Assignment 2

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Introduction to game theory

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1)

- A king is deciding where to hide his treasure, while a pirate is deciding where to look for the treasure.

- The payoff to the king from successfully hiding the treasure is 5 and from having it found is 2.

- The payoff to the pirate from finding the treasure is 9 and from not finding it is 4.

- The king can hide it in location X, Y, or Z.

Suppose the pirate has two pure strategies: inspect both X and Y (they are close together), or just inspect Z (it is far away).
Find a mixed strategy Nash equilibrium where:

- p is the probability the treasure is hidden in X or Y,

- $1 - p$ is the probability it is hidden in Z (treat the king as having two strategies),

- q is the probability that the pirate inspects X and Y.

Choose the correct option:

1. $p = \dfrac{1}{2}, \quad q = \dfrac{1}{2}$

2. $p = \dfrac{4}{9}, \quad q = \dfrac{2}{5}$

3. $p = \dfrac{5}{9}, \quad q = \dfrac{3}{5}$

4. $p = \dfrac{2}{5}, \quad q = \dfrac{4}{9}$

2

- Two players have to share 50 coins (of equal value).

- Players' payoffs are the number of coins they each get.

- First, player 1 splits the coins into 2 piles.

- Second, player 2 chooses one pile for him/herself and gives the other pile to player 1.

What is agent 1's strategy in a backward induction solution?

1. Splitting coins into 25/25.

2. Splitting coins into 0/50.

3. Splitting coins into 15/35.

4. Splitting coins into 1/49.

3) Which is the Subgame Perfect Equilibrium of this game? [Here ((Not Play,Steal),(Trust)) indicates that player 1 chooses Not Play at the first decision node and Steal at the second decision node, and 2 chooses Trust at his unique decision node.]
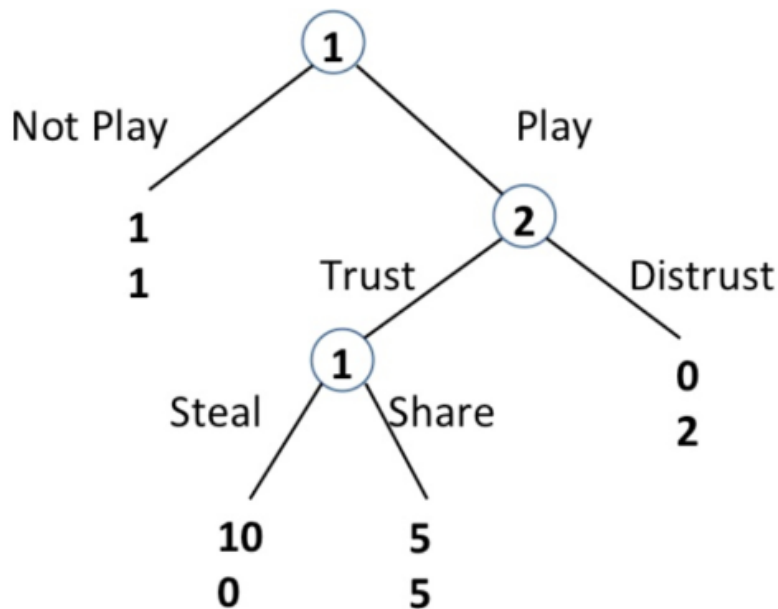
a) ((Not play, Steal),(Distrust))

b) ((Not play, Share), (Distrust))

c) ((Not play, Steal), (Trust))

d) ((Play, Steal), (Distrust))

e) ((Play, Share), (Trust))