IE5203 Decision Analysis
Assignment #1
Due: Tuesday, 16 Sep 2025, 7 pm

You may use computing tools or software for your computations, but you must show your workings. All decision trees can be drawn by hand.
Submit your solutions at the drop box outside the ISEM Department Office at
E1A-06-25 or to the professor at the end of lectures.

Question (Total 50 marks)

DA Company has to decide if it should develop a new product to be launched, preferably in 6 months. DA can invest $1 million, $2 million, or nothing now. If it invests $1 million now, the probability of successfully launching the product in 6 months is 0.6. On the other hand, if it invests $2 million now, the probability is 0.8.

If the product is not launched in 6 months, DA will have to decide if it should continue with the project by investing another $2 million to ensure that the product will be launched in 3 more months, or it can also decide to terminate the project.

DA has a competitor TCK, who is also working on a similar product for the same market. DA believes that TCK is equally likely to launch its product in either 6 or 9 months. DA will know in 6 months whether TCK has launched its product or not at that time.

If the two companies launch their products at the same time, DA will earn $10 million. If DA launches the product in 6 months and TCK in 9 months, DA will earn $4 million. If DA launches in 9 months and TCK in 6 months, DA will earn $1 million. **All these earnings do not include the development costs.**

Assume DA Company is *risk-neutral*. Ignore the time value of money in this problem.

(*a*)   Draw a decision tree representing DA Company's problem. Determine the company's optimal decision policy and certainty equivalent.   (10 marks)

(*b*)   Plot the risk profiles for the three initial decision alternatives (i.e., "Invest $1 million", "Invest $2 million", "Invest nothing") on a common graph.   (10 marls)

(*c*)   Is there any first-order or second-order stochastic dominance between the alternatives "Invest $1 million" and "Invest $2 million"? Explain your answers.   (5 marks)

(*d*)   What is the value of clairvoyance on whether TCK will launch its product in 6 months or not?
                                                                                       (10 marks)

(*e*)   An expert can predict when TCK will launch its product. If TCK launches the product in 6 months, the expert will predict it correctly with probability 0.75. On the other hand, if TCK launches its product in 9 months, the expert will predict it correctly with probability 0.9. How much is the expert's prediction worth to DA? If DA engaged the expert, what is its optimal decision policy?   (15 marks)