Monmouth COLLEGE

ECON 300: Intermediate Price Theory

Problem Set #7 - Part #2

Fall 2024

Problem 1. Battle of the Sexes

Consider two players (Players 1 and 2) interacting in a static game of complete information. Each player's actions consist of either theater (T) or ballet (B). The game is played once, and the payoffs are as follows:

- If both players choose T, player 1 receives 10 and player 2 receives 5.

- If both players choose B, player 1 receives 5 and player 2 receives 10.

- If one player chooses T, while the other chooses B, their payoffs are 0 each.

1.A Express this game in its normal form representation.

1.B Does either player have a dominant / dominated strategy?

1.C Find all Nash Equilibria for this game.

Problem 2. Prisoner's Dilemma

    Consider two players (Players 1 and 2) interacting in a static game of complete information. Each player's actions consist of either stay silent (S) or testify (T). The game is played once, and the payoffs are as follows:

- If both players choose S, both players receive 10.

- If both players choose T, both players receive 1.

- If player 1 chooses S while player 2 chooses T, player 1 receives 0, and player 2 receives 12.

- If player 1 chooses T while player 2 chooses S, player 1 receives 12, and player 2 receives 0.

2.A Express this game in its normal form representation.

2.B Does either player have a dominant / dominated strategy?

2.C Find all Nash Equilibria for this game.

Problem 2. Prisoner's Dilemma (continued)

Consider two players (Players 1 and 2) interacting in a static game of complete information. Each player's actions consist of either stay silent (S) or testify (T). The game is played once, and the payoffs are as follows:

- If both players choose S, both players receive 10.

- If both players choose T, both players receive 1.

- If player 1 chooses S while player 2 chooses T, player 1 receives 0, and player 2 receives 12.

- If player 1 chooses T while player 2 chooses S, player 1 receives 12, and player 2 receives 0.

2.D If this game is repeated 2 times, will the players be able to cooperate?

2.E If this game is repeated 100 times, will the players be able to cooperate?

2.F If this game is repeated indefinitely, will the players be able to cooperate?

Problem 3. Game of Chicken

Consider two players (Players 1 and 2) interacting in a static game of complete information. Each player's actions consist of either avoid (A) or continue straight (S). The game is played once, and the payoffs are as follows:

- If both players choose A, both players receive 10.

- If both players choose S, both players receive 0.

- If player 1 chooses A while player 2 chooses S, player 1 receives 1, and player 2 receives 15.

- If player 1 chooses S while player 2 chooses A, player 1 receives 15, and player 2 receives 1.
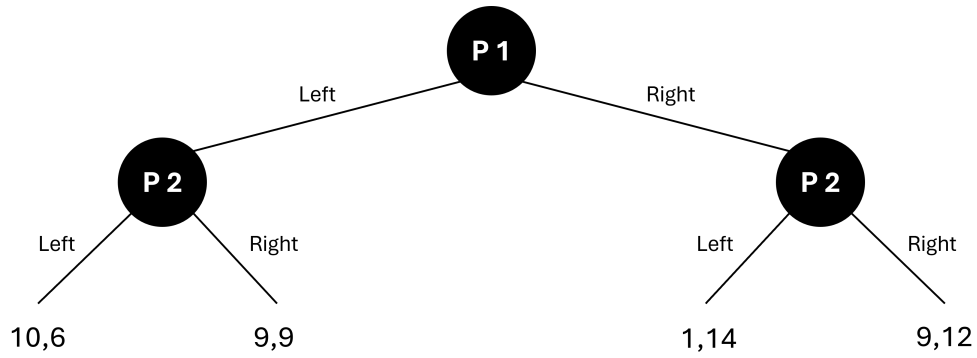
3.A   Express this game in its normal form representation.

3.B   Does either player have a dominant / dominated strategy?

3.C   Find all Nash Equilibria for this game.

Problem 4. Dynamic Games of Complete Information

Consider two players (Players 1 and 2) interacting in a dynamic game of complete information. The extensive form of the game can be expressed as follows:

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                              P 1
                 Left                    Right
          P 2                                   P 2
     Left        Right               Left            Right

    10,6          9,9                1,14             9,12
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4.A Find all subgame perfect Nash Equilibria.

4.B Express this game in its normal form representation.

Problem 4. Dynamic Games of Complete Information (continued)

Consider two players (Players 1 and 2) interacting in a dynamic game of complete information. The extensive form of the game can be expressed as follows:
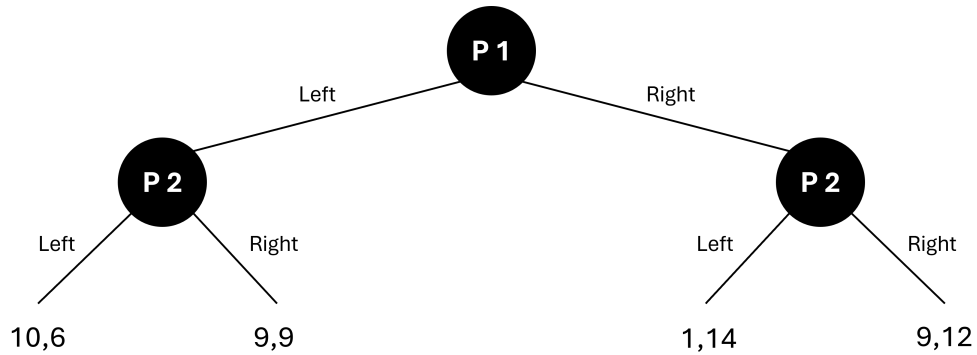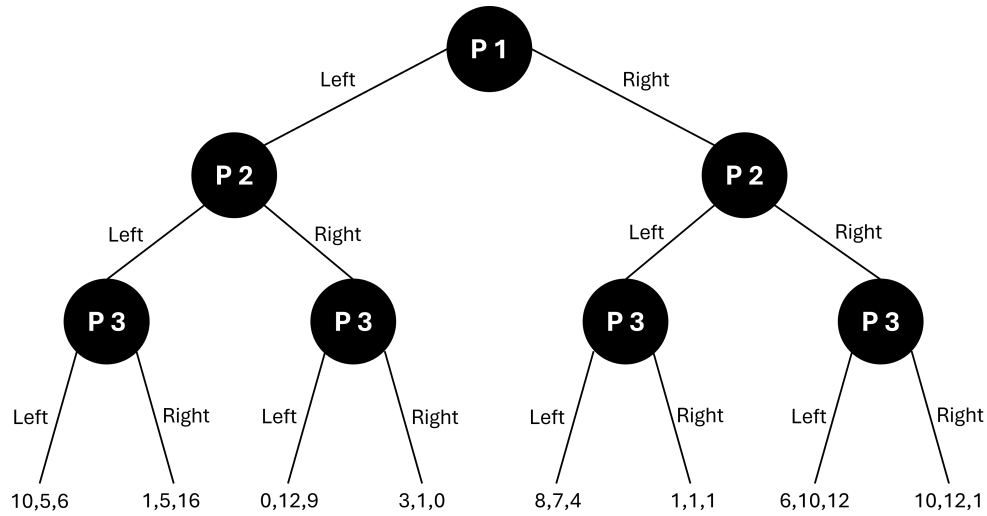

4.C Find all Nash Equilibria using the normal form from 4.B.

4.D Does your answer from 4.A and 4.C match? If not, why would they be different?

Problem 5. Dynamic Games of Complete Information with Three Players

Consider three players (Players 1, 2, and 3) interacting in a dynamic game of complete information. The extensive form of the game can be expressed as follows:

5.A Find all subgame perfect Nash Equilibria.