Part I (due at the beginning of class Wednesday, November 19, 2025)

Read through these questions and think about how you would answer whichever (hopefully nonempty) subset of them you can. You do not need to turn anything in for Part I this time, but you may want to print out the questions and jot down any thoughts you have on any of them to help you remember those thoughts.

Questions People Have Asked That We Haven't Gotten to Discuss Yet

- Why does truncation always show a saddle point? Does it?
- Need to go between trees and matrices
- (From Spring 2023; worth discussing) Is it possible to tell from a game tree or from a matrix where there is sequential decision making if it would be more beneficial to have your move first or your move second? For example, in Figure 7.3 Colin is benefited because he goes first and can force Rose into a certain move but in Game 7.1, Rose is benefited because she goes second and gets to see what Colin has done before she makes a move.
- It seems like this order of preferences holds for any game, regardless of the presence of a saddle point. Is there a case in which we would not order preferences?
- I don't like the fact that consistency is required for cardinal utilities. We say with the beast that people like security over the lottery. Is there any math adjustment for this?
- Why does this [utility theory] matter/what is it used for? Why do we want to know this?
- Fallacy questions (Chapter 9)
  - Fallacy 1 doesn't really make sense as a fallacy: I see that it's backwards, but still seems like it should work.
  - 2: isn't that how we defined rationality?
  - 3
    - the thing about scale changes by positive linear functions didn't make sense.
    - I think I mainly don't understand why the example given is false. The reasoning is false, but I can't tell if it's because they used a poor example or if I'm misunderstanding the fallacy.
    - What does "socially better" mean?
- Can we talk about assigning cardinal utilities?
- What is the "cardinal" utility? utility or options ranked on a number line?
- It seems quite complicated to find the cardinal utilities.
- What on earth is intransitive preferences?
- I think the reasoning behind how we can transform games was unclear.
- Do you need to preserve fatios of numbers to make an order preserving transformation?
- What are zero sum games again?

- What is "meaningful"?
- On page 53, why must this line have a negative slope? What would be true of a matrix game with a zero, undefined, or positive slope?
- Once we have utilities, is there a way we can find the linear function to turn them into actual values? Or are those things that are sort of given?
- Generally speaking, how well does this kind of utility theory work as a predictor of the decisions humans like to make?
- Is utilitarianism related to utility theory in more than name only?
- Graph idea feels a little strange.

Part II: Exercises (prepare for class Wednesday, November 19, 2025)

We'll have our presentations from Exercises 9.1 and 9.2 in addition to these:

1. Explain why each of the four decision methods described in Chapter 10 satisfy each of the first three axioms.

Part III: Homework Problems (due Wednesday, December 3 at the beginning of class)

Write up your solutions for Race to 100 (what player(s) has(have) a winning strategy, what that winning strategy is, and why it's a winning strategy) in these forms:

(a) On their turn, each player must add an integer between 1 and 8.

(b) On their turn, each player must add an integer between 1 and 9.

(c) On their turn, each player must add an integer between 1 and 4.

(d) Bonus: the first player must add an odd integer between 1 and 8; the second player must add an even integer between 1 and 8.

Portfolio Assignment

Create a Guide to Utility Theory section and summarize all the things we learned about utility. Create your own examples to illustrate each item (something like Exercise 9.3—but of your own making—could cover several of the points). (It's a bit early to finish this, perhaps, as we have many questions we're discussing about utility still, but I thought I'd put it here in case you want to start.)