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Lecture 6

Economies & Balance

What is Game Balance?

- What does it mean to be **unbalanced**?

- Examples of unbalanced games?

- Examples of well-balanced games?

- What types of games can be unbalanced?

Types of Game Balance

- Player-versus-Player

  - **Fairness**: equal players have equal chance of winning

  - **Pacing**: players have "reasonable" chance of catch-up

  - **Politics**: skill should be more important than alliances

- Player-versus-Environment

  - **Appropriately challenging**: neither too hard nor too easy

  - **Balanced resources**: actions are not too "expensive"

  - **No dominant strategy**: requires multiple play styles

PvE: Appropriately Challenging

- Play should ramp up from easy to harder
  - Early levels are tutorial levels
  - Feeling of accomplishment over time

- Easy mode crucial for story-focused games
  - Casual players just want to experience story
  - Should have "press button to win" mode

- Harder modes should be hard, not boring

Game Balance

PvE: Balanced Resources

- Sources: How a resource can increase
  - **Examples** (player): ammunition clips, health packs
  - **Example** (external): spawn points

- Drains: How a resource can decrease
  - **Examples** (player): firing weapon, player damage
  - **Examples** (external): monster death

- Adjust sources and sinks to "balance" economy
  - Together, determine "price" of resource
  - Price of resource should reflect its "power"

Design Problem: Pricing Resources

Underpricing

- Cheap, powerful actions
  - Players favor these verbs
  - Limits play variety

- Buffs in *Might & Magic*
  - Same mana as attacks
  - Lasted all **day** long

- *Dragon Age* cold spells
  - Shattered enemy on critical
  - Rogues had auto criticals

Mechanics Revisited

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Design Problem: Pricing Resources

Overpricing

- Expensive, weak actions
  - Usage is "penalized"
  - Waste of designers' time

- Shredder ammo in *ME2*
  - Same damage as inferno
  - But inferno lights on fire

- *Raise Dead* in early D&D
  - Loss of stats (e.g. Con)
  - No easy way to regain

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Design Problem: Pricing Resources

Underpricing

- Cheap, powerful actions
  - Players favor these verbs
  - Limits play variety

- Examples:
  - Buff spells in most RPGs
  - *Dragon Age* cold spells

Overpricing

- Expensive, weak actions
  - Usage is "penalized"
  - Waste of designers' time

- Examples:
  - Shredder ammo in ME2
  - *Raise Dead* in early D&D

- Resource usage determines difficulty
  - *Resident Evil*: Availability of ammunition
  - D&D 3.x: 20% resource per encounter
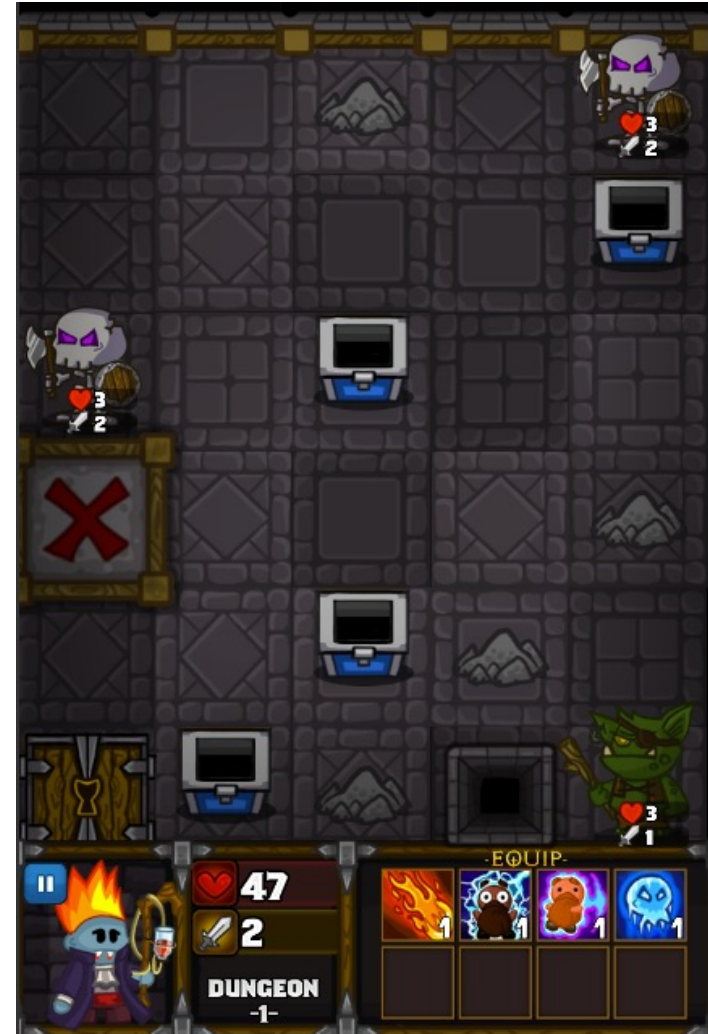
Game Balance

Resources and Strategy

- What is more "dangerous"?

  - Damage-dealer

  - Healer

  - Controller (lock-down skills)

  - Summoner (chain or simple)

- How does this affect strategy?

- Is the answer always the same?

  - How do you analyze this?

  - What resources do each of the archetypes above involve?

Game Balance

Resource Analysis: Dungelot

- Simple combat mechanic
  - Each round, swap damage
  - Enemy dies when health is 0

- Player goes until health is 0
  - There is healing in game
  - …but too sparse to go forever

- Two primary characters
  - **Paladin**: can lessen damage
  - **Vampire**: drains blood to heal
  - Which is better?

Game Balance

Bad Design: "Engines"

- Actions combine to make resources free
  - Spend one resource to get another
  - Use new resource to get old one back

- Example: *Dragon Age: Origins*
  - Resources: Health, Mana
  - Small health loss; regain much mana
  - Small mana loss; heal much damage
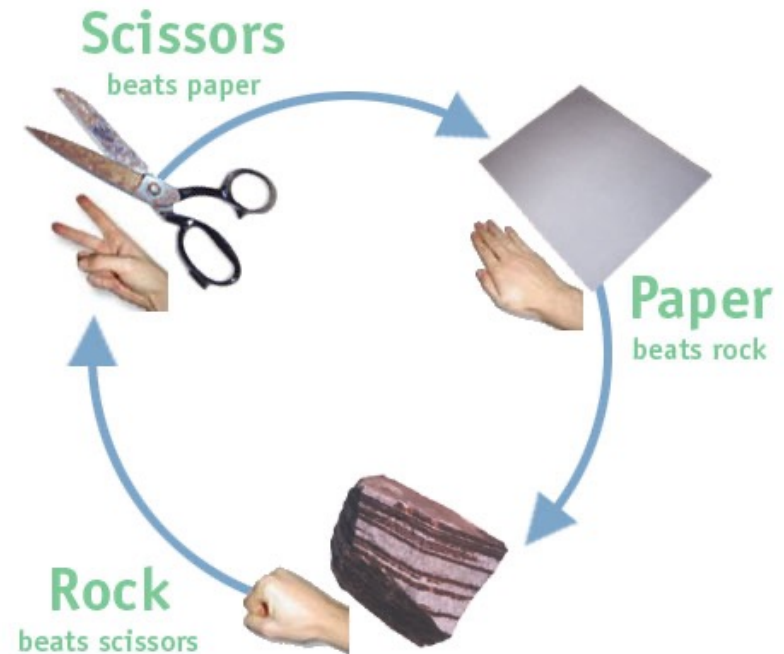 - Solution? Cool-down time

Bad Design: Deadlocks

- Cyclical interaction between sinks & sources

  - Prevents any further action

  - Example: *Settlers 3*

    - Need stone for stonecutter's hut

    - Stonecutter's hut is source for stone

- Treat deadlock as a loss condition

  - **Example**: No more builders in *Starcraft*

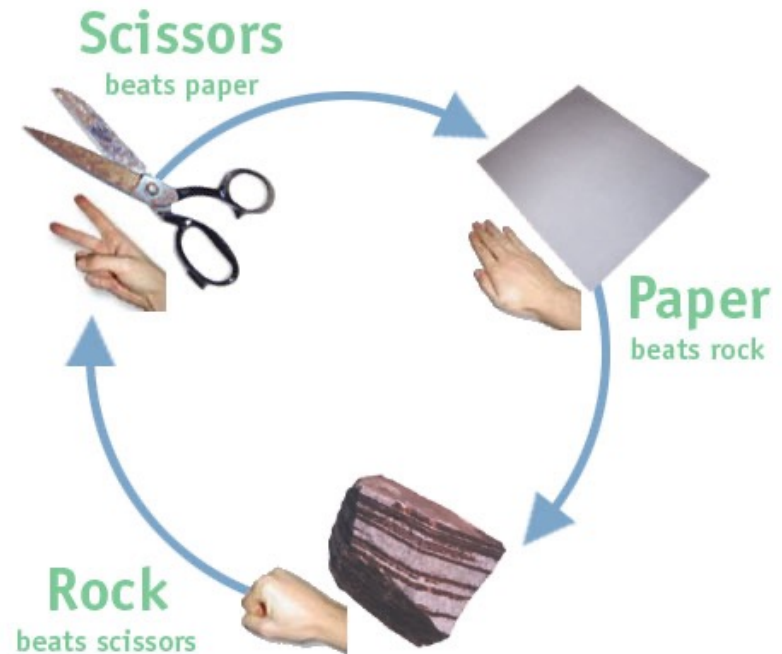 - But detection of deadlock is **hard**

PvE: No Dominant Strategy

- "Rock-Paper-Scissors" model
  - No strategy always wins
  - Optimal depends on context
  - Challenge is finding context

- Play is **highly variable**
  - Monotonous play is punished
  - Must master different styles

- Play becomes **psychological**
  - What is opponent thinking?
  - True even if opponent an AI

Scissors
beats paper

Paper
beats rock

Rock
beats scissors

Game Balance

Meaningful Choice?

- Isn't this a bad design?
  - Game "feels" random

- Don't make actions equal
  - Just make nothing the best
  - But some actions are worse
  - **Challenge**: separate two

- Make AI "predictable"
  - Best move if know opponent
  - Player learns how AI thinks
  - Challenge for AI design

Scissors
beats paper

Paper
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Rock
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Types of Game Balance

- **Player-versus-Player**

  - **Fairness**: equal players have equal chance of winning

  - **Pacing**: players have "reasonable" chance of catch-up

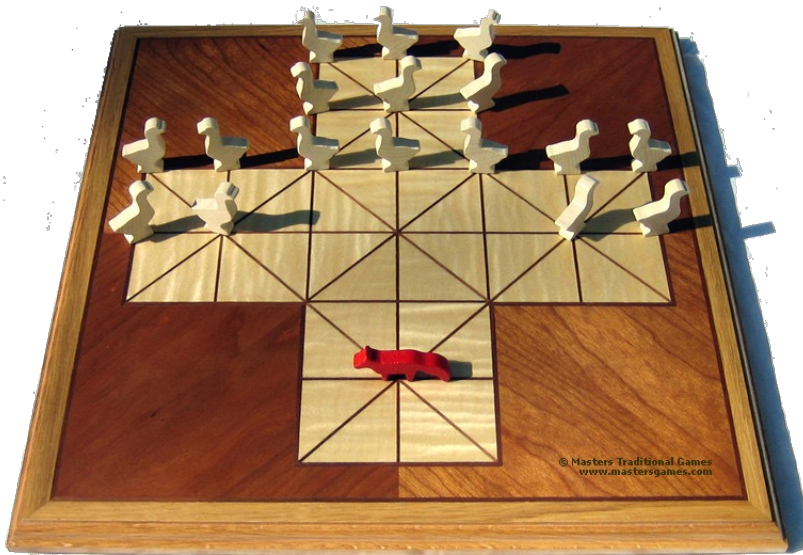 - **Politics**: skill should be more important than alliances

- Player-versus-Environment

  - **Appropriately challenging**: neither too hard nor too easy

  - **Balanced resources**: actions are not too "expensive"

  - **No dominant strategy**: requires multiple play styles

PvP: Fairness

- **Symmetric**: have same start position & rules
  - Easiest way to achieve fairness
  - **Examples**: Chess, monopoly, *Warcraft II*

- **Assymetric**: start & play with different rules
  - Fairness harder, but more interesting
  - **Examples**: Fox & Geese, *Starcraft*

- Requires user testing

Assymetric Gameplay

Game Balance

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PvP: Pacing

- Pacing is a function of feedback
  - **Positive feedback**: rewards player successes
  - **Negative feedback**: punishes player successes

- Positive feedback leads to snowballing
  - Once player gets ahead, hard to catch up
  - Opponent will quit early (redefine loss, victory)

- Negative feedback leads to stalemate
  - Game goes on forever without a winner
  - Even worse, winner may feel arbitrary

Feedback

- Common form of emergent behavior
  - Game mechanics produce certain outputs
  - Outputs then modify the game mechanics

- **Positive**: reward player for success
  - Extra-lives in any arcade game
  - Power-ups/abilities in Raiden clones

- **Negative**: handicap player for success
  - Blue shells in *Mario Cart*

Game Balance

Feedback: *Raiden*

Game Balance

Feedback: *Mario Cart*

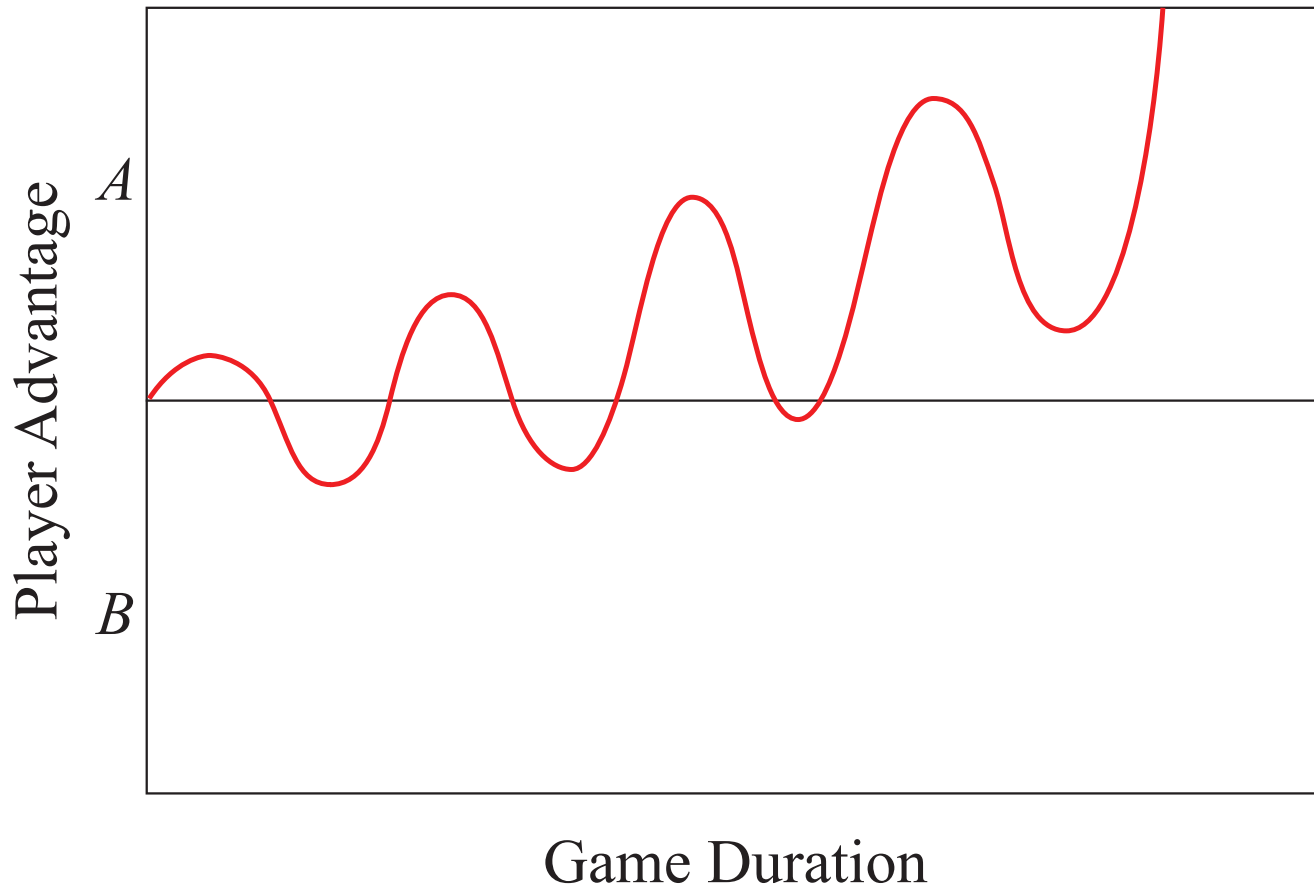Game Balance

These Terms are Not Normative

Positive Feedback

- Can be *constructive*
  - **Ex**: Increase attack
- Can be *destructive*
  - **Ex**: Drain opponent
- **Key Features**
  - Magnifies early successes
  - Increases player disparity
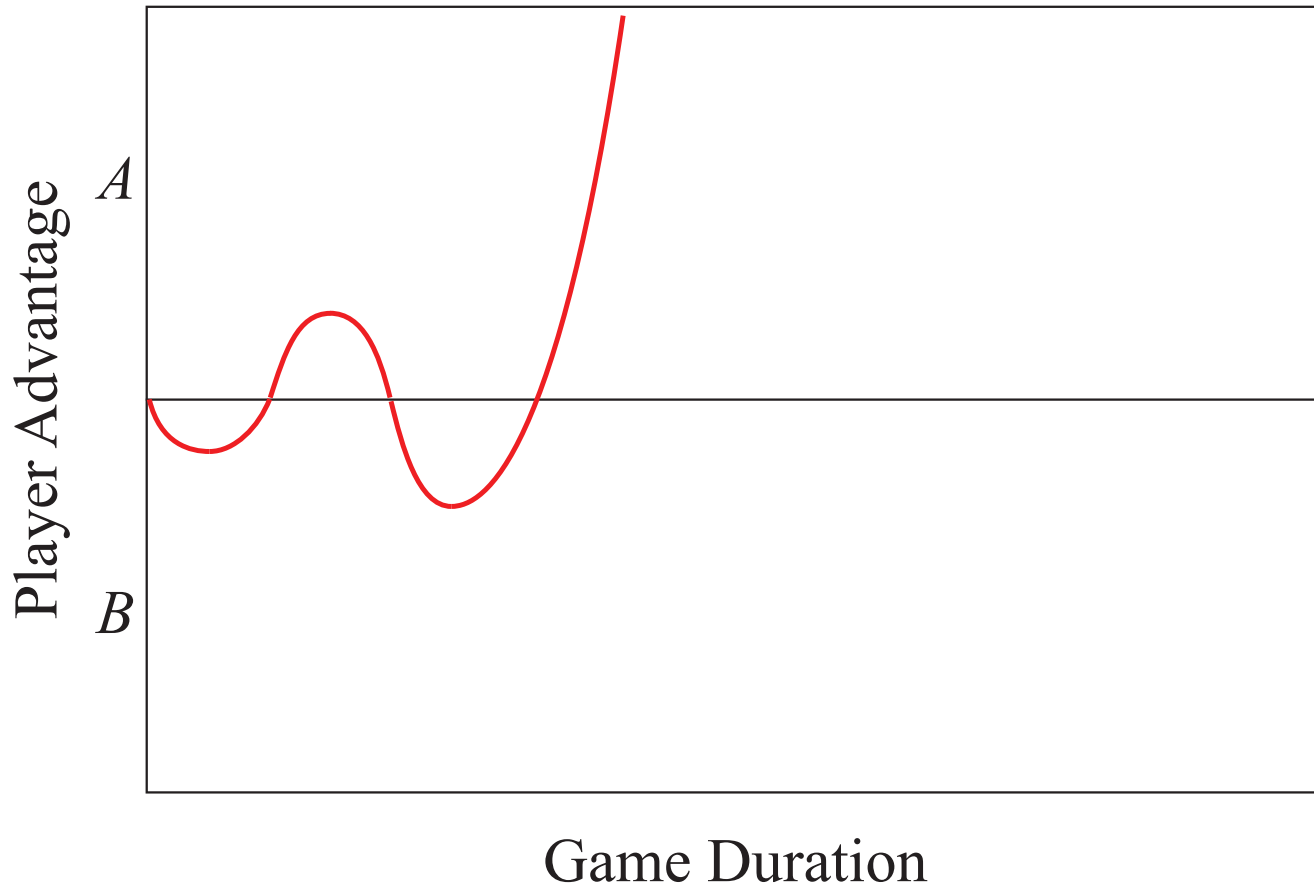 - Make game end quickly

Negative Feedback

- Can be *constructive*
  - **Ex**: Boost opponent
- Can be *destructive*
  - **Ex**: Drain player
- **Key Features**
  - Magnifies later actions
  - Equalizes player status
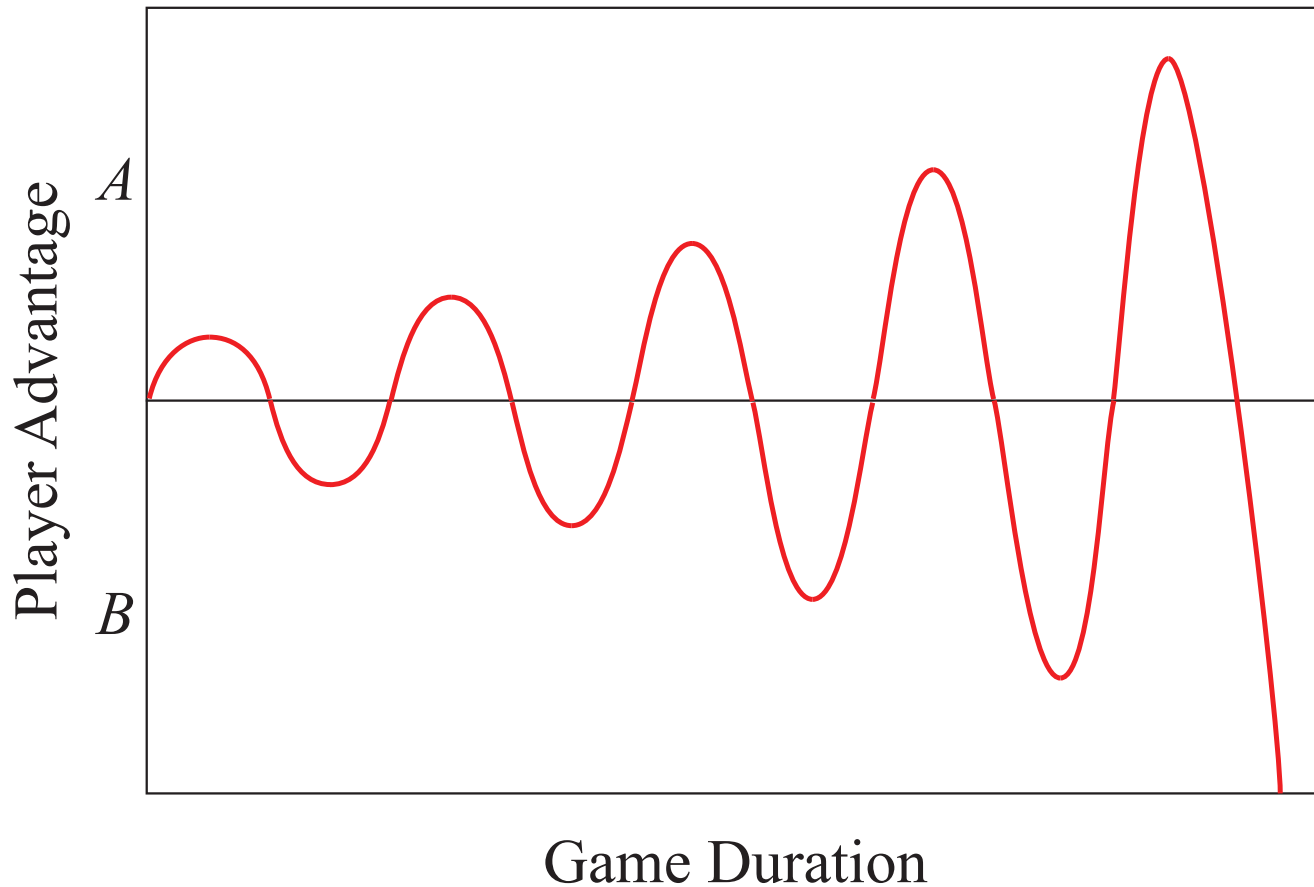 - Make game end slower

Game Balance

Ideal Game Progression

Player Advantage vs. Game Duration

Game Balance

Too Much Positive Feedback

Game Balance

Powerful Negative Feedback

Player Advantage vs. Game Duration

Game Balance

Parameter Tuning

- **Recall**: mechanics have parameters
  - How fast you can run
  - How far you can jump

- **Tuning**: adjust these parameters
  - Allows you to control feedback
  - How bad should blue shell effect be?

- Tuning requires a **lot** of playtesting

Game Balance

PvP: Politics

- Politics occur from **player alliances**
  - Players "gang up" against an opponent

- Problem with politics
  - Turns the game into a form of "voting"
  - Winner a matter of popularity, not skill

- What games are susceptible to politics?
  - Game must support more than two players
  - Game must allow resource sharing

Game Balance

Are Politics a Bad Thing?

- Not necessarily; some players like them
  - Make a strategy game more social
  - Example: *Settlers of Catan*
    - Trading resources is important
    - Consider player advantage in trade

- Impossible to eliminate in some games
  - Example: free-for-all games, wargames

- Just be aware in player testing

Game Balance

Kingmaking

- Player "chooses" winner
  - Extreme form of politics
  - Voting is not necessary

- Forms of kingmaking
  - Excessive aid to "king"
  - Sabotaging other players
  - Blocking player obstacles

- **Snowballing** encourages kingmaking

Game Balance

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Controlling Politics

- Make the game more like a race
  - Players have little ability to influence each other
  - Examples: footrace, backgammon, high scores

- Make sabotage resource expensive
  - Loss of resources disadvantages saboteur later
  - Example: base defenses in a strategy game

- Limit opportunities for alliances
  - Make it difficult for players to share resources
  - Example: cannot trade cards in Risk

Game Balance

Summary

- Game balance does not need an opponent

  - **Appropriately challenging**: neither too hard nor too easy

  - **Balanced resources**: actions are not too "expensive"

  - **No dominant strategy**: requires multiple play styles

- Multiplayer games introduce other issues

  - **Fairness**: equal players have equal chance of winning

  - **Pacing**: players have "reasonable" chance of catch-up

  - **Politics**: skill should be more important than alliances

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