Adapting Game Mechanics with Micro-Machinations

Seminar Automated Game Design
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Joint work with
Joris Dormans
Problem Statement, Objectives and Approach

• Problem
  – Long design iteration times because designers lack a means of adapting game mechanics in software

• Objectives
  – Reduce game design iteration times

• Approach
  – Live adaptation of game mechanics with Micro-Machinations
Machinations Background

• Visual modeling language for game design

• Diagrams are directed graphs

• Expresses game mechanics
  – Depicts internal economy
  – Makes feedback loops explicit

• Works by redistributing resources between nodes along the edges

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<th>2</th>
<th>3</th>
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<td>28</td>
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<td>112</td>
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<td>7</td>
<td>14</td>
<td>28</td>
<td>56</td>
<td>112</td>
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</tbody>
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The Machinations logo contains a feedback loop
Machinations Language Evolution

1. Game Design Aid
   - Prior work of Ernest Adams and Joris Dormans
   - Helps understand how rules affect play
   - Limited to game design

2. Analyze Micro-Machinations
   - Prior work with Paul Klint
   - In MM we formalized Machinations’ meaning and extended the language
   - Added a textual notation

3. Live Adaptations
   - We make MM embeddable in game software and modifiable at run-time
   - We provide the embeddable MM Library and language extensions for modifications
   - Helps experiment and play test for gaining immediate feedback
Why Live Adaptations?

• **Speed-up** of game design
  – reduced game design iteration times
  – immediate feedback in play testing

• **Quality and Productivity** improvement opportunities
  – short iterations → more improvements possible
  – software reuse → lower chances for new bugs
AdapTower: Workshop Teaser

- Creeps spawn into the world

- Two kinds of buildings
  - Towers
    - kill creeps
    - produce essence
  - Bases
    - catch essence
    - produce gold

- Players can spend gold
  - Buy a tower for 20 gold
  - Buy a base for 50 gold
Workshop Teaser: Demo
AdapTower: Internal Mechanics

Let’s count the number of creeps, towers, bases, essence and gold.

Visual Micro-Machinations run-time state
Workshop

• Goals
  – Share information about Micro-Machinations
  – Demonstrate interactive game adaptations
  – Think about practical applications
  – Discuss limitations
  – Discuss future directions
Conclusion

- Micro-Machinations Library
  - Open source
    https://github.com/vrozen/MM-Lib/

- Collaboration with IC3D Media
  - Loren Roosendaal
  - Early quality assurance in software production

- Future work
  - Generalize results Micro-Machinations
  - Procedural Game Mechanics and Gameplay