CE810 - Game Design 2

Game Balance

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Friday, 18 May 2018

University of Essex

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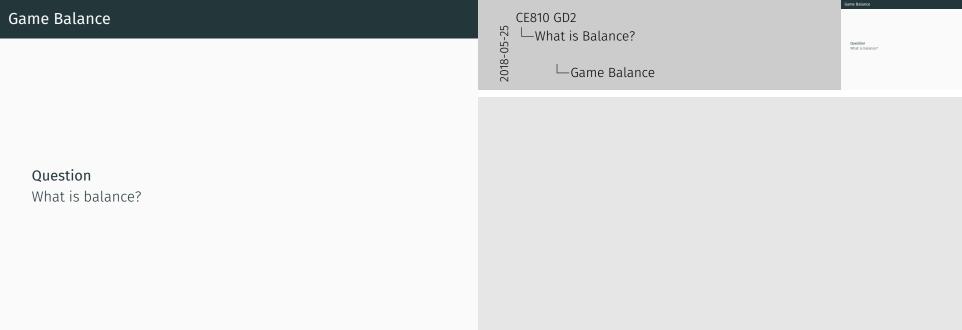# What is Balance?

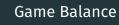**Question**
What is balance?

Game Balance

"All players have an equal chance of winning"

– Richard Bartle

Richard covered a combat example in the first part of the module.

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On Strategies

- What about higher level strategies?

Game Balance

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└─On Strategies

        └─Game Balance

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- Zerg rush?

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- Dominant strategies

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- Zerg rush?
- Dominant strategies
- Metagaming

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- A beats B, B beats C, C beats A

Metagaming - Rock Paper Scissors

- A beats B, B beats C, C beats A
- If there are lots of A players, people will play C

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- A beats B, B beats C, C beats A
- If there are lots of A players, people will play C
- Then there are a lot of C players, so people play B

Metagaming - Rock Paper Scissors

- A beats B, B beats C, C beats A
- If there are lots of A players, people will play C
- Then there are a lot of C players, so people play B
- and so on...
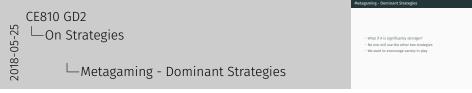
· What if A is significantly stronger?

- What if A is significantly stronger?
- No one will use the other two strategies

- What if A is significantly stronger?
- No one will use the other two strategies
- We want to encourage variety in play

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└─On Strategies

└─Can we detect this?

- Can we detect strategies which are overpowered?

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Can we detect this?

- Can we detect strategies which are overpowered?
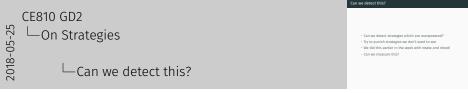- Try to punish strategies we don't want to see

- Can we detect strategies which are overpowered?
- Try to punish strategies we don't want to see
- We did this earlier in the week with rotate and shoot!

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- Can we detect strategies which are overpowered?
- Try to punish strategies we don't want to see
- We did this earlier in the week with rotate and shoot!
- Can we measure this?

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- Ryan Leigh et al (2008) - Co-evolution for game balancing

Automated Game Tuning

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- Alexander Jaffe et al (2012) - Restricted-Play balance framework

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- Academics seem to think so...
- Ryan Leigh et al (2008) - Co-evolution for game balancing
- Alexander Jaffe et al (2012) - Restricted-Play balance framework
- Mihail Morosan - GAs for tuning parameters

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Game Curves

First Move Advantage

- Typically affects turn based games

9

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- Going first in tac tac toe means either a win or a draw

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First Move Advantage

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- White has $> 50\%$ win rate over all games

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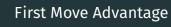- We need a way of dealing with this

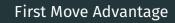9

Magic Second player gets an extra card

Magic Second player gets an extra card

Go Second player gets 7.5 bonus points

10

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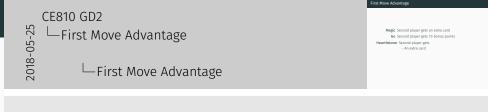
Hearthstone Second player gets

First Move Advantage

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- Mulligan an extra card

Magic Second player gets an extra card

Go Second player gets 7.5 bonus points

Hearthstone Second player gets

- An extra card
- Mulligan an extra card
- Special card worth one free Mana

- It is really difficult to decide how to balance the FMA

First Move Advantage

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- Go players spent 150 years slowly tuning the bonus points

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First Move Advantage

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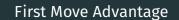
First Move Advantage

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  - Hearthstone players will know what I mean

First Move Advantage

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- Many professional hearthstone players like to go second
  - Second player bonus may be too much
  - Hearthstone players will know what I mean
  - Which is good - I don't

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- Static

- Static
  - All pieces available at start

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└─First Move Advantage

    └─Static or Developed

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- Static
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└─First Move Advantage

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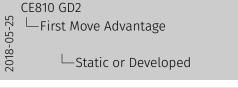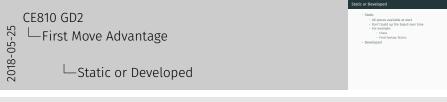 - Don't build up the board over time
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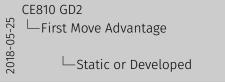- Developed
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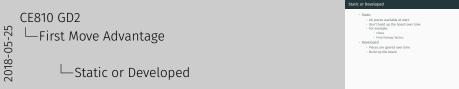   - Build up the board
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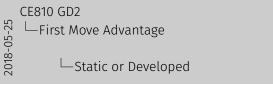- Developed
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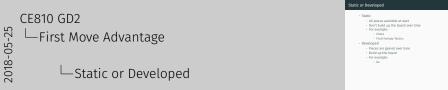   - Build up the board
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Static or Developed

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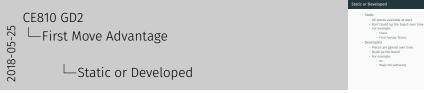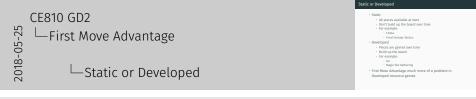   - Build up the board
    - For example:
        - Go
        - Magic the Gathering
- First Move Advantage much more of a problem in Developed resource games

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- Gets worse over time

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  - Even if you do nothing

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- Gets worse over time
  - Even if you do nothing
- Players get more skilled over time

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First Move Advantage

- Gets worse over time
  - Even if you do nothing
- Players get more skilled over time
- More skilled players exploit the advantage better

- Ensure game has fine tuning of handicap

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  - Go's point system easy to tune in small steps

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- Ensure game has fine tuning of handicap
  - Go's point system easy to tune in small steps
  - Hearthstone's bonus much harder

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- Metrics help us - we can track win rates

First Move Advantage - dealing with it

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- Need ways of tweaking power levels - small increments are better

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- AIs might help here - known skill levels, running lots of games help us tune our values

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First Move Advantage - dealing with it

- Metrics help us - we can track win rates
- Need ways of tweaking power levels - small increments are better
- AIs might help here - known skill levels, running lots of games help us tune our values
- Careful, our AIs might not be good measures of possible skill levels

Exercise

Investigate dominant strategy in Civ style game

- Download latest copy of the game engine
- Look at and run class "DominantStrategy"
- Create new maps that don't display this behaviour

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Watching

Extra Credits

- https://www.youtube.com/watch?v=Bxszx60ZwGw - Power Creep
- https://www.youtube.com/watch?v=M3b3hDvRjJA - Power Creep in hearthstone
- https://www.youtube.com/watch?v=e31OSVZF77w - Perfect Imbalance
- https://www.youtube.com/watch?v=EitZRLt2G3w - Balancing for skill
- https://www.youtube.com/watch?v=0V5eq4IQ6Go - Delta of Randomness
- https://www.youtube.com/watch?v=TRHdIScOMWQ - Balancing Turn based games

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└─Extra Credits