
UNIVERSITY OF Southampton

# Game Theory
## A Brief Introduction

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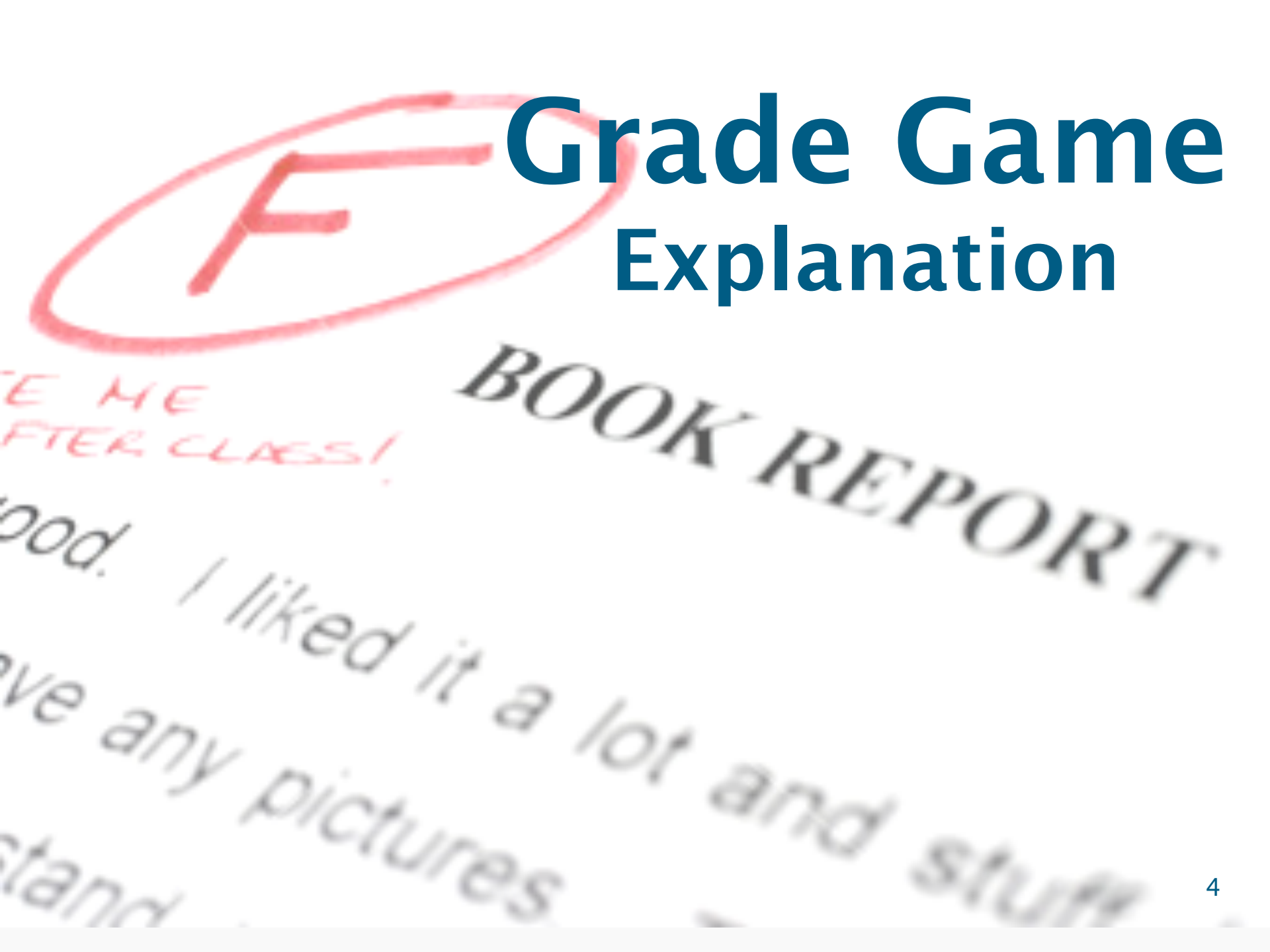
# Grade Game

# 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


- http://www.youtube.com/watch?v=p3Uos2fzIJ0&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)

| Me \ Pair | A | B |
|---|---|---|
| A | 0, 0 | -1, -3 |
| B | -3 , -1 | 1, 1 |

No Dominant Strategy

For me:

Guilt

(A,C) → 3 –4 = –1

(C,A) → –1 –2 = –3

Indignation

# Payoff's Matter (lesson 3)

You can't get what you want, until you know what you want.

# Evil Git vs Indignant Angels

| Pair (angel) / Me (evil) | A | B |
|---|---|---|
| A | 0, 0 | 3, -3 |
| B | -1, -1 | 1, 1 |

A is Dominant Strategy

# Indignant Angels vs Evil Git

| Me \ Pair | A | B |
|---|---|---|
| A | 0, 0 | -1, -1 |
| B | -3, 3 | 1, 1 |

A does not dominate B

- My A does not dominate B.
- But my pairs A dominates her B
- So I know she is going to choose A



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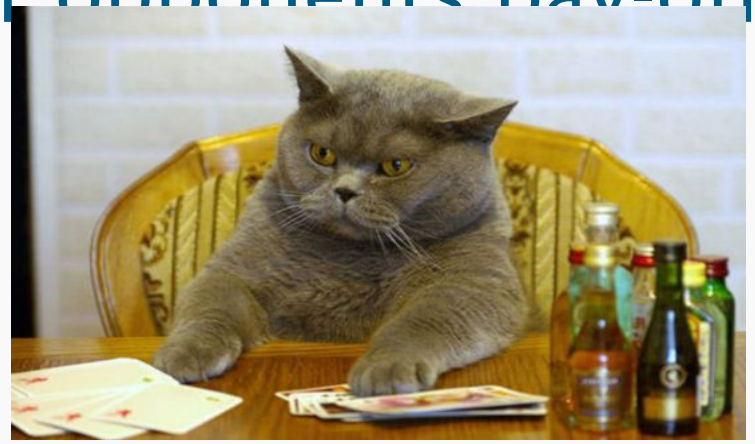
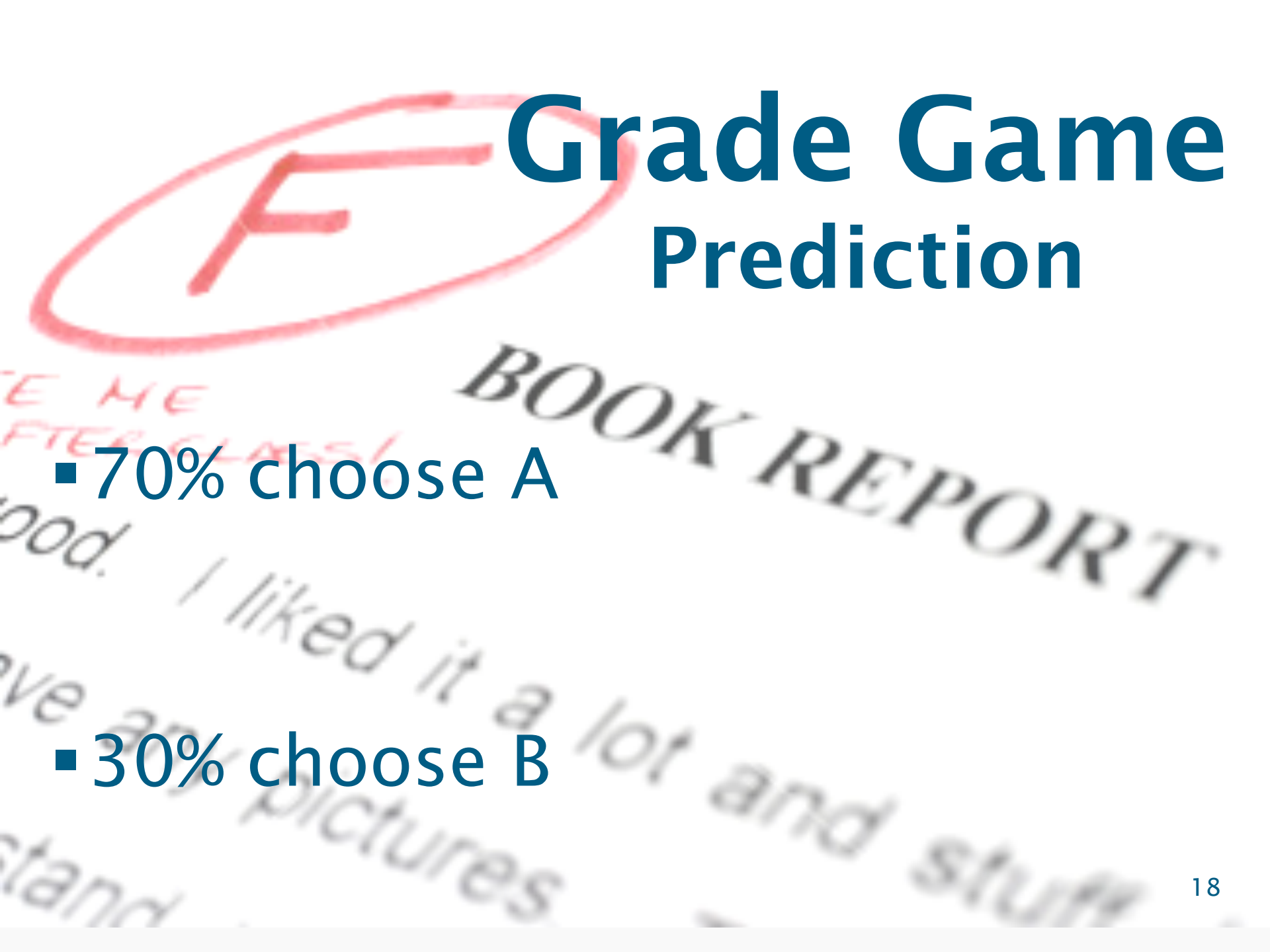
# Lessons

- 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

- Golden Balls and the Prisoners Dilemma
  - http://welkerswikinomics.com/blog/2009/04/10/golden-balls-gamaae-theory-the-prisoners-dilemma-and-the-cold-rationality-of-human-behavior/