Class 8:

Progressions
<table>
<thead>
<tr>
<th>Mon</th>
<th>Wed</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/11</td>
<td>9/13</td>
<td>9/15</td>
</tr>
<tr>
<td>Progressions</td>
<td>Achievement Mechanisms</td>
<td>Throwaway Testing 1</td>
</tr>
<tr>
<td>9/18</td>
<td>9/27</td>
<td>9/29</td>
</tr>
<tr>
<td>Throwaway Testing 2</td>
<td>Alpha Testing 1</td>
<td>Alpha Testing 2</td>
</tr>
</tbody>
</table>
Assignment 5: Throwaway Prototype

- Friday and Monday
- **No pressure**
- Doesn’t need to be playable or integrated
- Pick *some pieces* of your game and build them
  - Avatar moves/jumps on flat land
  - Grid with nothing on it
  - Background artwork
- Submit picture through CMS by *end of class* on Friday 8/15
Review: *discoverable situations*

- *Impossible to pass* without experiencing interaction
- *Isolated* from other actions and interactions
- Player is relatively *safe*
Review: User Interfaces
Impact of animations

Refraction

Hello Worlds

Andersen et al. CHI 2011
Impact of animations
Impact of animations

**Refraction**

7,765 players

**Hello Worlds**

5,050 players
With animations, engagement...
With animations, engagement…

You can bend the beam using this laser bender.
With animations, engagement...
With animations, engagement...

no change

no change
Engagement (time played, seconds)

**Hello Worlds**

- No animations: 300 seconds
- Animations: 400 seconds

*p = 0.01*

**Refraction**

- No animations: 400 seconds
- Animations: 500 seconds

*p < 0.001*
Performance (levels completed)

**Hello Worlds**

- No animations: 6
- Animations: 7

*p > 0.05*

**Refraction**

- No animations: 9
- Animations: 10

*p < 0.001*
Now: Learning and Engagement
Outline

1. Flow and units of challenge
2. Progression metrics and Gantt charts
3. Group activity: *progression analysis*
Outline

1. Flow and units of challenge
2. Progression metrics and Gantt charts
3. Group activity: progression analysis
Flow
Flow State

- **Intense and focused concentration** on what one is doing in the present moment
- Loss of reflective self-consciousness
- A sense that one can control one’s actions
- Distortion of temporal experience
- Experience of the activity as intrinsically rewarding

Nakamura and Csikszentmihalyi 2001
Conditions for Flow

- Perceived challenges, or opportunities for action, that stretch (neither overmatching nor underutilizing) existing skills
- Clear proximal goals and immediate feedback about the progress that is being made

Nakamura and Csikszentmihalyi 2001
Trivia: That Game Company

Journey (2012)

Flower (2009)
Trivia: *Flow*

Jenova Chen

Abuhamdeh and Csikszentmihalyi 2012

- Studied impact of skill difference on fun in chess
- Measured skill through Elo ratings
  - Base score: 1400
  - Expert: 2000
  - Grandmaster: 2600
- Win probability:
  - +0 = 50%
  - +200 = 16%
  - +400 = 3%
Players preferred playing players ranked:

-1000   -500   0    +500   +1000
Players preferred playing players ranked:

0  +125  +250  +375  +500

262 points
“Players most enjoyed competing against opponents who had ratings that were 262 points higher than their own ratings.”

“The probability of a player winning such a game is approximately 20%.”
Flow: Ideal situation

- Anxiety
- Boredom
Challenge: manage complexity

- **Break down** complexity into *discrete* and *recognizable* components
- *Systematically* and *gradually* introduce components
  - this is called a *progression*
Units of Challenge: Design Patterns

Platformer: Jump

- Tricky Jump

Stealth Game: Avoidance

- Avoid Detection

- Help player to *recognize* situations and *apply* learned skills
- Often inspired by game genre
- Ultimately, specific to your game design
Robot Unicorn Attack Progression

Challenges:
A = jump        B = dash

A A A A B A A B A A B
Robot Unicorn Attack Progression

- **Dash**:较少的挑战
- **Jump**:较多的挑战
Outline

1. Flow and units of challenge
2. Progression metrics and Gantt charts
3. Group activity: progression analysis
Gantt Chart

- Generally used for project planning
- We will use them to analyze and plan progressions

Task 1
Task 2
Task 3
Task 4

June July August September October November December
Portal 2 Gantt Chart

Level

Mechanic

Source: Piotr Bugno
https://www.behance.net/gallery/4434779/Portal-2-timelines
Design Patterns *Compose*

Avoidance + Avoidance  
Avoidance + Chasing

[Diagram showing the concepts of Avoidance and Chasing]
LightBot Playthrough
## LightBot Progression

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>jump</td>
<td></td>
</tr>
<tr>
<td>turn</td>
<td></td>
</tr>
<tr>
<td>light</td>
<td></td>
</tr>
<tr>
<td>move</td>
<td></td>
</tr>
</tbody>
</table>
This tends not to happen
This tends not to happen
This tends not to happen
More likely

Challenge

Mechanic 3

Mechanic 2

Mechanic 1

Task
Ideal?

Challenge

Level

Mechanic 3

Mechanic 2

Mechanic 1
What metrics define a progression?

Mechanic 1

Mechanic 2

Mechanic 3
Learning Pace
Learning Pace

- How frequently to introduce new mechanics?

\[
\frac{\text{# of mechanics}}{\text{# of tasks}}
\]
Portal 2 Pace

61 levels

28 mechanics

\[
pace = \frac{\text{# of mechanics}}{\text{# of tasks}} = \frac{28}{61} = 0.46 \text{ mechanics/task}
\]
Reinforcement

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

**Challenges:**

A = jump  
B = dash

**A B**  vs.  **A A A A B**
Recombination

• How often to combine mechanics with other mechanics?

Challenges:
A = jump         B = dash       C = shoot fireball

A  B  C  vs.  A  AB  ABC
Comparing progressions

Reinforcement

Recombination
Pair activity: compare progressions

Reinforcement

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

Recombination
Reinforcement

\[ A, A, A, \]
\[ B, B, B \]

Recombination

\[ A, AB, ABC, ABCD, ABCDE \]
\[ A, AB, ABC, ABCD, ABCDE \]
A, A, B, B, AB, AB

A, A, A,
B, B, B

A, B, C, D, E

A, AB, ABC,
ABCD, ABCDE

Reinforcement

Recombination
Robot Unicorn Attack Progression

Challenges:
A = jump  B = dash

High reinforcement, low recombination
Hello Worlds

**Challenges:**
A = move  
B = two worlds  
C = close world
Hello Worlds

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

A AB AB ABC ABC

Moderate reinforcement, high recombination
What’s the best?

- No correct answer
- Some reinforcement but not too much
- Some recombination but not too much
Outline

1. Flow and units of challenge
2. Progression metrics and Gantt charts
3. Group activity: progression analysis
Group activity #1

Make a Gantt Chart for *In the Company of Myself*

http://www.kongregate.com/games/2DArray/the-company-of-myself