

Stat/Econ 473 Game Theory
Problem Set 3

Due: Tuesday February 5

From the Text: Chapter 3: 10 (in this problem are any Nash equilibria lost in IDWDS?)

Chapter 4: 11, 13, 15

1) Consider a first price sealed bid auction where there are two bidders Alice and Bob. Each submits a bid. If they submit different bids, the highest bidder wins. If they submit the same bid, each has a $1/2$ chance of winning. In either case the winner pays the amount of the bid. Suppose Alice values the object auctioned at \$20 and Bob values it at \$12 and the allowable bids are \$0, \$1, \$2, ...

a) Find a Nash equilibrium where Alice bids \$12.

b) Are there any Nash equilibria where Alice bids \$ m where $20 < m$?

c) Are there any Nash equilibria where Alice bids \$ m where $12 < m \leq 20$?

d) Are there any Nash equilibria where Alice bids \$ m where $m < 12$?

e) (3pt Bonus) Suppose we eliminate all strategies that are weakly dominated. What Nash equilibria are possible?

Justify your answers.

2) Watch the following excerpt from the film *A Beautiful Mind*, the Academy Award winning film about the life of John Nash.

<https://www.youtube.com/watch?v=CemLiSI5ox8>

Consider the (admittedly sexist) strategic game where 4 men meet 5 women, one blonde and four brunettes, in a bar. Each man must decide to make a pass at the blonde or any of the brunettes. Each man prefers the blonde to the brunettes and prefers the brunettes to failure. If more than one man makes a pass at the blonde everyone will fail. If at most one man makes a pass at the blonde everyone will succeed.

a) What are the pure strategy Nash equilibria?

b) Did the screenwriters get this right?

Justify your answers.