

Chapter 1: Homework

Mathematics 170

due Tuesday, Feb. 18

1. Suppose you are trying to explain the optimal strategy for bidding in the dollar auction with stakes $s = 3$, assuming that both players use the conservative convention. You point out that if the bankroll is $b = 3$, then the optimal strategy is to bid 1 and the other player will pass; however if the bankroll is $b = 4$, the optimal strategy is to bid 2 and the other player will pass.

Your listener does not understand the difference. "Surely," says he, "if the optimal strategy involves never actually going past 3, then the bankroll doesn't affect the outcome." Explain to him why this is not the case, without using the decision tree (he gets lost in the symbols) or O'Neill's Theorem (he doesn't trust this O'Neill character anyway).

In other words, just explain in plain English how you get the optimal strategy in each case and where the distinction arises.

2. Suppose you are playing the dollar auction with stakes $s = 3$. Your bankroll is $b = 3$; however, player two's bankroll is $b = 4$. In other words, you can bid at most 3 but player two can bid up to 4. Draw the decision tree. What is your optimal strategy?
3. The following exercises assume that both players are using the conservative convention, and thus O'Neill's Theorem for the optimal strategy.
 - (a) Suppose you will play the dollar auction with $s = 10$. Which bankrolls b will lead to the best outcome for you? Why?
 - (b) Suppose you have a fixed bankroll $b = 10$. Which stakes s lead to the best outcome for you? Why?