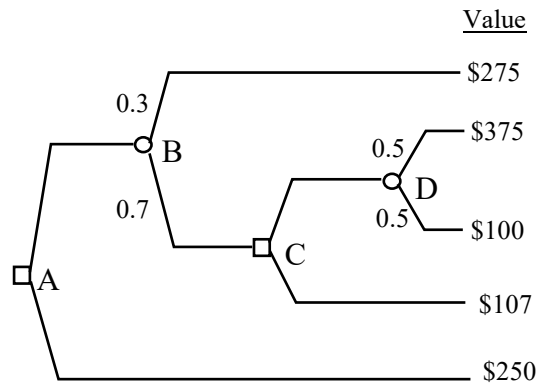


TIE4203 Decision Analysis in Industrial & Operations Management

Tutorial #7

Question 1 (P6.7)

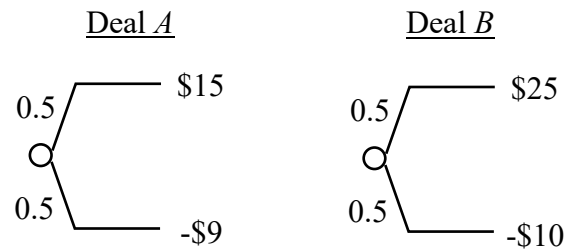
Consider decision A (below) where the dollar values are winnings and the probabilities are the assessments of the deal's owner.



- (a) Suppose Rex, whose utility function for dollars is $u(x) = 1 - e^{-\frac{x}{5000}}$ owns decision A .
- i. What would be his certainty equivalent for decision A ?
 - ii. What is the most Rex should pay for clairvoyance on D before making decision A ?
 - iii. What is the most Rex should pay for clairvoyance on D before making decision C but after making decision A ?
 - iv. What is the most Rex should pay for clairvoyance on B before making decision A ?
- (b) Paulina's utility function for dollars of total wealth is $u(x) = \frac{x^2}{10,000}$. Her current wealth is \$1,000. Suppose she owned decision A .
- i. What would be her certainty equivalent for decision A ?
 - ii. Should she pay \$15 for clairvoyance on D before making decision A ?

Question 2 (P6.8)

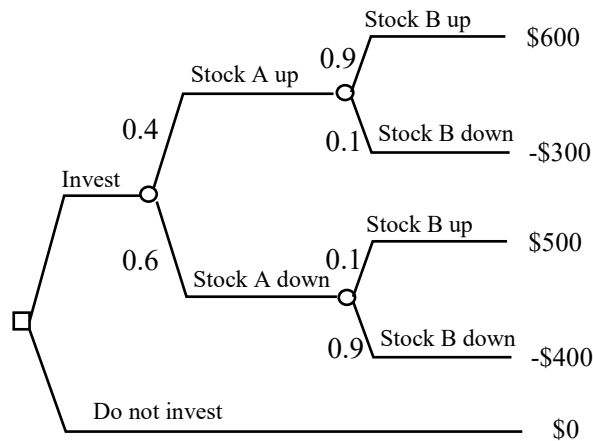
Les is considering giving away deals A and B .



- (a) Stan is risk neutral and has only \$20 in total wealth.
- Suppose Les offers Deal A . What is Stan's certainty equivalent for Deal A ? Should he accept Deal A ?
 - Suppose that Les offers Stan Deal B instead. What is Stan's certainty equivalent for Deal B ? Should he accept Deal B ?
 - Now suppose that Les offers Stan both Deal A and Deal B as a bundle. What is Stan's certainty equivalent for possessing both deals?
- (b) Burke has the utility function $u(x) = \ln x$, where x is *total wealth*. Burke also has an initial total wealth of \$20 when he meets Les. Answer questions (i), (ii), and (iii) above for Burke.
- (c) How does the sum of Stan's certainty equivalents for Deals A and B compare to his certainty equivalent for the bundle? How about Burke? Explain.

Question 3 (P6.9)

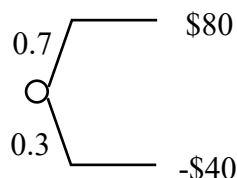
Kay faces the decision problem as shown below. Her utility function is $u(x) = 2 - 9^{\frac{-x}{1000}}$.



- What is the utility value for each alternative (Invest versus Not Invest)?
- What is the expected value of the dollar measures for each alternative?
- What is Kay's best decision in this circumstance? What is her certainty equivalent for the deal?
- Which of the first two answers, (a) or (b), did you use to answer part (c)? Why? What is wrong with using the other one?
- Should Kay pay \$10 for clairvoyance on the performance of Stock A?
- Should Kay pay \$10 for clairvoyance on the performance of Stock B?
- Find Kay's value of clairvoyance on both the performance of Stocks A and B together.

Question 4 (P6.10)

Daniel's utility function is $u(x) = \begin{cases} x + 10, & x \geq 0 \\ 6x + 10, & x < 0 \end{cases}$, where x is the total asset in dollars. He owns \$20 and the following deal:



Mad Dog has the utility curve $u(x) = 2^{\frac{x}{50}}$ and he currently has \$75.

- What is Daniel's certainty equivalent for the deal?
- How much money can you make by buying Daniel's deal and selling it to Mad Dog?