

Problem Set 2

Econ 3250

1

Consider the familiar “Rock, Paper, Scissors” game. Two players indicate either “Rock”, “Paper”, or “Scissors” simultaneously. The winner is determined by

- Rock crushes scissors
- Paper covers rock
- Scissors cut paper

Indicate a -1 if you lose and +1 if you win. Write down the strategic (matrix) form of the game. What is the Nash equilibrium of the game?

In an episode of Seinfeld, Kramer played a version of this game with his friend Mickey except that the rules were a little different:

- Rock crushes scissors
- Rock Flies Right through paper
- Scissors cut paper

How does this modification alter the Nash equilibrium of the game?

2

Consider the following game

		Player 2		
		Left	Middle	Right
Player 1	Up	1, 2	3, 5	2, 1
	Middle	0, 4	2, 1	3, 0
	Down	-1, 1	4, 3	0, 2

Table 1:

- Does either player have a dominant strategy? Explain.
- Does either player have a dominated strategy? Explain.
- Solve the equilibrium for this game.

3

In the movie *E.T.*, a trail of Reese's Pieces, a Hershey's candy, is used to lure the little alien out of the woods. As a result of the publicity of the scene, sales of Reese's Pieces tripled, allowing Hershey to catch up with rival Mars.

Universal's original plan was to use a trail of Mars' M&M's. Mars turned down the offer, presumably because it thought \$1 million, the price demanded by the *E.T.* producer, was too high. The makers of *E.T.* then turned to Hershey.

Suppose that the publicity generated by having M&M's included in the movie would increase Mars' profits by \$800,000. Suppose also that Hershey's increase in market share cost Mars a loss of \$500,000. Finally, let b be the benefit for Hershey from having its brand chosen.

Describe the preceding events as a game in extensive form. Determine the equilibrium as a function of b . If the equilibrium differs from the actual events, how you think they can be reconciled? Watch the film *E.T.* if you haven't already.

4

Hernan Cortez, the Spanish navigator and explorer, is said to have burnt his ships upon arrival to Mexico. In so doing, he effectively eliminated the option of him and his soldiers returning to their homeland. Discuss the strategic value of this action, knowing the Spanish colonists were faced with potential resistance from the native peoples of Mexico.

5

Consider the following game depicting the process of standard setting in 4K TV. The US and Japan must simultaneously decide whether to invest a high or a low value into TV research. Each country's payoffs are summarized in the table below.

- Are there any dominant strategies in the game? What is the Nash equilibrium?
- Suppose now that the US has the option of committing to a strategy before Japan's decision is reached. How would you model this? What are the Nash equilibria of the new game?
- Comparing answers to (a) and (b) what can you say about the value of commitment to the US.

		Japan	
		Low	High
US	Low	4, 3	2, 4
	High	3, 2	1, 1

Table 2: 4K standards