

# Exercise 4

INR 3303: Foreign Policymaking

Name:

Due: Tuesday, Oct. 18

1. Fill in the payoff matrices with the **ordinal preferences** for a modified version of the "matching pennies" game in which: if you and your opponent both play "heads" (H), you get both pennies; if you both play "tails" (T), your opponent gets both pennies, and if your strategies don't match (HT or TH), then you each keep your own penny.

|   |   | Your Payoffs |   |
|---|---|--------------|---|
|   |   | H            | T |
| H |   |              |   |
|   | T |              |   |

|   |   | Your Opponent's Payoffs |   |
|---|---|-------------------------|---|
|   |   | H                       | T |
| H |   |                         |   |
|   | T |                         |   |

2. Suppose that you and your friend want to get together this weekend. You both want to do something together, but unfortunately you want to do different things. You really want to go shopping at the Falls, and you don't like football. Your friend, on the other hand, hates shopping and wants to stay at home to watch the Dolphins play the Dallas Cowboys on TV. Each of you would rather do *either* activity together rather than miss the chance to see each other. Rank the outcomes (A, B, C, and D) in the order of your preferences (e.g., utility) as they are stated above.

|                              |          | Your friend watches the Dolphins on TV | Your friend goes shopping at the Falls |
|------------------------------|----------|--|--|
|                              |          | You watch the Dolphins on TV           | <b>A</b>                               |
| You go shopping at the Falls | <b>C</b> | <b>D</b>                               |  |

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(see over)

For problems 3-4, **circle all dominant strategies and Nash equilibria**. Payoffs are given in the order of (Row, Column), where 1 = best and 4 = worst. Example:

|        |        |      |                       |
|--------|--------|------|-----------------------|
|        | Silent | Talk |                       |
| Silent | 2,2    | 4,1  | 1 = best<br>4 = worst |
| Talk   | 1,4    | 3,3  |                       |

Talk is a dominant strategy for each side.  
3,3 is the only nash equilibrium.

3.

|     |   | Column |     |
|-----|---|--------|-----|
|     |   | H      | T   |
| Row | H | 4,4    | 3,1 |
|     | T | 1,3    | 2,2 |

4.

|     |   | Column |     |
|-----|---|--------|-----|
|     |   | H      | T   |
| Row | H | 2,1    | 3,4 |
|     | T | 1,2    | 4,3 |

For problems 5-6, consider the following situation:

Two countries, Octavia and Spinlandia, share a border along a river. Near each side of the river, each country has a steelworks that is polluting the river and endangering the health of both countries' citizens downstream. If the steel processing plants are modernized using expensive technology, then the price of their steel will go up slightly. If **both** countries modernize their plants, their citizens' health will be greatly improved. If only one country modernizes, the health problems will remain largely unaffected. Each country has the following two choices: it can modernize its steel plant, or it can continue with the status quo. There are four possible outcomes **for each country**, depending on what both choose:

**Best** is if *both* countries modernize their steelworks. They will continue to sell steel much as before, but their citizens will be healthier.

**Next best** is if they modernize and we don't. The health problems will continue, but at least our steel will be cheaper, giving us a competitive advantage.

**Still worse** is if *neither* country modernizes. This is the current situation, with health problems that each country regards as much too high.

**Worst of all** is if we modernize and they don't. The health problems will continue, and our steel will become more costly, giving them an advantage.

5. Show how the two countries would rank their preferences (Octavia, Spinlandia), where 1 = best and 4 = worst, **assuming all of the above**:

|         |                 | Spinlandia    |                 |
|---------|-----------------|---------------|-----------------|
|         |                 | Modernize     | Don't Modernize |
| Octavia | Modernize       | (     ,     ) | (     ,     )   |
|         | Don't Modernize | (     ,     ) | (     ,     )   |

6. Circle all dominant strategies and Nash equilibria (in the above matrix).