Lecture 7

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?

Game Balance

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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

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"

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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

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

Overpricing

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- 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

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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
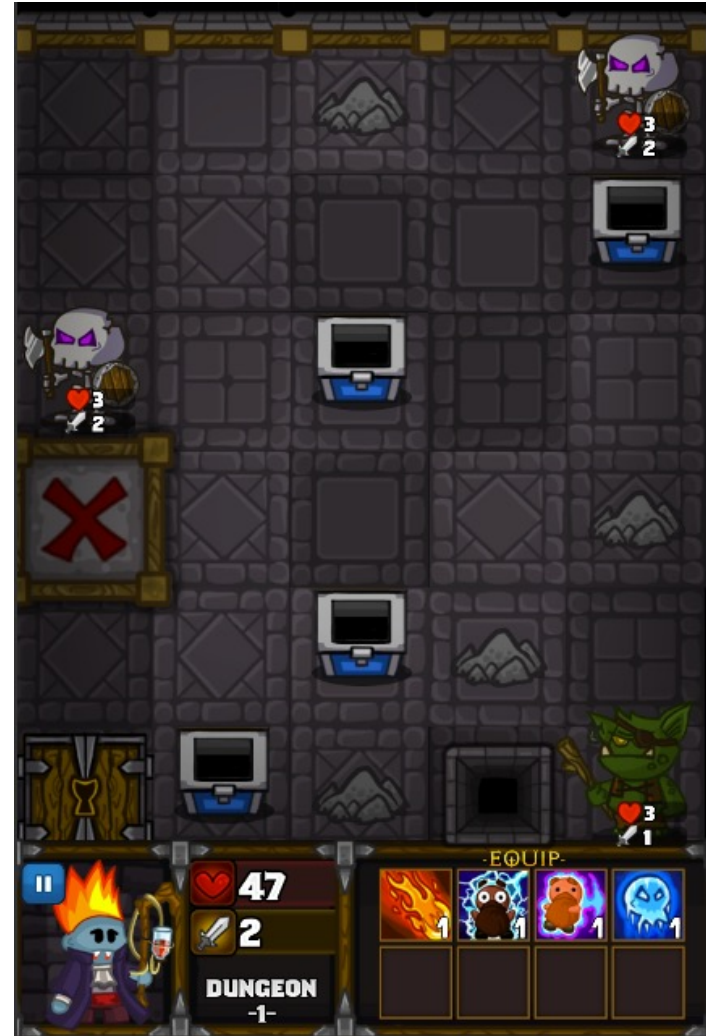
Bad Design: "Engines"

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

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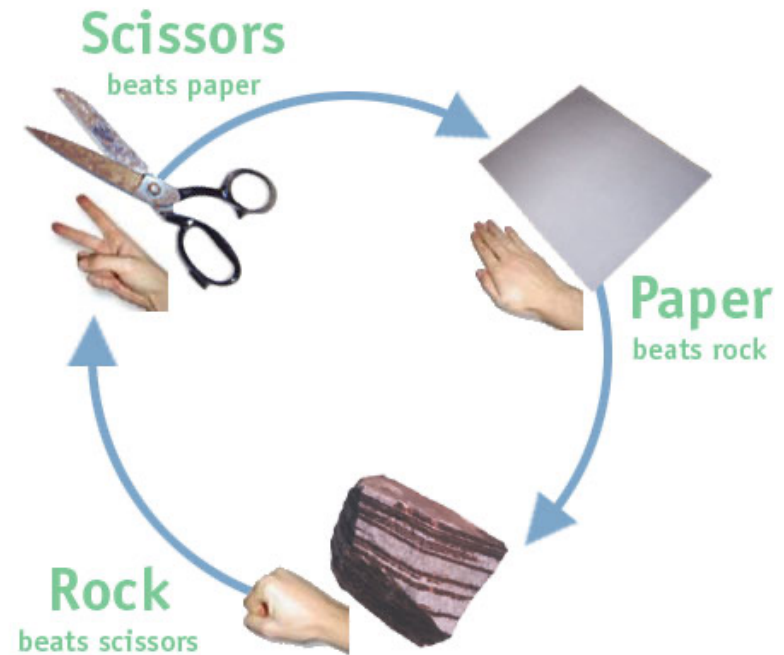 - Solution? Cool-down time

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**

Game Balance

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

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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
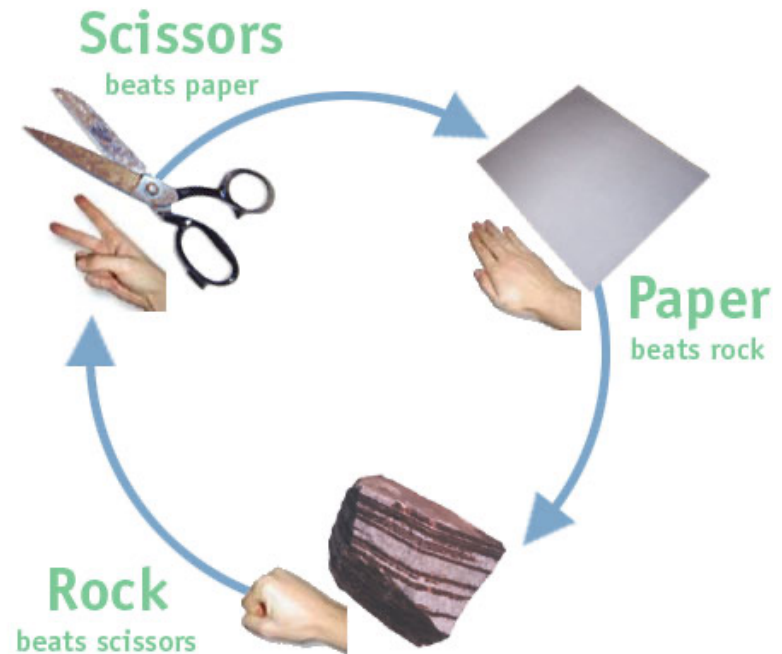
Scissors
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Paper
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Rock
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Types of Game Balance

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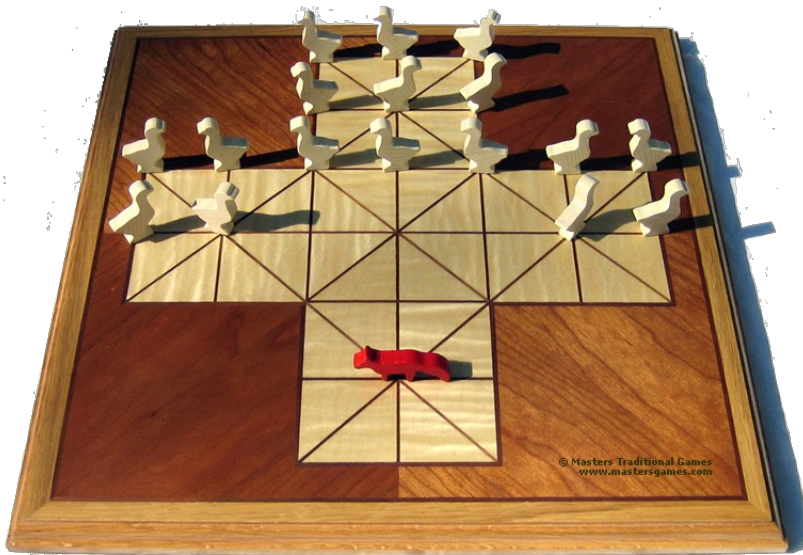 - **No dominant strategy**: requires multiple play styles

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

Game Balance

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

Game Balance

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
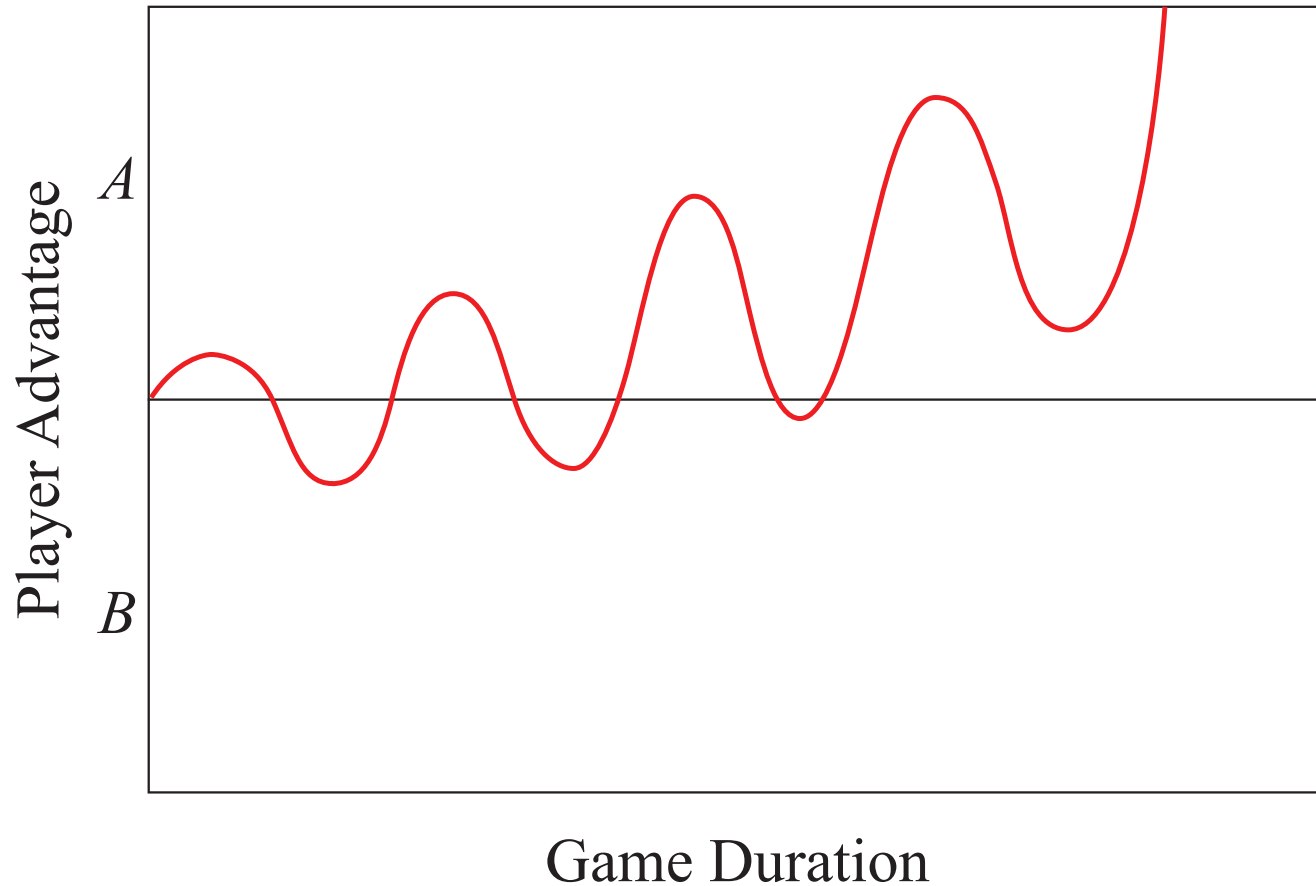 - Make game end quickly
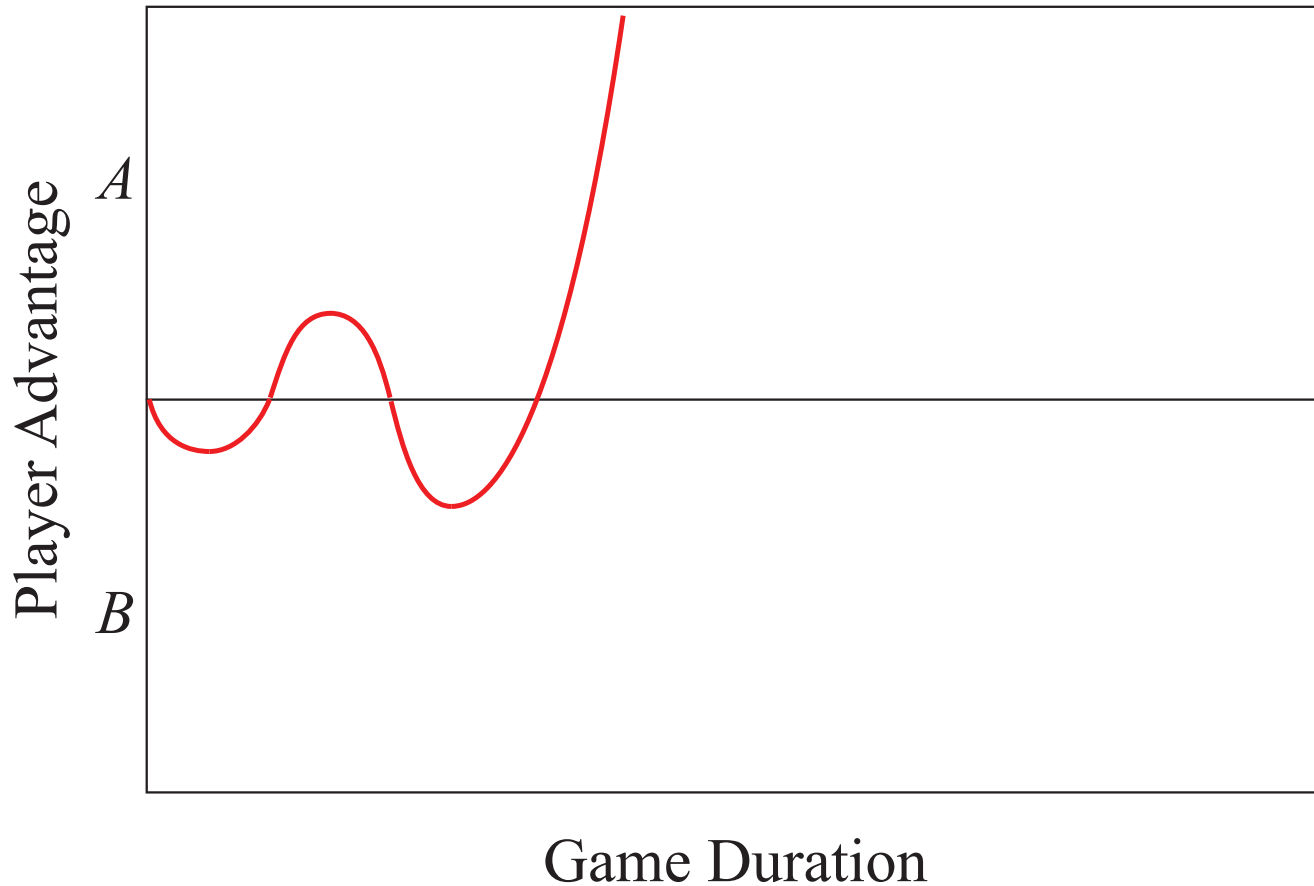
Negative Feedback

- 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

A

B

Game Duration

Game Balance

Too Much Positive Feedback

Player Advantage (vertical axis) vs. Game Duration (horizontal axis), with reference levels A and B.

Game Balance

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Powerful Negative Feedback

Game Duration

Player Advantage

A

B
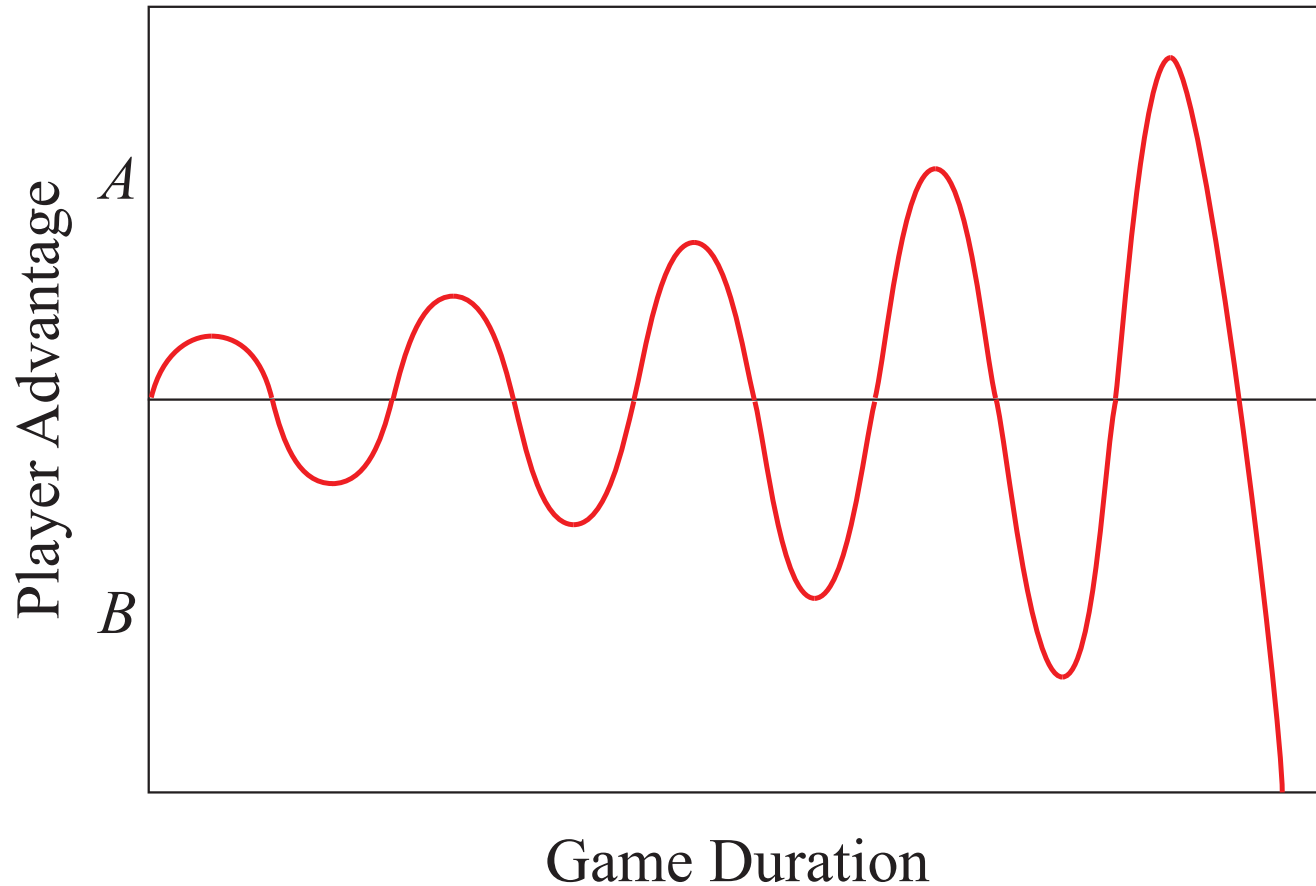
Parameter Tuning

- **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

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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

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

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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