Game Theory
A Brief Introduction

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Grade Game
Learning Outcomes:

- Understand game theory, strategic strategies and identify when this applies.

- Explain the prisoners dilemma and differentiate between dominant and non-dominant examples.
Grade Game
Explanation
Lesson 1

- Do not play a strictly dominated strategy.

- Why?
Prisoners Dilemma

- 2 accused crooks in separate cells,
- If neither rats the other guy out both go to jail for a year
- If both rat each other out they go to jail for 2 years.
- If you rat the other guy and he doesn’t rat you then he’ll go to jail for 5 years.
Golden Balls

- [Link to YouTube video](http://www.youtube.com/watch?v=p3Uos2fzIJo&feature=player_embedded)
Golden Balls

- Weakly Dominant Strategy
  - You can do no worse than the other player, but you can both lose.

- Three Nash Equilibria in the Game:
  - Outcomes where a player can not do better on his or her own by changing his or her strategy
Contracts and Communication

- Does communication help?
- Who does it help?
- Why?
End Video
Lesson 2

- Rational choice can lead to outcomes that “suck”.
Game 2

- Without showing your neighbor, put in the box a whole number between 1 and 100.
- We will then calculate the average number chosen in the class.
- The winner will be the person who picks the number closest to 2/3rds times the average number in the class.
Indignant Angels

(Coordination Problem)

For me:

\[(A,C) \rightarrow 3 - 4 = -1\]

\[(C,A) \rightarrow -1 - 2 = -3\]

No Dominant Strategy
Payoff’s Matter (lesson 3)

You can’t get what you want, until you know what you want.
## Evil Git vs Indignant Angels

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>0, 0</td>
<td>3, -3</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>-1, -1</td>
<td>1, 1</td>
</tr>
</tbody>
</table>

A is Dominant Strategy
My A does not dominate B.

But my pairs A dominates her B.

So I know she is going to choose A.
Lessons

- When analysing strategy, put yourself in others’ shoes and try and figure out what they will do.

- Hard to figure out your opponents pay-offs.

- Play the odds.
Grade Game Prediction

- 70% choose A
- 30% choose B
Resources

- **Game Theory Lecture Series at Yale:**
  - [http://oyc.yale.edu/economics/econ-159/lecture-1](http://oyc.yale.edu/economics/econ-159/lecture-1)

- **Golden Balls and the Prisoners Dilemma**