Lecture 13

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
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

For a later lecture
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
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

Easy Level

Level Design
Embodied Action: Multiple Scenes

- Point light
- Move, plug in
- Move, grab lights
- Point light
- Walk
- Win
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

Stealth Game

Tricky Jump

Start → End

Start → End

Avoid Detection
Design Pattern Examples

Shooter/Action Game

- Cover
- Cover
- Cover
- Kill Enemies
- Cover

Racing Game

- Brake
- Gain Speed
Dash: Basic Design Patterns
Dash: Putting it All Together

Legend

Player
Wanderer
Shielded
Chaser
Shooter
Object

Lantern
Finish
Player Path
Enemy Path
Point Along Enemy Path

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

Racing Game

Cover

Cover

Cover

Cover

Cover Busters

GRENADEx

Restrict Positions
Is Linearity a Problem?

FPS map design

1993

2010

cutscene
cutscene

cutscene
cutscene

cutscene
But Actually…

[refugeinaudacity.wordpress.com]
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
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

Level Design
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

A  B  C  vs.  A  AB  ABC
Reinforcement vs. Recombination

Reinforcement

<table>
<thead>
<tr>
<th>A</th>
<th>A</th>
<th>A</th>
<th>B</th>
<th>B</th>
<th>B</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

Recombination

<table>
<thead>
<tr>
<th>A</th>
<th>A</th>
<th>B</th>
<th>B</th>
<th>B</th>
<th>AB</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>AB</td>
<td>ABC</td>
<td>ABCD</td>
<td>ABCDE</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

Level Design
Robot Unicorn Attack

Level Design
Robot Unicorn Attack Progression

Mechanics:

A = jump  B = dash

High reinforcement, low recombination
Hello Worlds!
game design initiative at Cornell University

Level Design

A B C

Pillars

TIME: 0
PAR TIME: 60
SPEED TIME: 30

COINS: 0/19
STARS: 12
POINTS: 1203
Hello Worlds

Mechanics:
A = move  B = two worlds  C = close world

A  AB  AB  ABC  ABC

Moderate reinforcement, high recombination
Starcraft
Starcraft

Low reinforcement, high recombination
Next Time…

- **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