

## Decision Analysis

### Tutorial Problem 5

A building contractor is submitting an estimate to a potential customer for carrying out some construction work at the customer's premises.

The builder reckons that if he offers to carry out the work for £150,000 there is a 0.2 probability that the customer will agree to the price, a 0.5 probability that a price of £120,000 would eventually be agreed and a 0.3 probability that the customer will simply refuse the offer and give the work to another builder.

If the builder offers to carry out the work for £100,000 he reckons that there is a 0.3 probability that the customer will accept the price, a 0.6 probability that the customer will bargain so that a price of £80,000 will eventually be agreed and a 0.1 probability that the customer will refuse the offer and take the work elsewhere.

(a) Determine which price the builder should quote in order to maximize the expected payment he receives from the customer.

Suppose that after some questioning, the builder is able to make the following statements:

*"I am indifferent between receiving £45,000 for certain or entering a lottery that will give me a 0.5 probability of £150,000 and a 0.5 probability of winning £0."*

*"I am indifferent between receiving £80,000 for certain or entering a lottery that will give me a 0.5 probability of £150,000 and a 0.5 probability of winning £45,000."*

*"I am indifferent between receiving £20,000 for certain or entering a lottery that will give me a 0.5 probability of £45,000 and a 0.5 probability of winning £0."*

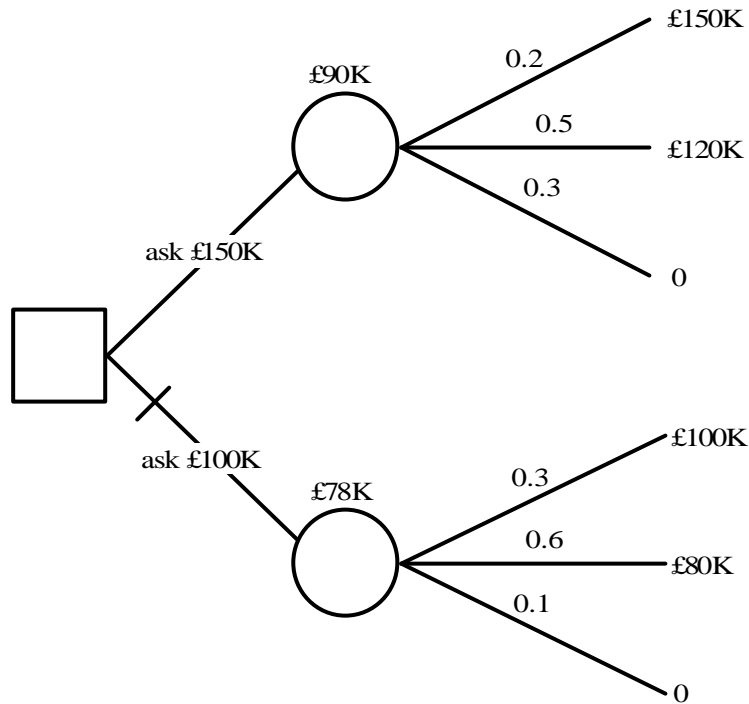
(b) Sketch the builder's utility function and comment on what it shows.

(c) In the light of the above statements which price should the builder now quote to the customer?

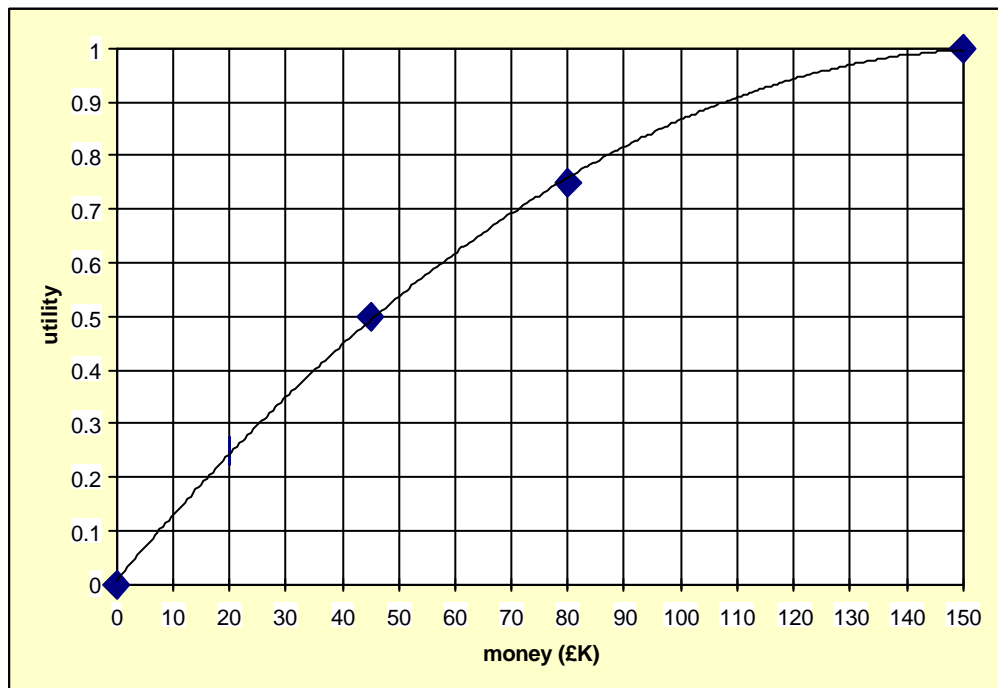
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## Solution to Tutorial Problem 5

(a) According to the decision tree, the EMV of asking £150K is £90K, whilst the EMV of asking £100K is £78K. So, asking £150K is has the higher EMV.

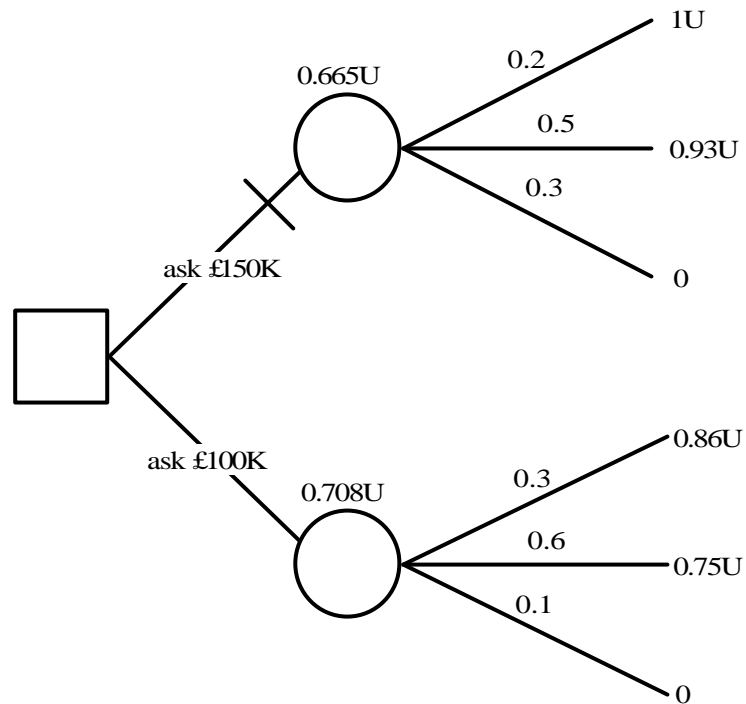


(b) The builder's utility curve looks like:



It seems that the builder is risk averse over the whole range of relevant payments.

(c) The decision tree with utility values rather than monetary values is:



The expected utility value of asking £150K is 0.665U, whilst the expected utility value of asking £100K is 0.708U. So now, asking £100K seems the better option for the builder, bearing in mind his risk aversion.