

CS 672: Spring 2010

Game Programming and Design

<http://experimentalgameplay.com/blog/games/>

Rapid prototyping
MDA framework
Prototype design

MDA Framework

Hunicke, LeBlanc, Zubek
MDA: A Formal Approach to
Game Design and Game
Research

Games *as* Software

MDA Framework



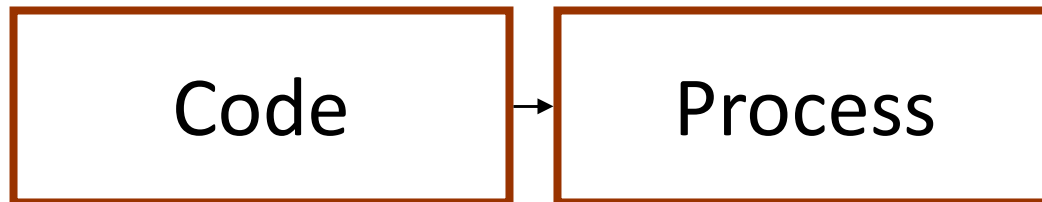
Code

Hunicke, LeBlanc, Zubek.

**MDA: A Formal Approach to Game Design
and Game Research**

Games *as* Software

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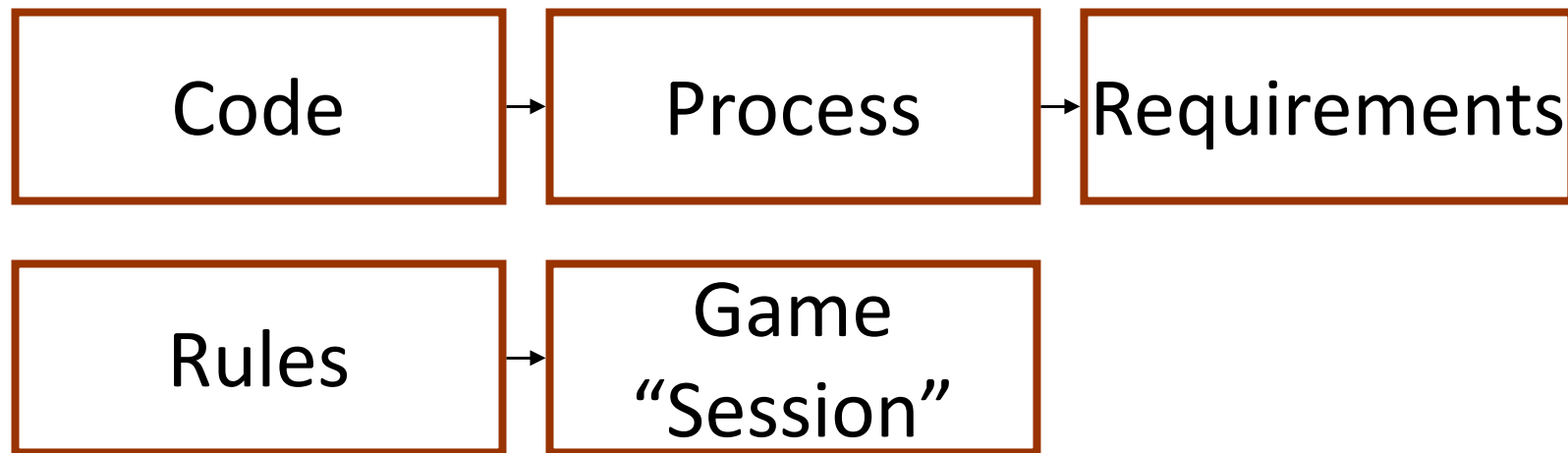


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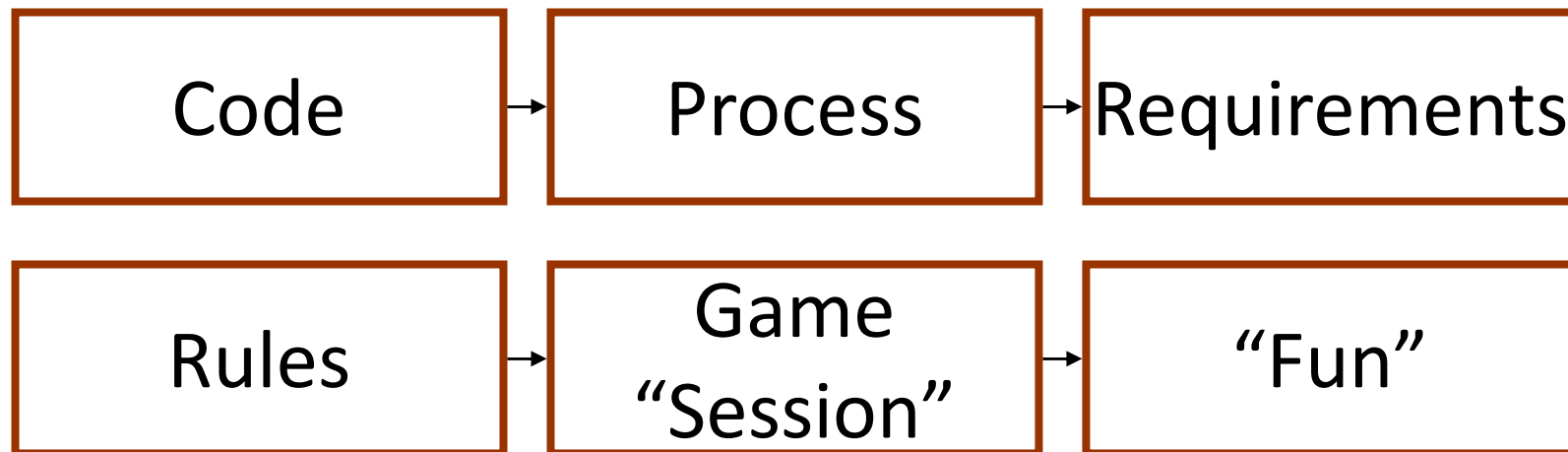


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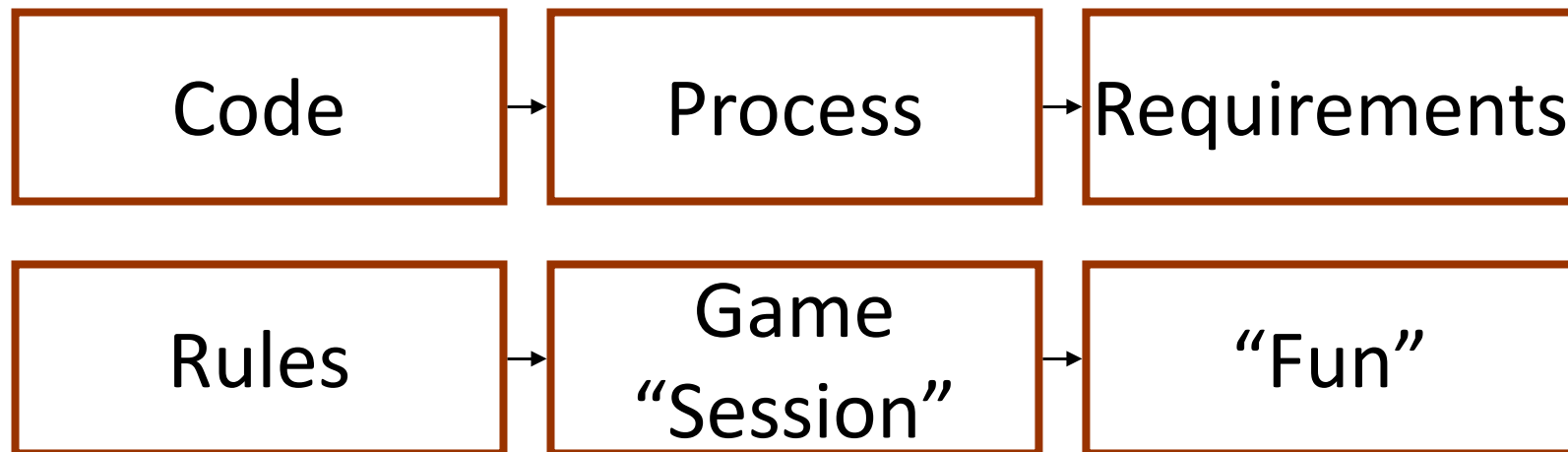


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A Design Vocabulary

MDA Framework

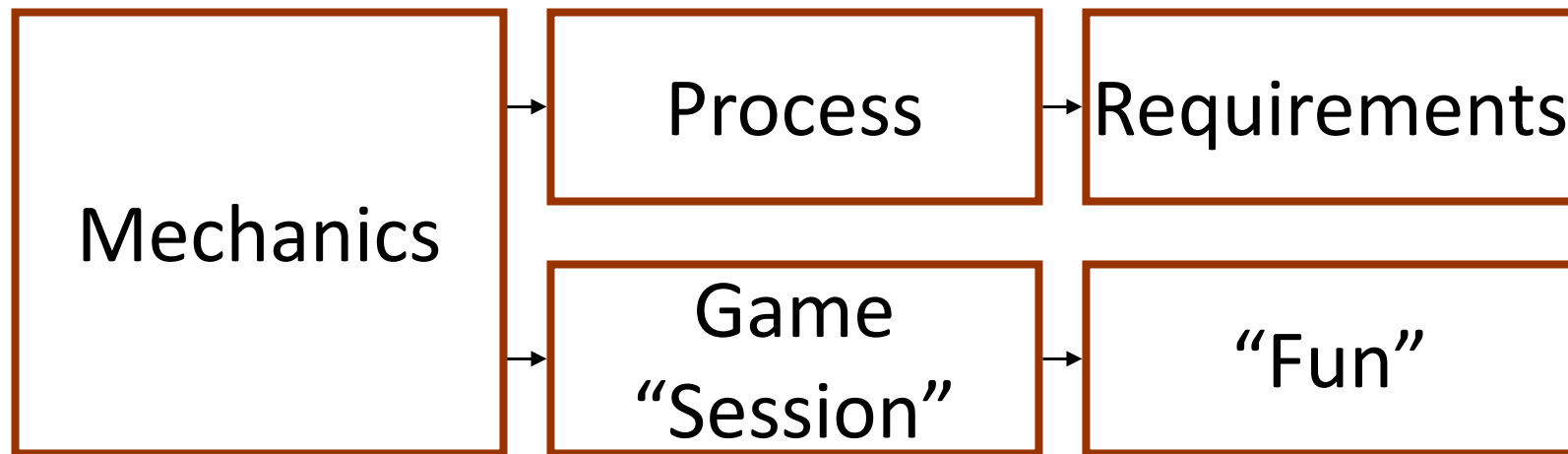


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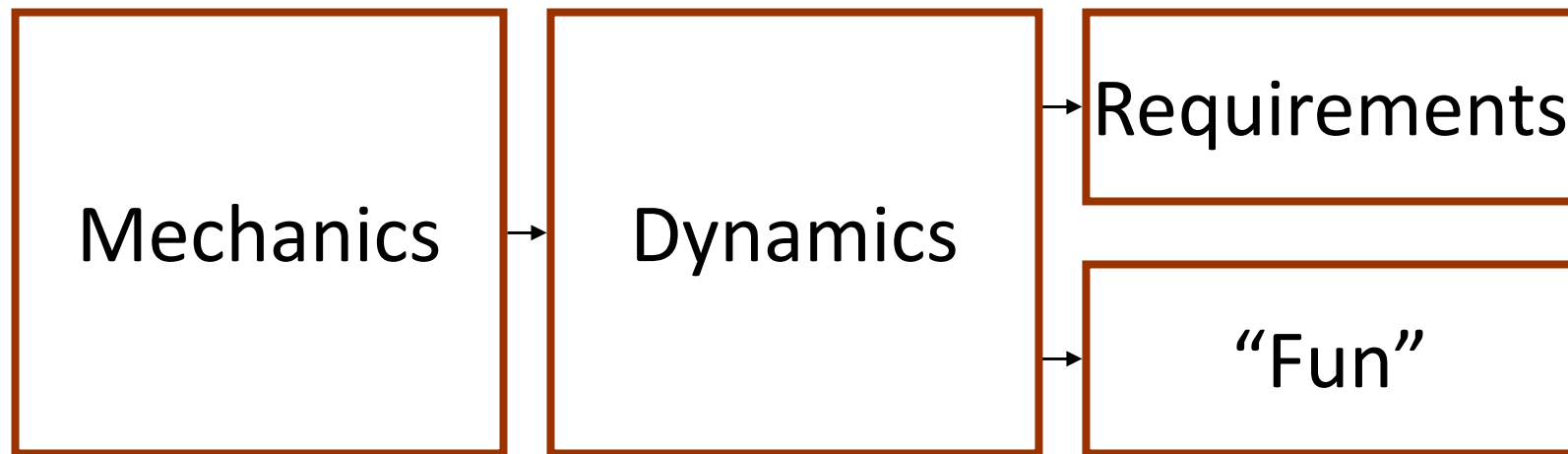


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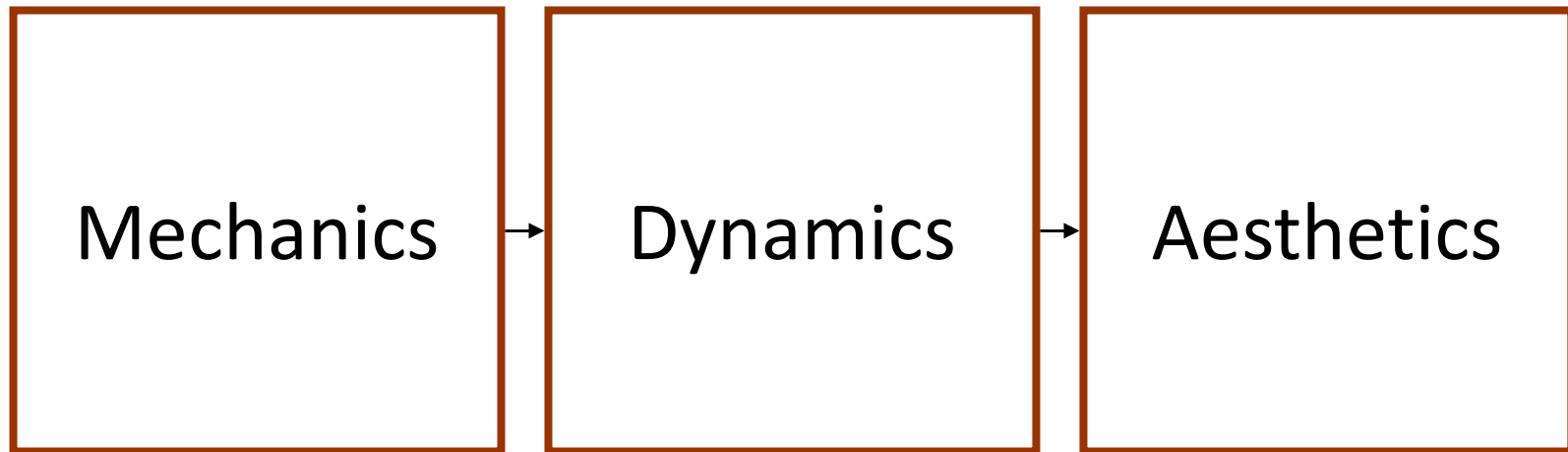


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Definitions

MDA Framework

- **Mechanics:** The rules and concepts that formally specify the game-as-system.
- **Dynamics:** The run-time behavior of the game-as-system.
- **Aesthetics:** The *desirable emotional responses* evoked by the game dynamics.

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The Player's Perspective

MDA Framework



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The Designer's Perspective

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Aesthetics

- **Emotional** requirements of the Software
- Questions
 - How to get past words like **fun** and **gameplay** ?
 - What kinds of **fun** are there?
 - How to recognize a particular kind of **fun** when we see it?

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Aesthetics

Eight Kinds of Fun

1. Sensation

Game as sense-pleasure

2. Fantasy

Game as make-believe

3. Narrative

Game as drama

4. Challenge

Game as obstacle course

5. Fellowship

Game as social framework

6. Discovery

Game as uncharted territory

7. Expression

Game as self-discovery

8. Submission

Game as pastime

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Aesthetics

Clarifying Aesthetics

- **Quake** is fun.
- **Final Fantasy** is fun.

- **Quake**: Challenge, Sensation, Fantasy
- **Final Fantasy**: Fantasy, Narrative, Expression, Discovery, Challenge

Hunicke, LeBlanc, Zubek.

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Aesthetics

Clarifying Goals

- As designers, one can choose certain aesthetics as **goals** for the game design.
- As with other software, the process is driven by **requirements**, not **features**.
- However, one word is not enough to describe a goal.

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Dynamics and Mechanics

- **Dynamics:** state machine(s), feedback systems
- **Mechanics:**
 - **Shooters:** Ammunition, Spawn Points
 - **Golf:** Sand Traps, Water Hazards
- Mechanics vs. Dynamics
 - Dynamics and Mechanics are different *views* of games.
 - Dynamics *emerge* from Mechanics.

Hunicke, LeBlanc, Zubek.

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Prototype design

Basic “how to”

Protoype Programming

- What is important
 - Agility
 - Quick rethinking of ideas and easy change
 - Velocity
 - Throw away and rebuild from scratch fast
 - Try out many ideas very fast
- What is **not** important
 - Robustness
 - Elegance and/or optimal code (important later 😊)
 - Do **not** fall in love with your idea and/or tech !

[Gingold 2006]

Rapid Prototyping

www.experimentalgameplay.com

- **Setup:** “Rapid” is a State of Mind
 - Embrace possibility of failure
 - Develop in parallel
- **Design:** Creativity and “Myth of Brainstorming”
 - Formal brainstorming = 0% success rate
 - Gather art + music to create emotional target
 - Simulate in your head: pre-prototype the prototype
- **Development:** Nobody knows how you made it, and nobody cares
 - Build the toy first
 - Fake it. Nobody cares about your great engineering
- **General Gameplay:** Juicy Fun
 - Complexity does not equal fun
 - Create a sense of ownership for the player
 - Build toward a well defined goal

Rapid Prototyping

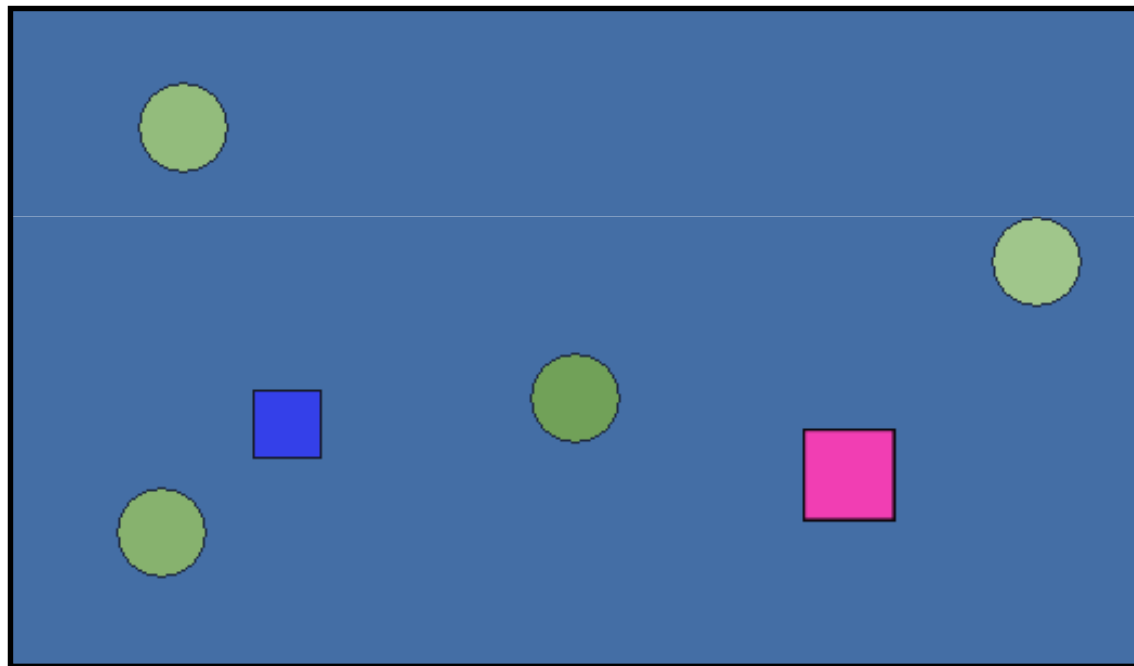
Failure is not the end of the world

- Shigeru Miyamoto:
 - ... and Miyamoto himself would say that he did not want any documents. He would just say, "Find the fun, and I'll be back in three months to take a look at what you have."
- The „Lessons“
 - Give yourself a short period of time to 'find the fun' in a design
 - If the fun isn't there, move on
 - If you do fail, it isn't the end of the world

[Lost Garden 2007]

Examples (1)

- The Marriage

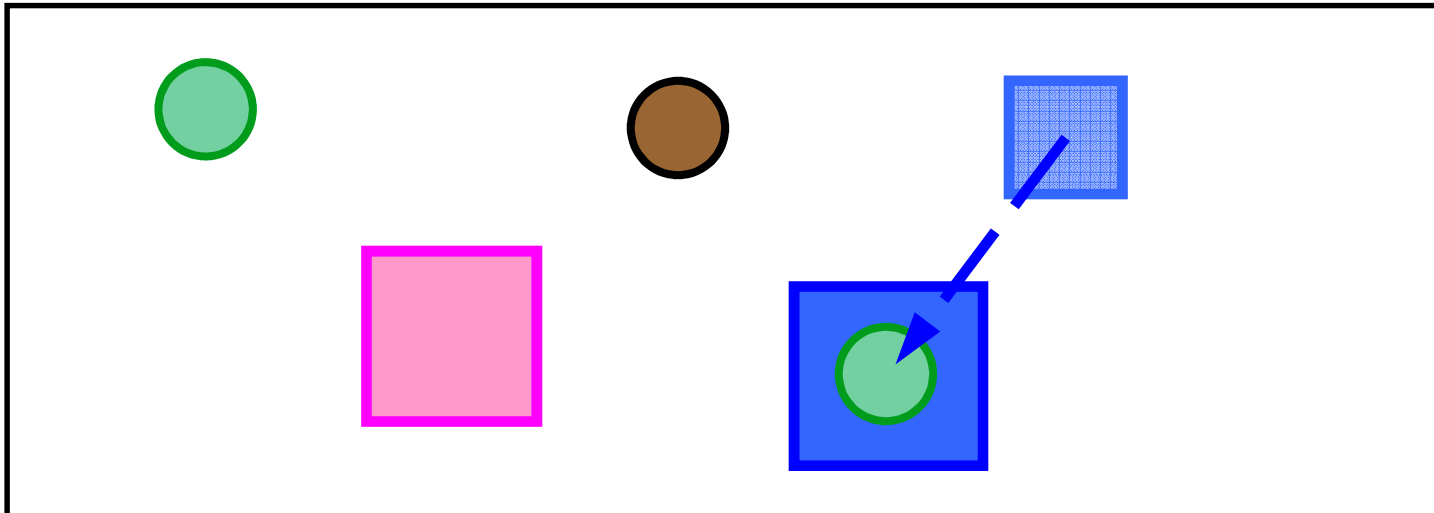


<http://www.rodvik.com/rodgames/>

Gameplay Mechanics (1)

- **Situation:**

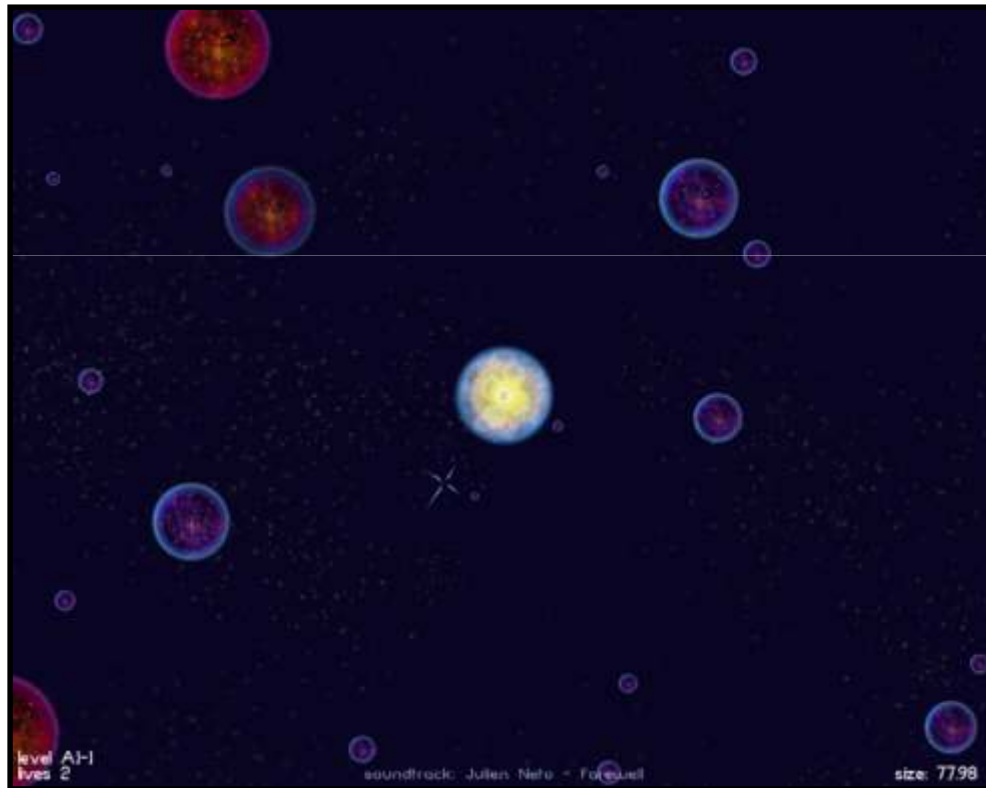
- Need to keep both partners   happy



- Takes some learning and „interpretation“
- Interaction is minimal, but very interesting
- „Winning“ is not as simple as it looks

Examples (2)

- Osmos

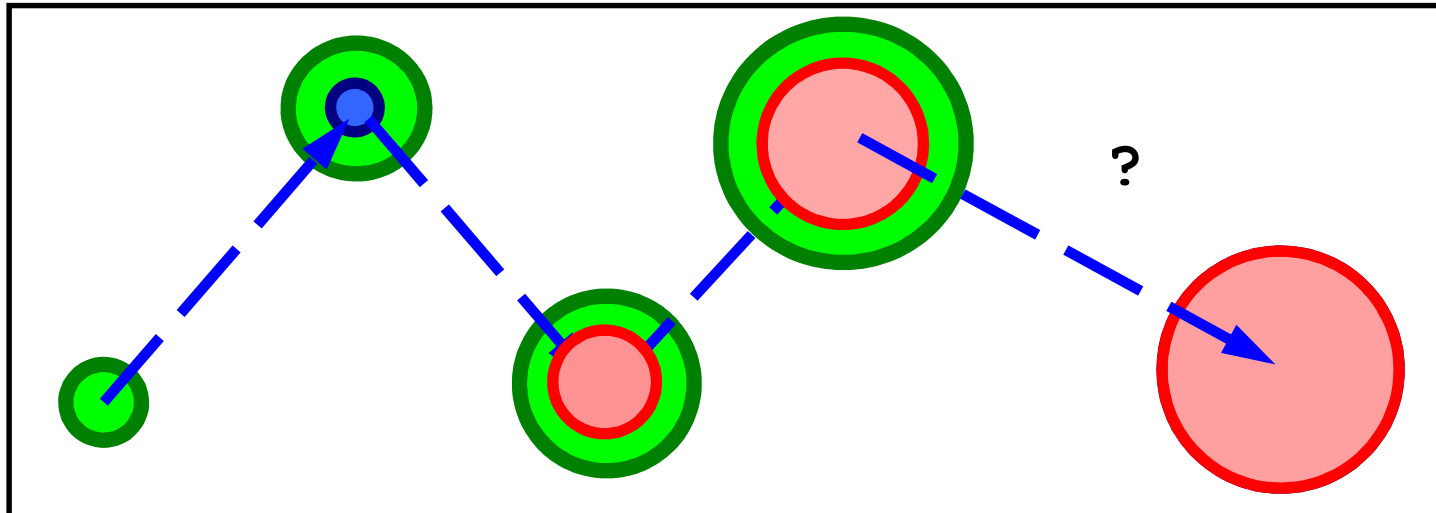


<http://www.hemispheregames.com>

Gameplay Mechanics (2)

- **Situation:**

- Need to eat all ●, and travel by preservation of linear momentum



- Introduces trade-off (speed/direction vs. size)
- Ambient sound and visuals
- Small change in design = large difference in gameplay
- Compared to ?

Examples (3)

- flOw

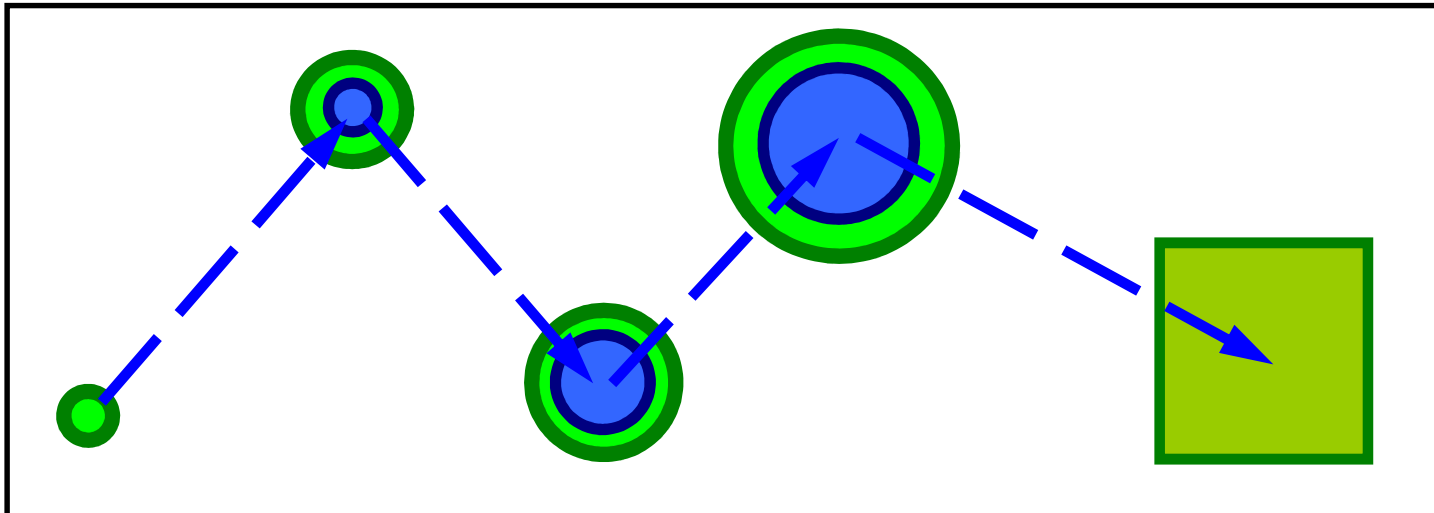


© Jenova Chen

Gameplay Mechanics (3)

- **Situation:**

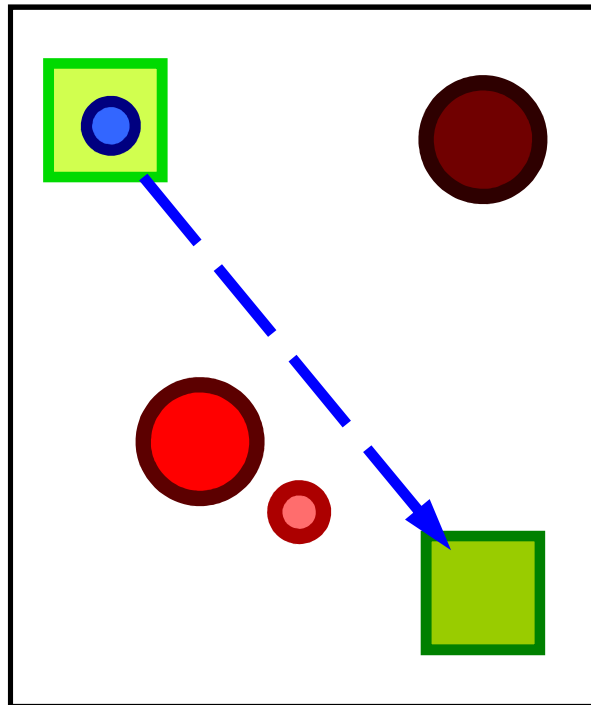
- Need to eat ● and progress to ■ in order to evolve



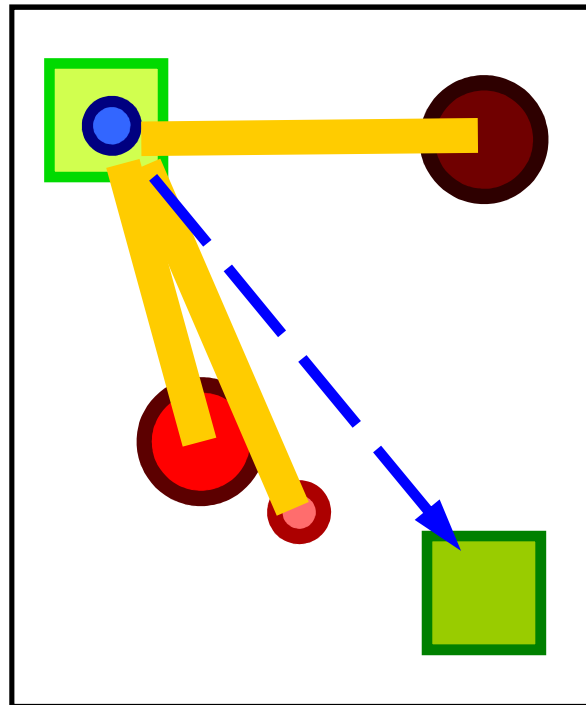
Start with Abstraction (1)

- **Situation:**

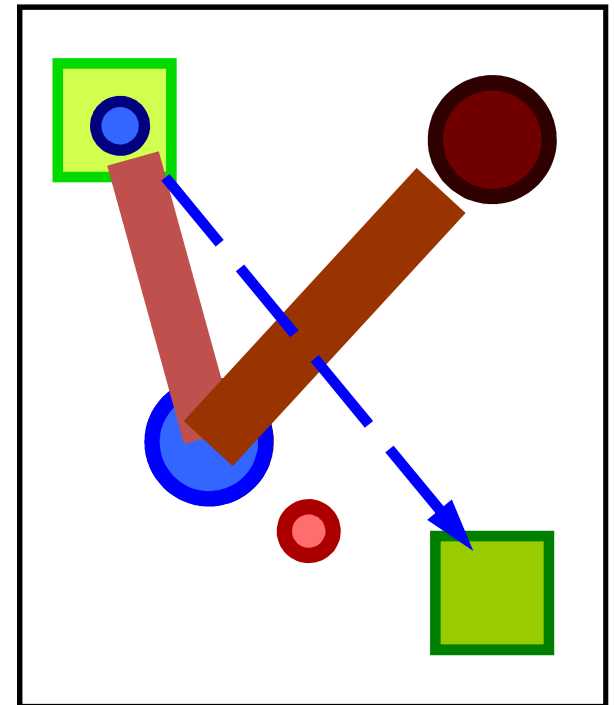
- Need to get from  to , while avoiding enemies   



Problem



(Trivial) Solution



Other Solution

Implementation Example (1)

- This principle is implemented in some games
 - Example: **Bioshock** (August 2007)

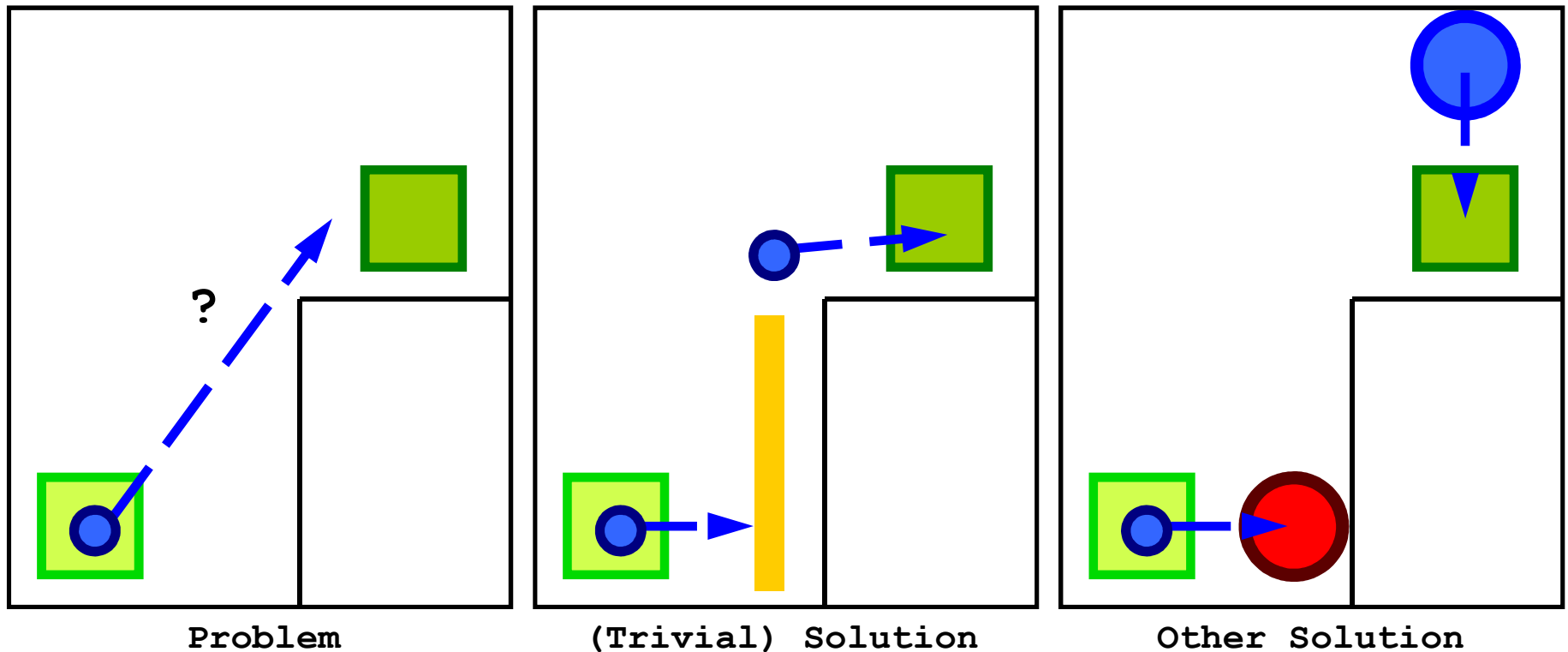


© Irrational Games

Start with Abstraction (2)

- **Situation:**

- Need to get from  to , in possession of 2 „doors“  



Implementation Example (2)

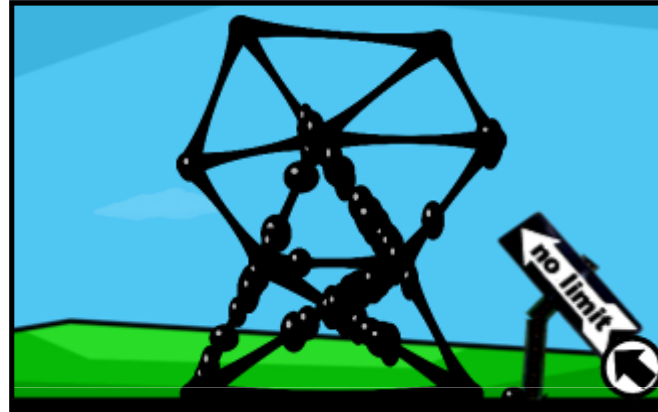
- This principle is implemented in Narbacular Drop, also known as Portal



© 2007 Valve

Prototype vs. Final Game

- Prototype:
Tower of Goo
(Demo)



http://www.gamasutra.com/features/20051026/gabler_01.shtml

- Final:
World of Goo
(Video/Demo)
<http://www.2dboy.com>



Abstraction vs. Actual Game

- Is an abstraction less playable and/or fun ?

DEMO

- Discuss:
 - Why is this still ok ? Is this still ok ?
 - Familiar music, character, and/or setting ?
 - Game balance is independent of rendering ?
 - Player control is more important than visuals ?

Ideas are Everywhere

- „Three Hundred“ Mechanics

<http://www.squidi.net/three/>

- 400 Rules list

<http://www.theinspiracy.com/Current%20Rules%20Master%20List.htm>

- Indie Game List(s)

<http://www.indiegames.com/play.htm>

<http://www.gametunnel.com/articles.php?id=620>



Cave Story (FREE)

Cave Story invariably gets mentioned whenever independent games are discussed, and for good reason: it's a sublime video game. Daisuke "Pixel" Amaya has paired finely tuned game mechanics with a sad but sweet tale involving an amnesiac robot soldier, a power-hungry mad scientist, and a race of rabbit-like creatures called Mimigas. The graphics and music are decidedly retro, but serve the simple elegance of the game. Cave Story is a true classic that takes a beloved genre to a near-perfect excellence.



Darwinia (\$20)

Winner of the 2006 IGF Grand Prize, Darwinia deftly combines action, strategy, and puzzle elements. In the game, the player is charged with saving a virtual world from a terrible virus. Darwinia was one of the first independent titles to achieve true mainstream critical acclaim, and rightfully so: its unique blend of game mechanics and striking visual style bring classic gaming back in a very new way.

Also by this developer: [Defcon](#), [Link](#)



flOw (FREE)

Born from Jenova Chen's undergraduate thesis on dynamic difficulty adjustment ("DDA") in video games, flOw is a landmark experiment in game development. Whereas most games rely on tension and forced challenges to keep you interested, flOw draws the player in by allowing them to adjust the challenge themselves through actions performed during the game. With crystalline graphics and soothing, ambient music, the result is an experience you can truly get lost in.

Also by this developer: [Cloud](#)

Further Reading

- Rules of Play

- Unit 1: Core Concepts (but the ideas are interspersed throughout the book)

- The Chemistry Of Game Design

http://www.gamasutra.com/view/feature/1524/the_chemistry_of_game_design.php?print=1

- Flow in Games

<http://jenovachen.com/flowingames/thesis.htm>

- Library of Game Mechanics (page 385)

<http://acta.uta.fi/english/teos.phtml?11046>

- MDA Framework

<http://www.cs.northwestern.edu/~hunicke/pubs/MDA.pdf>

- Formal Abstract Design Tools

http://www.gamasutra.com/view/feature/3357/formal_abstract_design_tools.php?print=1