60%	20m	10m
	Disagree	40%	8m	
Do not expand the factory	Agree	60%	10m	0m
	Disagree	40%	7m	



Exam tip

When drawing the tree it is best to start at the left and work to the right. When solving the tree, it is necessary to start at the right and work to the left.



Solving decision tree

- ❓ Calculate total estimated value(EV) for each option
- ❓ Calculate Net expected value for each option (**net expected value = expected value –cost**)
- ❓ Total EV to expand Factory= $(20 \times .6) + (8 \times .4) = \15.2 million
- ❓ Net expected value for expanding factory = $\$15.2 - 10 = \5.2 million
- ❓ Total EV for not expanding the factory= $(10 \times .6) + (7 \times .4) = \8.8 million
- ❓ Net expected value for not expanding factory = $\$8.8 - \$0 = \$8.8$ million

On pure financial grounds, the factory should not be built, since the expected value of this option is £8.8 million, while the expected value of profits (net of costs) if the plant is expanded is only £5.2 million

Evaluation of the Decision Tree ****

Advantages	Disadvantages
As a planning tool, decision trees offer managers a visual representation of different decisions and choices, with probable and quantifiable outcomes. This makes decision making more informed, objective, and logical	The probabilities given in the decision tree are only estimates subject to forecasting errors
All potential options can be seen at the same time, thereby speeding up decision making process	The task of assigning probabilities is an estimate so it can be biased opinion of the management
It helps managers to consider the various financial risks involved with different choices options, not just the potential financial rewards.	Due to estimates of probabilities, risk is always there.
Cost of the decision is also considered	It doesn't include uncertainty in the real business world.
It is a quantitative tool relying on people's opinion and or emotions	As a purely quantitative planning tool, decision trees ignore qualitative factors (non-financial information) that often affect decision making. For example, there is no consideration of the role of intuitive, emotion (staff morale) or ethical issues in the decision-making process