

CE810 - Game Design 2

Game Balance

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What is Balance?

Question

What is balance?

“All players have an equal chance of winning”

– Richard Bartle

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

On Strategies

Game Balance

- What about higher level strategies?
- Zerg rush?
- Dominant strategies
- Metagaming

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...

Metagaming - Dominant Strategies

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

Can we detect this?

- 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?

Automated Game Tuning

- 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

Game Curves

First Move Advantage

First Move Advantage

- Typically affects turn based games
- Going first in tac tac toe means either a win or a draw
- White has $> 50\%$ win rate over all games
- Worse effects if you have resources
- We need a way of dealing with this

First Move Advantage

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

First Move Advantage

- It is really difficult to decide how to balance the FMA
- Go players spent 150 years slowly tuning the bonus points
 - We do not have 150 years
- 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

Static or Developed

- Static
 - All pieces available at start
 - Don't build up the board over time
 - For example:
 - Chess
 - Final Fantasy Tactics
- Developed
 - Pieces are gained over time
 - Build up the board
 - For example:
 - Go
 - Magic the Gathering
- First Move Advantage much more of a problem in Developed resource games

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

First Move Advantage - dealing with it

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

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

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=0V5eq4lQ6Go> - Delta of Randomness
- <https://www.youtube.com/watch?v=TRHdIScOMWQ> - Balancing Turn based games