Homework 7 – Assigned: February 25, 2026, Due: Thursday, March 11, 2026

1. Lotteries – Selling vs Buying Gambles.

Draw the binary lottery defined by each of the following statements and determine the risk premium for each lottery. Explain whether the manager is *selling* the lottery (is the decision maker willing to give up or avoid "a lottery that he currently owns and must face?") or *buying* the lottery (is he willing to "obtain a lottery that he does not currently have to face"?) and *what* is sold or bought in each case (see Section 19.6 of [1]):

a. A manager is willing to invest no more than $4 million in a project which is equally likely to gross $10 million or nothing.

b. Another manager is willing to sell for no less than $1 million the plans to a new process which would make $3 million with probability of .7 and nothing with a probability of .3.

c. A third manager is willing to pay no more than $2 million to avoid a 75% chance of losing $5 million and a 25% chance of making $1 million.

2. Utility Assessment

For this problem you will use the two procedures (CE and LEP) described in Chapter 19 of [1].

Use the program ASSESS (on Canvas in "Files > CEE631_Files > 06-Software > ASSESS" and on CAEN) to assess and plot your own personal utility curve for money (i.e., for positive increases to your current wealth) in the range from X_*=$0 (u=0) to X^*=$10,000 (u=1).

For both methods sketch by hand on your answer sheet the simple lottery for CE (or lotteries for LEP) for the corresponding final indifference statement that gives you each point (x, u(x)). The top of p.78 in "4_Decision_Analysis.pdf" shows example sketches using the CE method. For the LEP method your sketch will have lotteries on both sides of the indifference statement.

For each method assess a total of 5 points (X_*, X^*, and 3 more as indicated) and use ASSESS to draw a smooth, fully labeled utility curve.

a. First follow the Certain Equivalent (CE) method which is described starting on page 379 of [1]. Use the flip of a coin (p=0.5) to represent the probabilities for all lotteries.
b. Repeat the assessment (from the beginning) using the Lottery Equivalent/Probability (LEP) which is described starting on page 382 of [1]. Define utilities for X_i = $0, $2500, $5000, $7500, $10000.
c. Compare the two utility curves that you have assessed for yourself.

IMPORTANT: To install and use ASSESS and to avoid losing your work (after you have assessed a utility curve in ASSESS), read the instructions in the file:

- "How to use ASSESS to encode a utility curve.PDF"

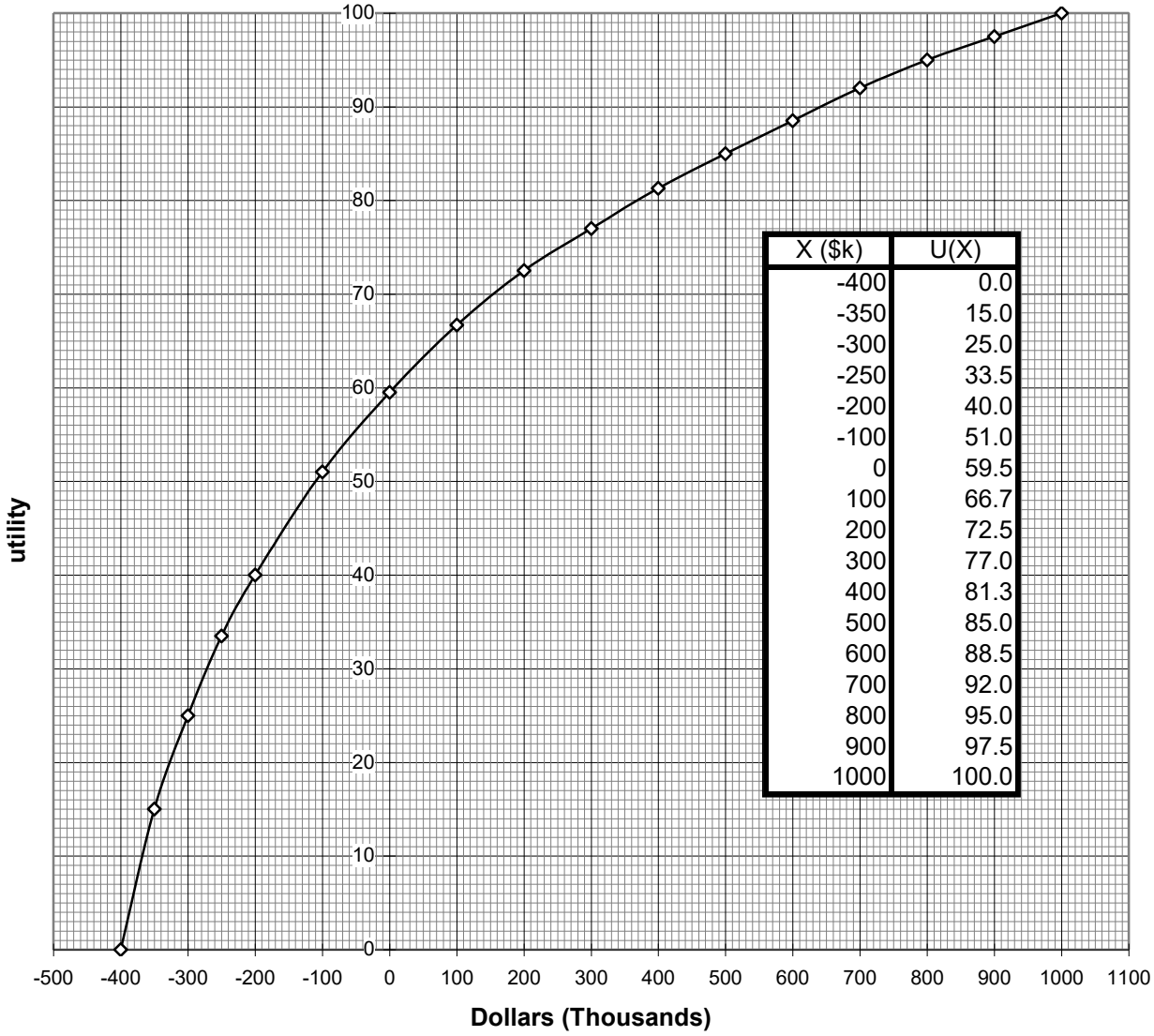
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[1] "Applied Systems Analysis" by R. deNeufville.
Available on Canvas here:
"Files" > "CEE631_Files" > "04-Readings_in_Decision_Analysis" > "08_DeNeuf_Ch19.pdf".

3. Decision Problem using Utility Curve.

3.1 Copy your final decision tree for Problem 15 (from Homework 3 or from Homework 6) whose end-nodes show net present values in dollars. Use the utility curve below to find the utility of the net present value at each end-node and write it to the right of the corresponding dollar amount on the tree. Calculate and write on the tree the expected utility values. What is the best decision policy? How does it compare to the best decision policy when using EMV?

3.2 Use DPL to solve Problem 15 again using the utility curve below.
Follow the instructions for using utility in DPL that are provided in the file "ReadUtil.txt" on Canvas.
"Files" > "CEE631_Files" > "03-Examples_Tutorials" > "03-Prefab_Plant" > "DPL" > "Ver_4" > "ReadUtil.txt"
Download the example DPL model "Plant_EU.da" from Canvas.
In DPL 9 Pro, open your DPL model file for Problem 15 (from Homework 6).
In "Home" > "Add to WS", select "Imported Program". Choose "Plant_EU.da" and then "Program – PLANT – Utility Curve". Rename the "Program – PLANT – Utility Curve" and link it to your model (see "ReadUtil.txt").
Substitute the utility table in the provided DPL program with the utility table shown below.
Follow the instructions in "ReadUtil.txt" to develop two solutions for Problem 15:
(a) A DPL tree that shows Expected Utility Values at each node. This should be identical to the tree for 3.1.
(b) A DPL tree that shows Certain Equivalents at each node. How does this tree relate to the tree in (a)?



X ($k)	U(X)
-400	0.0
-350	15.0
-300	25.0
-250	33.5
-200	40.0
-100	51.0
0	59.5
100	66.7
200	72.5
300	77.0
400	81.3
500	85.0
600	88.5
700	92.0
800	95.0
900	97.5
1000	100.0