

# Game Design tidbits



# Admin



- Project Questions? Concerns?
- Schedule?
- Reference
  - A lot of the material was distilled from
  - Gametek by Geoffry Engelstein published by Harper Collins Publishers
- For these and last please read chapters 4-5 in your book

# Rock, Paper,Scissors

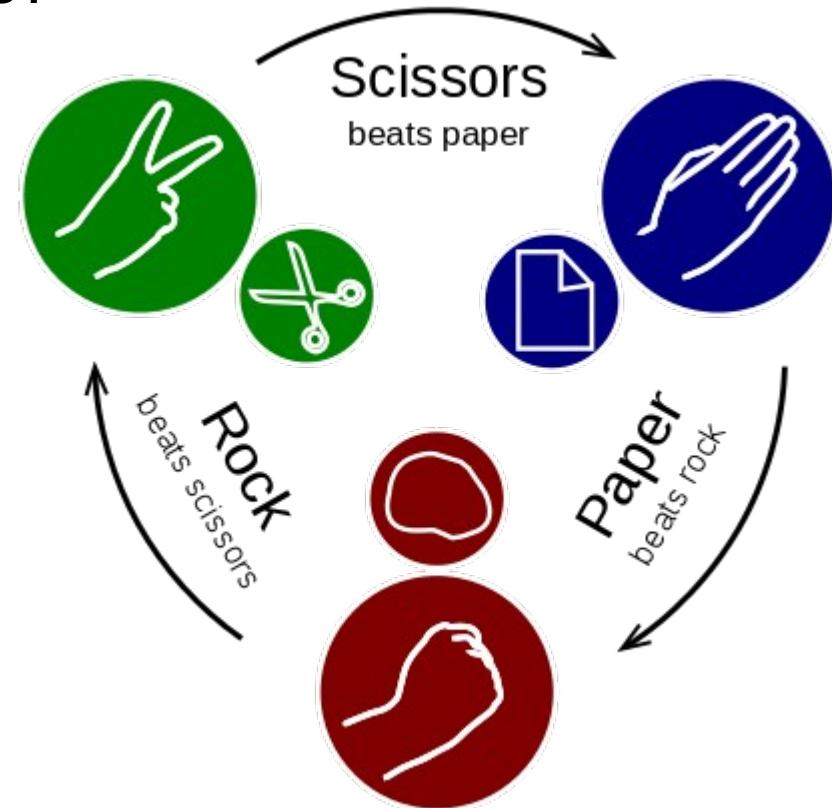


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- First lets describe the game

# Rock, Paper, Scissors



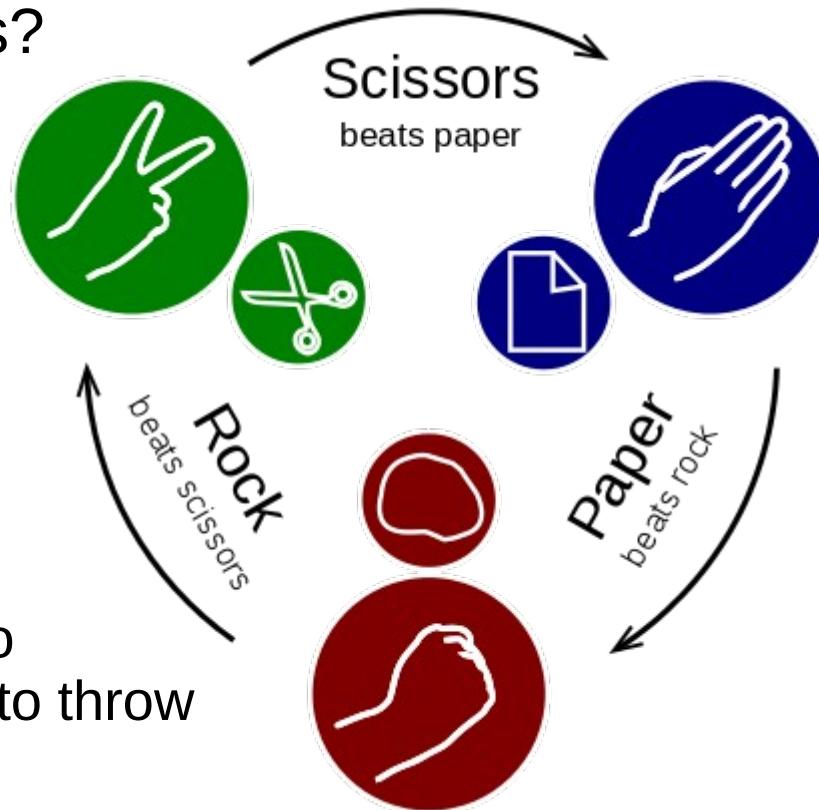
- How Do you win a Rock Paper Scissors?
- First lets describe the game
- Image credit wikipedia
- So what is the mathematically optimal strategy for rock paper scissors?



# Rock, Paper, Scissors



- How Do you win a Rock Paper Scissors?
- First lets describe the game
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- So what is the mathematically optimal strategy for rock paper scissors?
  - Throw out each 1/3 of the time in **true random** order
  - Anything else and you open yourself up to 'exploitative' play where someone knows to throw the counter to your favorite.
    - Even exploiting someone else can leave you in trouble for the big play



# Biofeedback



- It turns out, to optimize play, it is best for a player to pay attention to their 'gut'
  - Players often realize subconsciously something is wrong before it peculates to the conscious mind.
  - Iowa Gambling Task
    - Subject starts with \$XX
    - Four decks of cards, subject gains or loses money based on card drawn
      - Two of the decks are 'rigged' to give poorer results.
    - Subjects asked to count their heartbeats while 'playing'
    - Those good at counting heartbeats detected their stress at choosing from 'bad decks' and stopped drawing from those quicker.
  - Could we use this in game design?

# Game Theory



- Game Theory
  - Either a branch of mathematics, or the intersection of Math and Psychology that often live in Economics.
  - Most famous problem in game theory formulated in current form in 1950
  - Prisoner's Dilemma
    - What is prisoner's dilemma in a nutshell?

# Game Theory



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    - What is prisoner's dilemma in a nutshell?
    - You have two prisoners, separated and give them a choice, rat on the other, or else
      - If both rat on each other, they both get a bad outcome -5 (both go to jail for 5 years)
      - If neither rats, they both get a mild bad outcome -1 (both get misdemeanor and a fine)
      - If one rats and the other doesn't
        - The rat gets a good outcome +3 (reward for capture)
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    - What are the issues at play for a game?

# Game Theory



## Prisoner's Dilemma

prisoner's dilemma in a nutshell?

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  - Biggest issue – do you do this negotiation once or many times in a game?
    - Best strategy if once?
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# Game Theory



## Prisoner's Dilemma

- What are the issues at play for a game?
  - Biggest issue – do you do this negotiation once or many times in a game?
    - Best strategy if once?
      - If you only do this once, best strategy is to 'defect' to 'rat' out other player
    - Best if you do this many times?
      - If you do this many times, best strategy is to
        - Be 'nice' the first interaction
        - For every later interaction, act the way that person treated you last time.
  - Game design can help to force better behavior on players
  - Think about it as you start to design your own games.

# Reputation



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    - Anyone familiar with it?

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- Being able to use this optimal solution to the prisoners dilemma relies on your 'game reputation'
  - Game reputation is limited by "Dunbar's number"
    - It is known/shown, that in a group, once a group gets above about 150 people, it is impossible for people to keep track of everyone's reputation
    - So subgroups form.
    - Example from my grad school and graduate student lab.
  - How can you add game features to help deal with the limitations of Dunbar's number?

# What is part of gameplay?



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- Is card-counting ok?
  - Why or why not?
  - It is within the rules, but some people have a better memory than others.
  - Is it ok if those with the better memory use it?
- What about if I start writing down the cards we've seen so far on a pad with a pencil? Will that work?
  - What is the difference then?
- What if I bring a calculator to a game to do the probabilities so I don't have to do math in my head?

# Miller's Magic number 7



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# Miller's Magic number 7



- Students who have had Cognitive psychology classes and most of my former students remember this
  - What did Dr. George Miller discover?
    - People (or Harvard Undergraduates in the late 1950s) can keep roughly 7 'things' in their short term memory.
    - What is a thing? A chunk
      - Give example from gametek page 44.
    - So try to build your games to make it easier for players to 'chunk' information
      - In Scifi game
        - This fleet is XXXXX (rather than keeping all 5 ships in the players head)
        - This planet is doing YYYY
      - Etc.

## The 'innovation limit'



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# The 'innovation limit'



- We like exciting new games
  - But how many exciting new games really make it big?
  - Not talking about tech innovation, but gameplay
    - Sid Meier's Civilization spawned a new domain
    - So did Warcraft Orcs vs Humans
    - Sim City
    - Minecraft
  - But for all of these superhits that were really innovative, many games tried but didn't have the same success?
    - Examples from students?

## Innovation limit.



- Most games can afford to do one thing that is really new and interestingly different
  - Without putting off all but the most rules accepting players.
  - Blizzard at their best (granted some years ago) took a genre of game and aspired to make a genre-like game with some special quality.
    - This worked really well.
    - Other examples?

# Managing Choices



- A game
  - "Free play within constraints"
  - Making meaningful choices to affect (or maybe even effect) a(winning) outcome
- Beware 'analysis paralysis'
  - Player has so many choices, they can't make any
  - Iyengar and Lepper: 6 or fewer choices are better, more and quality of decision goes down dramatically.
    - <https://psycnet.apa.org/record/2000-16701-012>
  - What does that remind you of?

## Or in pictures



- Ever open your steam library, open a 'sandbox' game, wonder what to do and leave?
- 
- <http://thenocturnalrambler.blogspot.com/2017/04/open-world-games-suck.html>
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