Lecture 14

Level Design
What is Level Design?

- **Layout of game geography**
  - Location and relationship of challenges
  - Movement of dynamic features (e.g. NPCs)

- **Understanding of player capabilities**
  - Abilities, mechanics available to the player
  - Assumptions of current player skill level

- **Layout of player progression**
  - How the player should move through the game
  - How the player visualizes this progression
Aspects of Game Design

- **Games as Exploration**
  - Focuses on game *geography* and *capabilities*
  - Typically involves heavy storyboarding

- **Games as Education**
  - Train player skill and understanding
  - Focuses primarily on *player capabilities*

- **Games as Storytelling**
  - Focuses on *player progression*
  - Most challenging element of game design
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For a later lecture
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Players Want to Explore the World

- Exploring the **physical space**
  - What happens when I go here?
  - **Example**: Any western RPG
  - But does not require complex game world

- Exploring the **ludic space**
  - What happens when do this action?
  - Requires deep, complex interactions
  - **Example**: Buckets in Skyrim
Storyboarding

- Diagrams player action throughout level
  - Different from film storyboarding
  - Currently a bunch of *informal practices*

- **Embodied Action**
  - Action that is tied to a character/avatar
  - Typically maps player movement in level

- **Disembodied Action**
  - Action corresponding to UI elements
  - **Example**: Buttons, menus
Embodied Action: Single Scene

Level Design
Embodied Action: Multiple Scenes
Disembodied Action: Cause and Effect

- **Draw the initial scene**
  - Could be the entire level
  - Zoomed in portion of screen
  - Must capture area that will be affected by the action

- **Indicate the action**
  - Draw mouse pointer
  - Indicate gamepad button
  - Annotate with a “tool tip”

- **Draw the action effect**
  - Change in initial scene
Game Geography

- Relations of game challenges
  - Multiple challenges in a level
  - Flow of level progression

- Easiest to design **discretely**
  - Well defined player paths
  - Some deviation allowed
  - Storyboard indicates paths

- Ensure **meaningful choice**
  - More than one path works
  - Balance the risk vs. reward
Design Patterns

- Design uses building blocks
  - Mechanic/challenge pairs
  - Start and end location
  - String together to make level

- Key building block features
  - Requires verb/interaction
  - Must be possible to *fail*
  - Difficulty is *tunable*

- **Patterns** are common blocks
  - Appear many times in game
  - Even across multiple games
Design Pattern Examples

Platformer

Start

Tricky Jump

End

Stealth Game

Start

Avoid Detection

End
Design Pattern Examples

**Shooter/Action Game**
- Kill Enemies
- Cover

**Racing Game**
- Gain Speed
- Brake

Level Design
**Dash**: Basic Design Patterns

1. 
2. 
3. 
4.
**Dash:** Putting it All Together

[Diagram of game level design with legend including symbols for player, wanderer, shielded, chaser, shooter, and object, along with paths and points.]

Level Design
Composite Patterns

• Piecewise design creates a very linear feel
  • Pattern A followed by Pattern B followed by...
  • Player is explicitly aware of building blocks

• Composite patterns allow for variations
  • Two patterns combined in the same space
  • Makes original pattern much more difficult
  • Player now has to react to them both

• Reading: Extended/Evolutionary Challenge
Composite Patterns

Platformer

Interceptor

Force Jump

Stealth Game

Chaser
Composite Patterns

Shooter/Action Game

Cover Busters

Cover

Cover

Cover

Cover

GreNADE!

Racing Game

Restrict Positions
Is Linearity a Problem?

[Image attribution unknown]

1993

FPS map design

2010

Level Design
But Actually…

[refugeinaudacity.wordpress.com]
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Learning How to Play

- Mechanics are (often) new and unfamiliar
  - Players have to learn how to interact with them
  - **Aside**: why innovation is not always popular

- Players could learn by reading the *manual*
  - This is boring! Let me play already

- **Tutorial levels** allow the player to…
  - Get started playing immediately
  - Learn the mechanics while playing
Classic Approach: Restrict the Player

- Start with your **gameplay specification**
  - Remove all but the barest mechanics
  - Remove verbs by disabling controls
  - Remove interactions by omitting "board elements"

- Levels add new mechanics back one at a time
  - **Example**: Platformer with a "no-jump" level

- Do not need to add a new mechanic each level
  - "Deep" mechanics allow many levels per mechanic
  - This can influence game geography (e.g. worlds)
Example: Starcraft Campaign
Explicit Restrictions

• Mechanics are unavailable for current level
  • Controls for actions are explicitly disabled
  • Interactions disabled, even if elements present

• **Motivation**: Prevents player confusion
  • Do not waste time on useless mechanics
  • Key in the casual and young audience

• **Examples**: Many AAA commercial games
  • *Starcraft* single-player campaign
  • *Portal* (integrated into story)
Implicit Restrictions

• Mechanics are always available, but not needed
  • Challenges designed for an explicit mechanic
  • Other mechanics may succeed, but they are harder
  • Level has hints to guide player to right mechanic

• Motivation: Allow replay in tutorial levels
  • Players go back and try optional approaches
  • Achievements are structured to encourage this

• Example: Many amateur Flash games
  • My First Quantum Translocator
The Tyranny of Choice

- Too much choice can make us unhappy
  - We are often paralyzed by what to do
  - Studied by Myers & Lane; popularized by Barry Schwartz

- But games are about **meaningful choice**
  - Problem is when choices are too similar
  - Good choices must be *significantly* different
  - **Example**: Dagger adds +1 bonus to a stat of 102

- Players use rough heuristics for making choices
  - Pattern match current situation to determine action
Portal 2 Mechanics
game design

initiative at cornell university

Level Design

30

Recombination

New Mechanics

Mechanics

Introduction

Variation

Grab

Grab with Portal Device

Grab in flight

Portals

Single Portal Device

Dual Portal Device

Weighted Storage Cube

Multiple cubes

Emancipation Grill

Multiple buttons

Timed switches

Switches

Multiple beams

Panels

Momentum

Toxic Water

Thermal Discouragement Beam

Discouragement Redirection Cube

Unstationary Scaffold or Victory lift
Reinforcement

How long to “dwell” on mechanic before a new one?

Actions:
A = jump  B = dash

A  B  vs.  A  A  A  A  B
Recombination

How often to combine with other mechanics

**Actions:**

- A = jump
- B = dash
- C = shoot fireball

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>vs.</th>
<th>A</th>
<th>AB</th>
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Reinforcement vs. Recombination

Reinforcement

A A A B B B
A A B B AB AB
A B C D E
A AB ABC ABCD ABCDE

Recombination
Robot Unicorn Attack
Robot Unicorn Attack Progression

Mechanics:

A = jump    B = dash

A  A  A  B  A  A  A  B

High reinforcement, low recombination
Hello Worlds!
game design initiative at cornell university

A B
A
B
C
game design initiative at cornell university

Level Design

A

B

C
Hello Worlds

**Mechanics:**
\[ A = \text{move} \quad B = \text{two worlds} \quad C = \text{close world} \]

A   AB   AB   ABC   ABC

Moderate reinforcement, high recombination
Starcraft
Starcraft

Low reinforcement, high recombination
Next Time…

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