Lecture 14

Level Design
Do We Really Need Level Design?

- Level design makes sense for single player games

- What if our game is **open world**?
  - Each location is a level
  - All that changes is the transition

- What if our game is **multiplayer**?
  - Are the maps always the same?
  - What about game modes?

- What if is a **strategic card game** (e.g. *Magic*)?
  - Are all the cards available at start?
  - How does someone learn how to play?
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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Not in this Lecture

Level Design
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  - Most challenging aspect of game design
  
  *Not in this Lecture*
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**: Goofing on Bethesda NPCs
Storyboarding

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

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

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

Easy Level
Embodied Action: Multiple Scenes

Level Design
But There is a Problem

- You are **not** the player!
  - You storyboard what you *think* player will do
  - Player may do something completely *different*!

- Level design is about **constraining** player
  - You design level to force player to do things
  - Challenges are doors blocking progress
  - Player must use skill to open the door

- Storyboarding **maps** these constraints
This is How it Ever Was

- Classic text adventures...
  - Goal is location to reach
  - Locked doors block progress
  - Use actions to unlock doors
- Still design in the same way
  - Challenges block the goal
  - Use mechanics to overcome
- Design levels with...
  - **Discrete challenges** (doors)
  - Put together **intelligently**
This is How it Ever Was

- Classic text adventures…
  - Goal is location to reach
  - Locked doors block progress
- Use actions to unlock doors

- Tight Level Design = Tight Challenge Spacing

- Use mechanics to overcome

- Design levels with…
  - Discrete challenges (doors)
  - Put together intelligently
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
- 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
Dash: Putting it All Together

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 Busters

GRENADEx

Cover

Restrict Positions
Is Linearity a Problem?

[Image attribution unknown]  

FPS map design

1993  

2010  

[Image attribution unknown]
But Actually…

[refugeinaudacity.wordpress.com]
But Actually…

Complaint is not **linearity**; it is **tightness**
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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

Level Design
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 comercial 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
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Limiting choice helps train player
Portal 2 Mechanics

Level Design
New Mechanics

Recombination
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

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

Recombination

A A B B
A AB AB
A AB ABC
ABC ABCDE
Robot Unicorn Attack
Robot Unicorn Attack Progression

Mechanics:

A = jump         B = dash

A A A A B A A B A A A A B

High reinforcement, low recombination
Hello Worlds!
Hello Worlds!

TIME: 7
PAR TIME: 45
SPEED TIME: 12

ALPHA

COMBO(C) REWIND(Y) QUIT

RESTART(R)

COINS: 0/6
STARS: 0
POINTS: 0
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
Summary

- Level design is always important
  - How keep your game different, lively?
  - How do you train your player?

- Level design uses geographic constraints
  - Create challenges by defining design patterns
  - Storyboard so player must go through challenges

- Level design uses ludic constraints
  - Do not introduce all of your capabilities at once
  - Leverage reinforcement and recombination