

# Microeconomic Theory II

Spring 2020

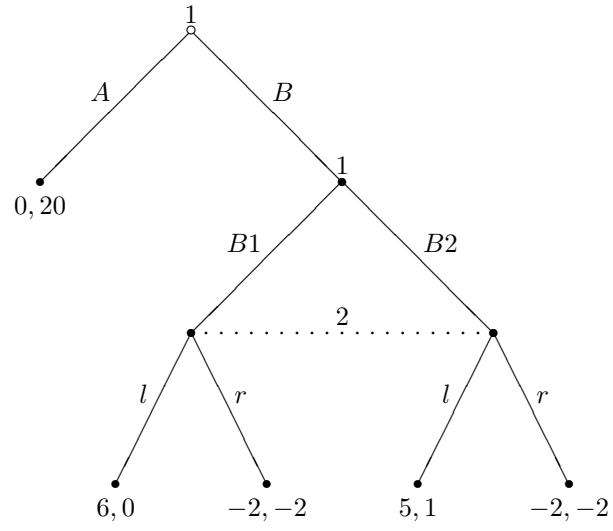
## Final Exam

Mikhael Shor

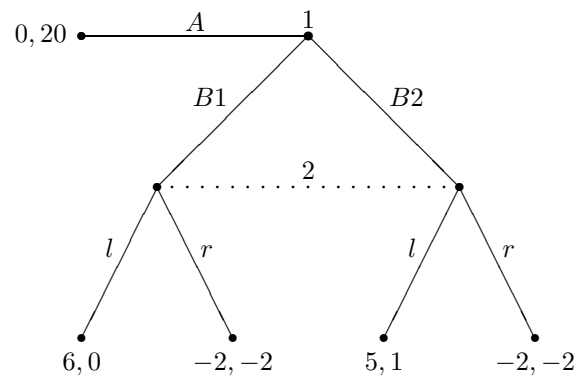
Carefully explain and support your answers.

**Question 1.** This question has you consider how Nash equilibrium outcomes differ from the outcomes of two Nash refinements: subgame-perfect Nash equilibrium and weak perfect Bayesian Nash equilibrium. For each of the four games drawn below, find all pure-strategy NE, SPNE, and wPBNE. For each game, discuss intuitively where the three equilibrium concepts coincide or differ and why. Then, briefly discuss generally what the four examples illustrate about the three solution concepts.

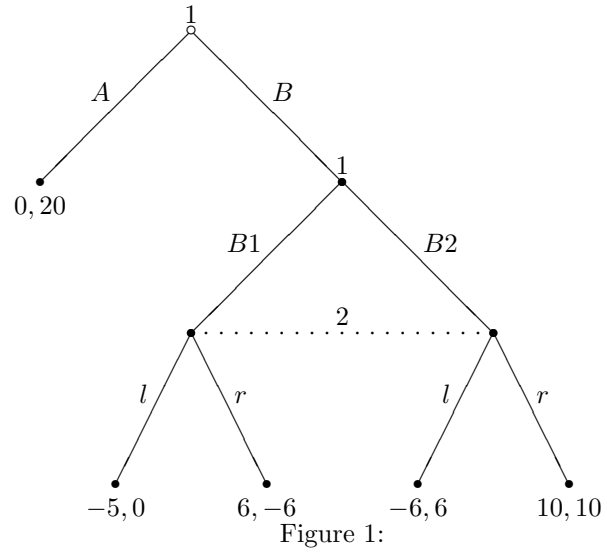
Game 1:



Game 2:



Game 3:



Game 4:

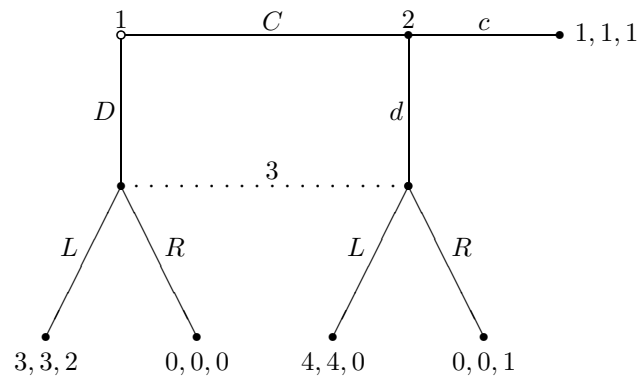
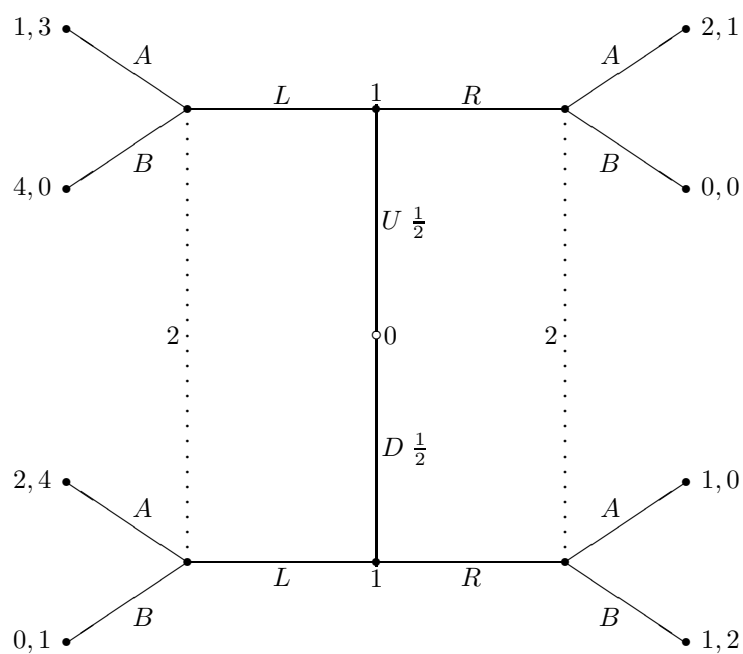


Figure 2:

**Question 2.** Consider the following game. First, nature (player 0) selects  $U$  with probability  $\frac{1}{2}$  or  $D$  with probability  $\frac{1}{2}$ . Next, player 1 selects  $L$  or  $R$ . Lastly, player 2 selects  $A$  or  $B$ .



- Find all pure-strategy weak perfect Bayesian equilibria.
- How would your answer above change if the probability of  $U$  and  $D$  changed? Explain.

**Question 3.** Consider a differentiated-products version of a Bertrand duopoly. Firm  $i \neq j$  has demand given by

$$q_i = 90 - 2p_i + p_j$$

with no costs of production. Each firm simultaneously selects  $p_i$  to maximize profit,  $p_i q_i$ .

1. Determine each firm's best response function.
2. What is the Nash equilibrium? What are the resulting profits for each firm?

Now imagine that the firms compete by selecting quantities.

3. Find the inverse demand function,  $p_i(q_i, q_j)$ .
4. If each firm simultaneously selects  $q_i$ , determine each firm's best response function.
5. What is the Nash equilibrium? What are the resulting profits?