

Lecture 19

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

Aspects of Game Design

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 - Most important element of game design

Not in this Lecture

Aspects of Game Design

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- **Games as Education**

- Train player skill and understanding
- Focuses primarily on *player capabilities*

- **Games as Storytelling**

- Focuses on narrative and player experience
- Most common element of game design

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Players Want to Explore the World

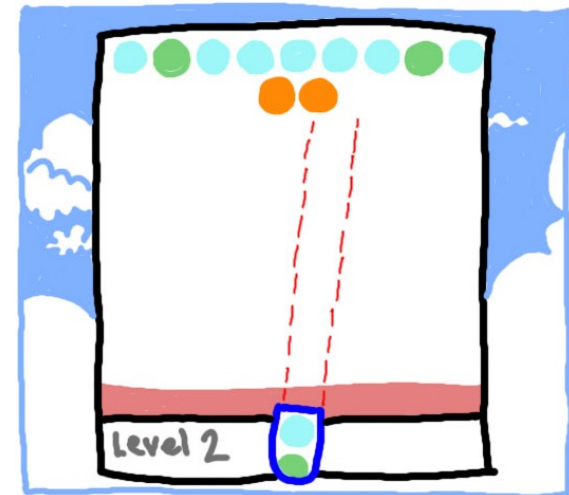
- Exploring the **physical space**
 - What happens when I go here?
 - **Example:** Any open world RPG
 - But does not require complex game world
- Exploring the **ludic space**
 - What happens when do this action?
 - Requires deep, complex interactions
 - **Example:** Goofing on Bethesda NPCs

Storyboarding

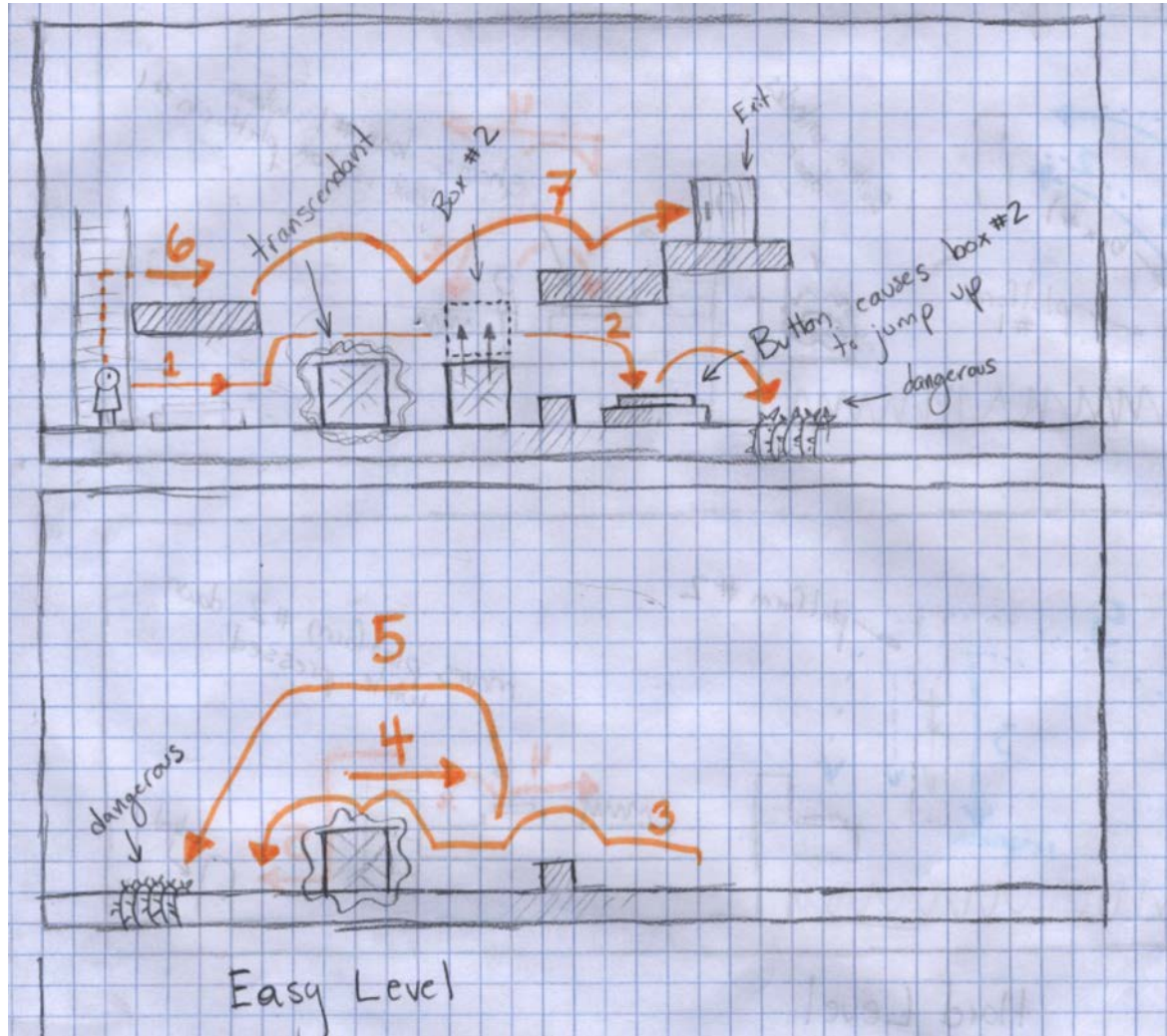
- Diagrams player action throughout level
 - Different from film storyboarding
 - Currently a bunch of *informal practices*
- **Disembodied Action**
 - Action corresponding to UI elements
 - **Example:** Buttons, menus
- **Embodied Action**
 - Action that is tied to a character/avatar
 - Typically maps player movement in level

Disembodied Action: Cause and Effect

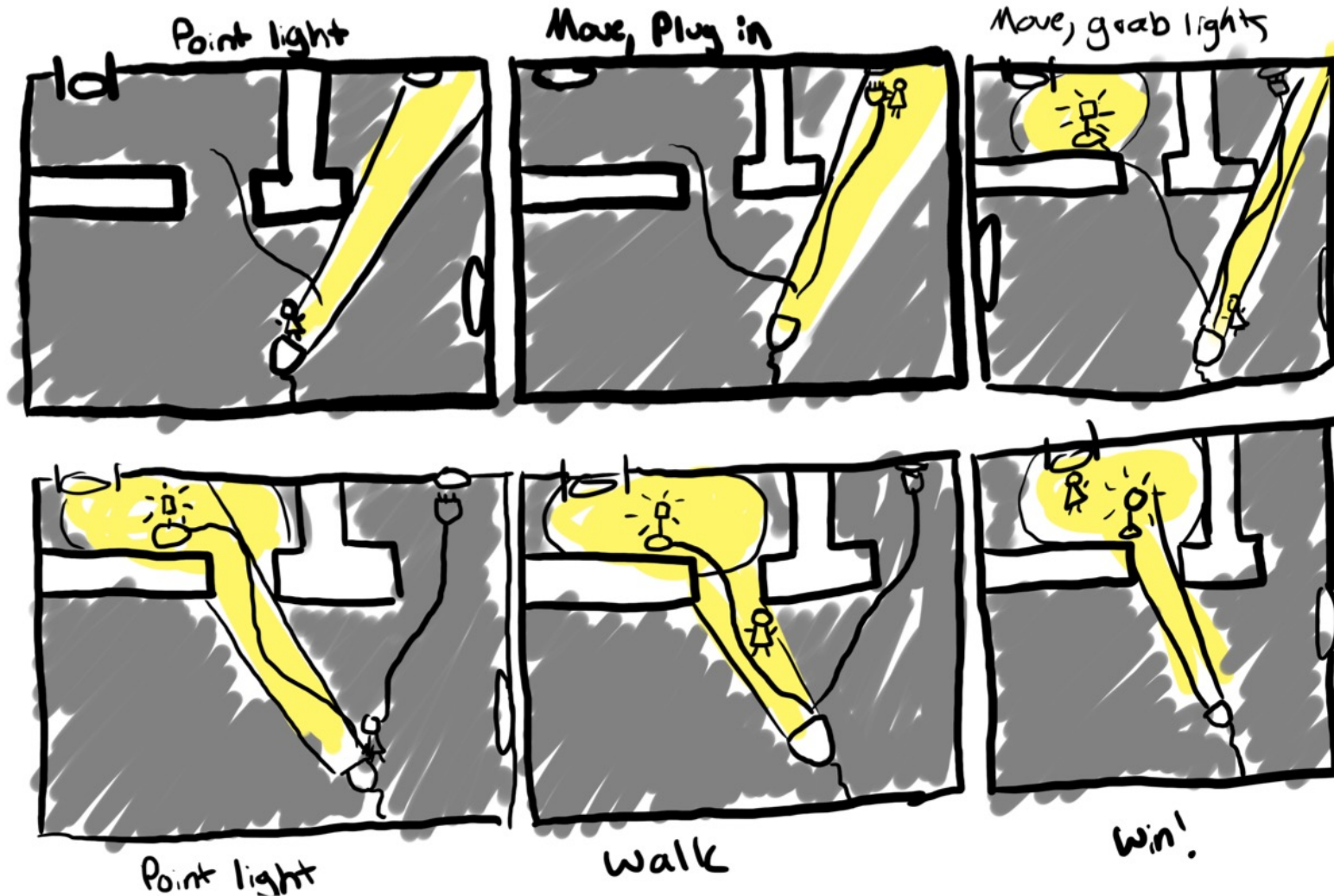
- **Draw the initial scene**
 - Could be the entire level
 - Zoomed in portion of screen
 - Must capture area that will be affected by the action
- **Indicate the action**
 - Draw mouse pointer
 - Indicate gamepad button
 - Annotate with a “tool tip”
- **Draw the action effect**
 - Change in initial scene



Embodied Action: Single Scene



Embodied Action: Multiple Scenes

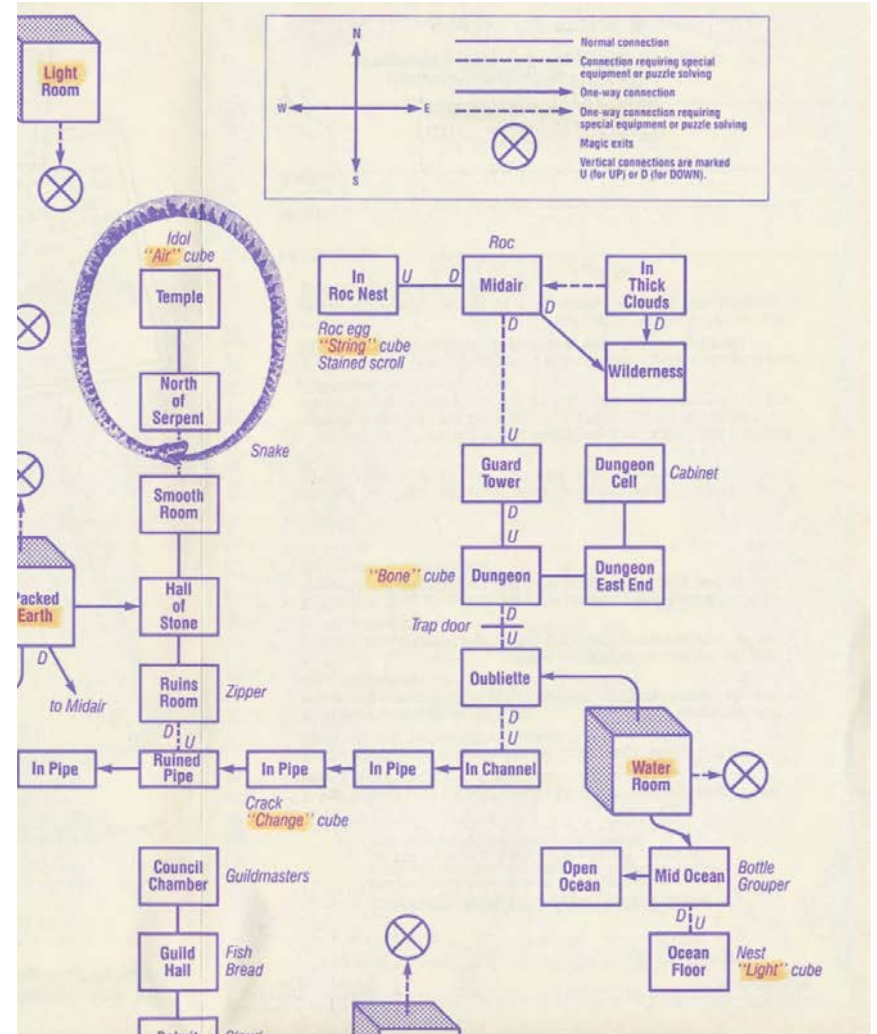


But There is a Problem

- 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

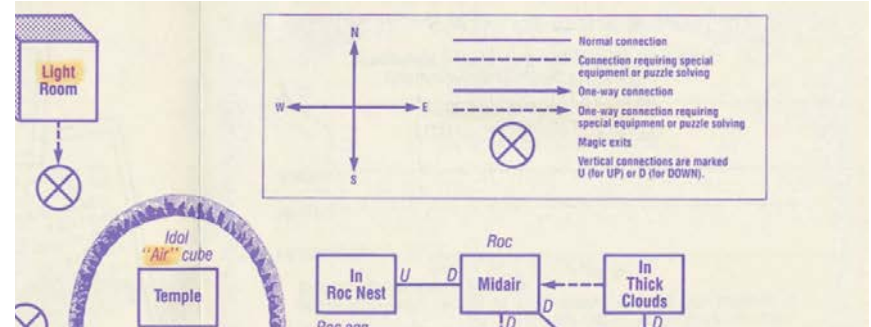
This is How it Ever Was

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



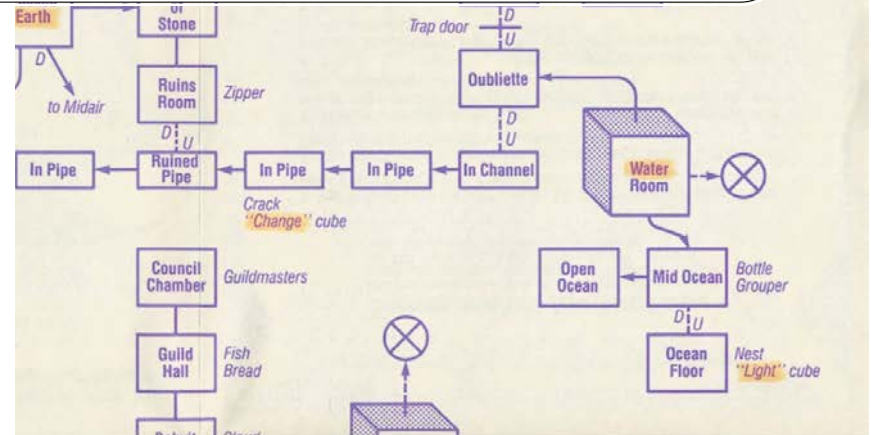
This is How it Ever Was

- Classic text adventures...
 - Goal is location to reach
 - Locked doors block progress



Tight Level Design = Tight Challenge Spacing

- Use mechanics to overcome
- Design levels with...
 - **Discrete challenges** (doors)
 - Put together **intelligently**



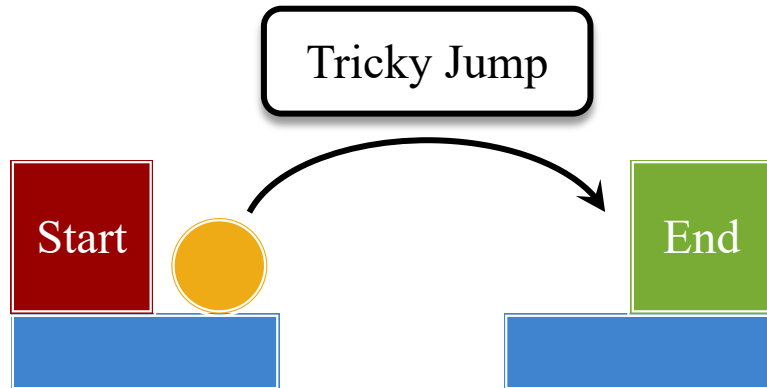
Design Patterns

- 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

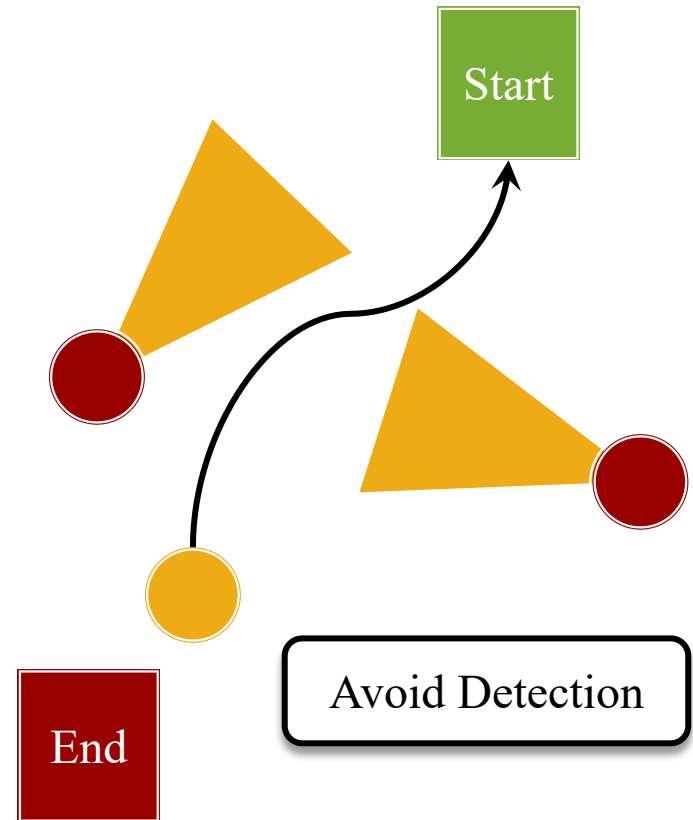


Design Pattern Examples

Platformer

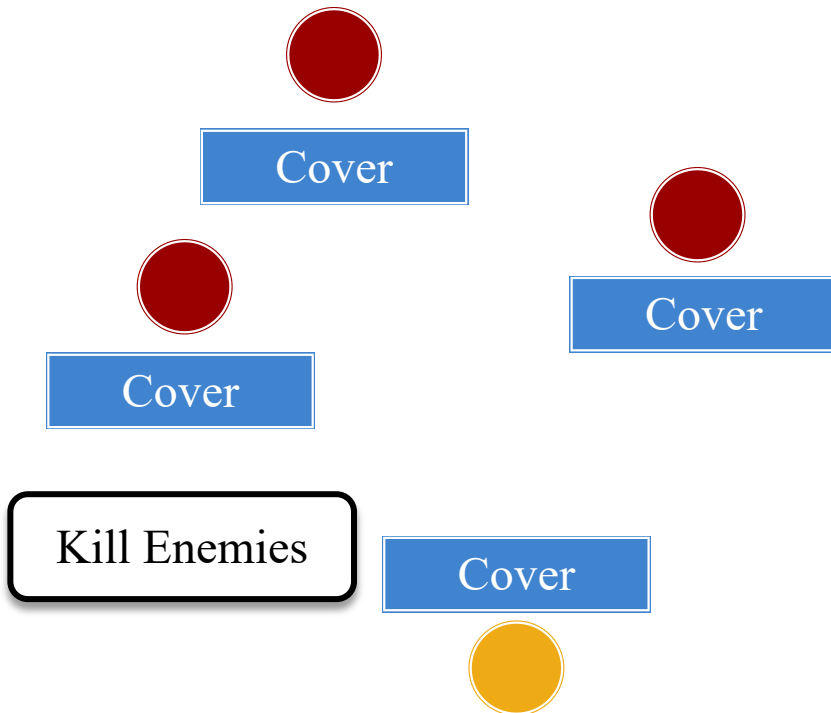


Stealth Game

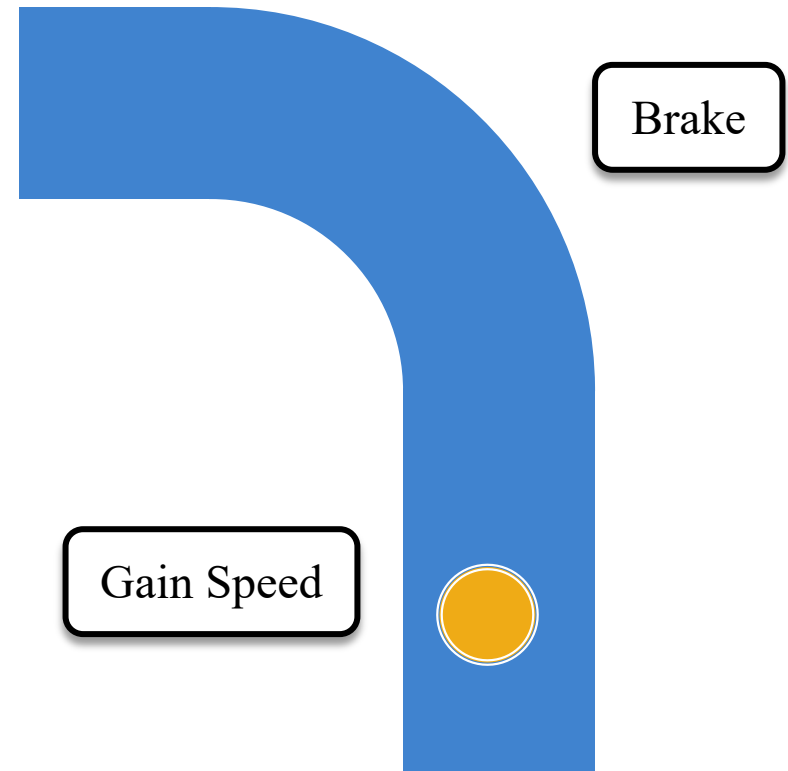


Design Pattern Examples

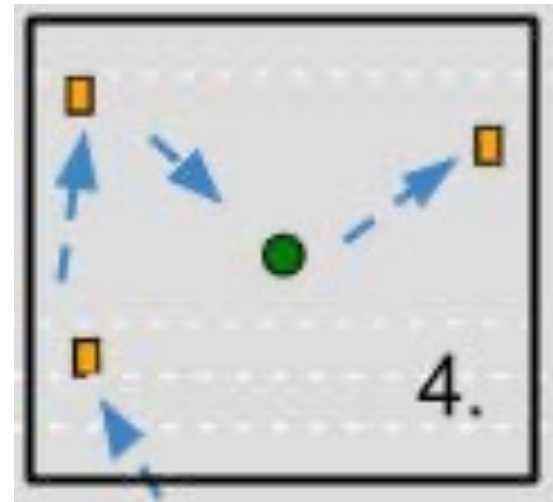
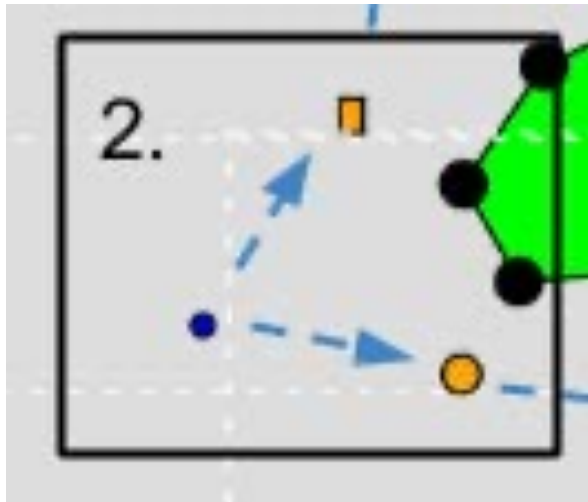
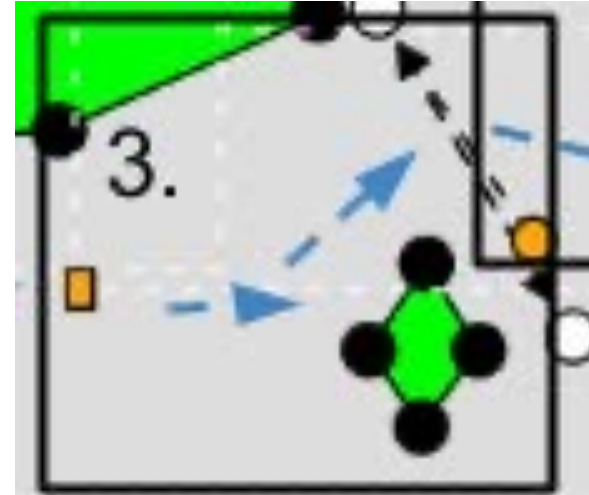
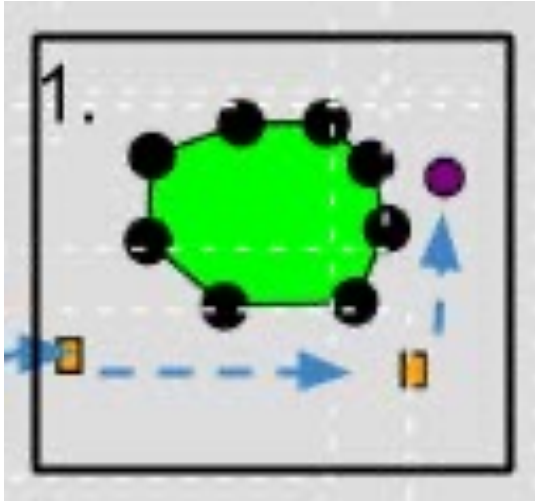
Shooter/Action Game



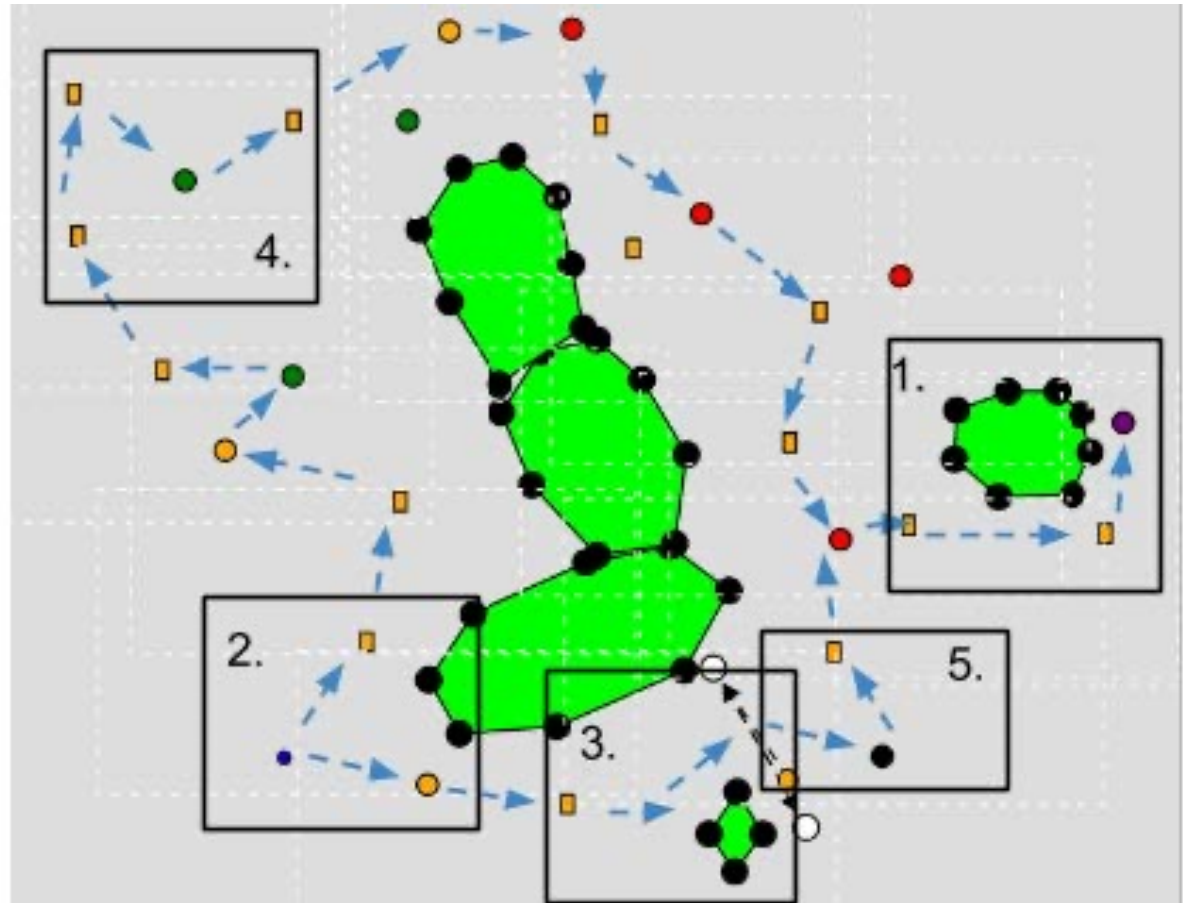
Racing Game



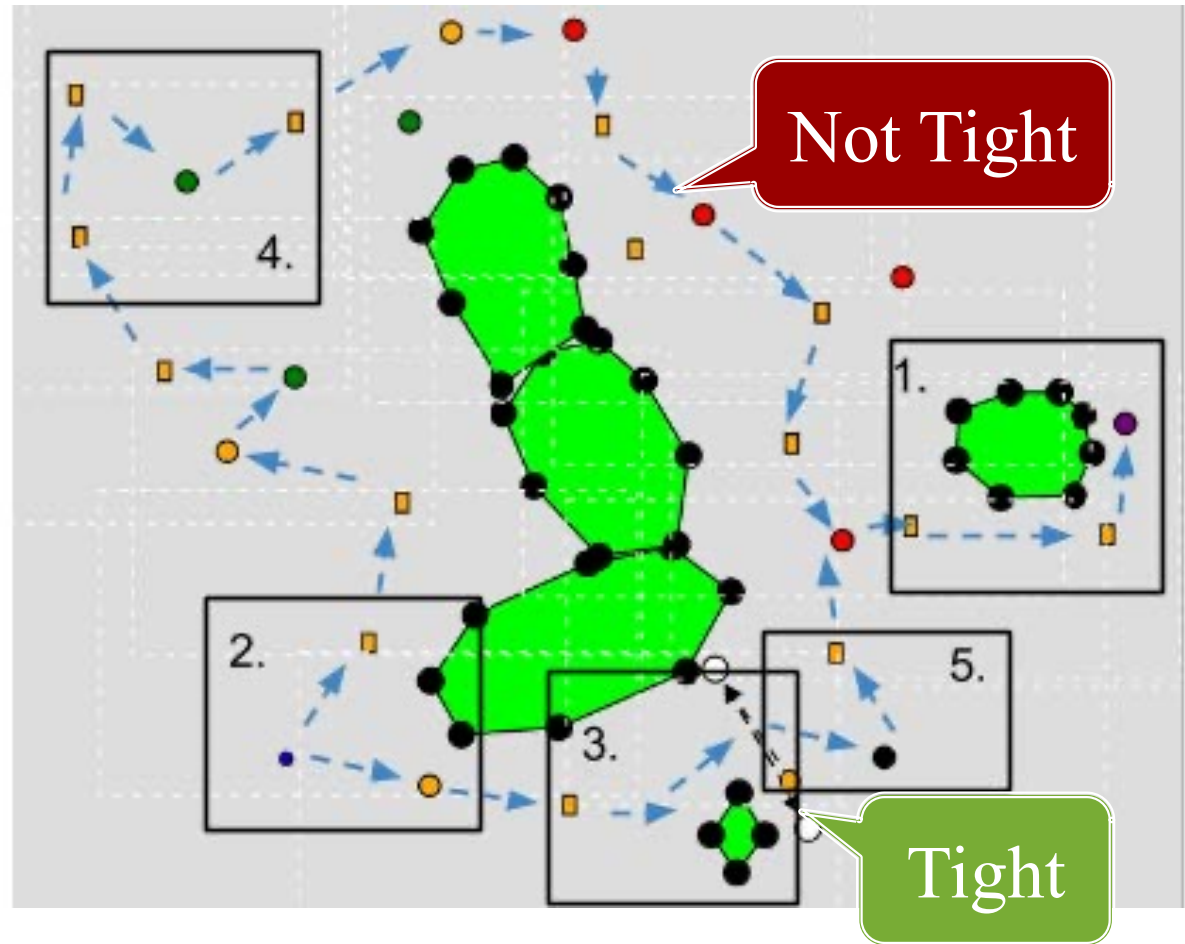
Dash: Basic Design Patterns



Dash: Putting it All Together



Dash: Putting it All Together

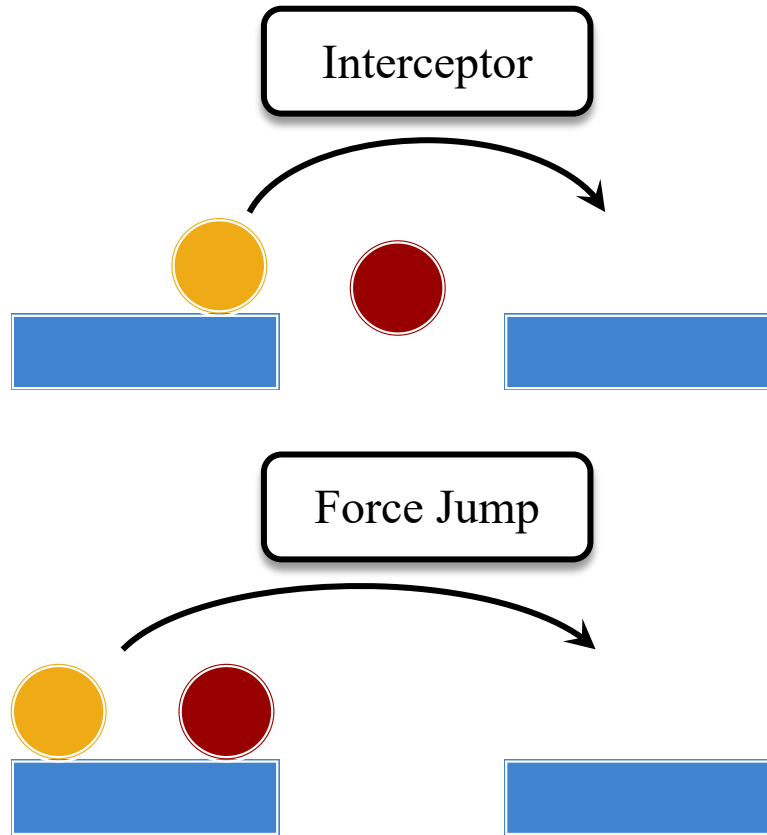


Composite Patterns

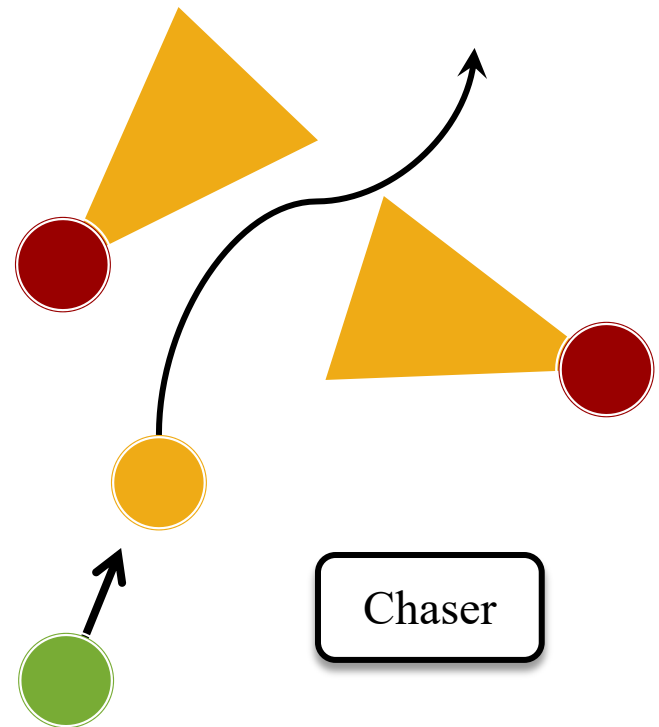
- Piecewise design creates a very linear feel
 - **Pattern A** followed by **Pattern B** followed by...
 - Player is explicitly aware of building blocks
- **Composite patterns** allow for variations
 - Two patterns combined in the same space
 - Makes original pattern much more difficult
 - Player now has to react to them both
- **Reading: Extended/Evolutionary Challenge**

Composite Patterns

Platformer

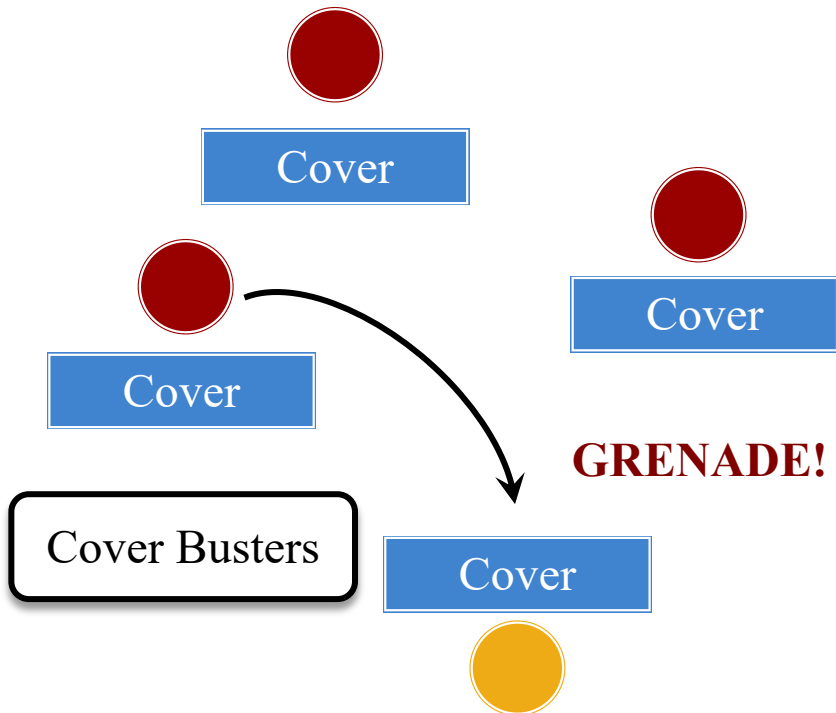


Stealth Game

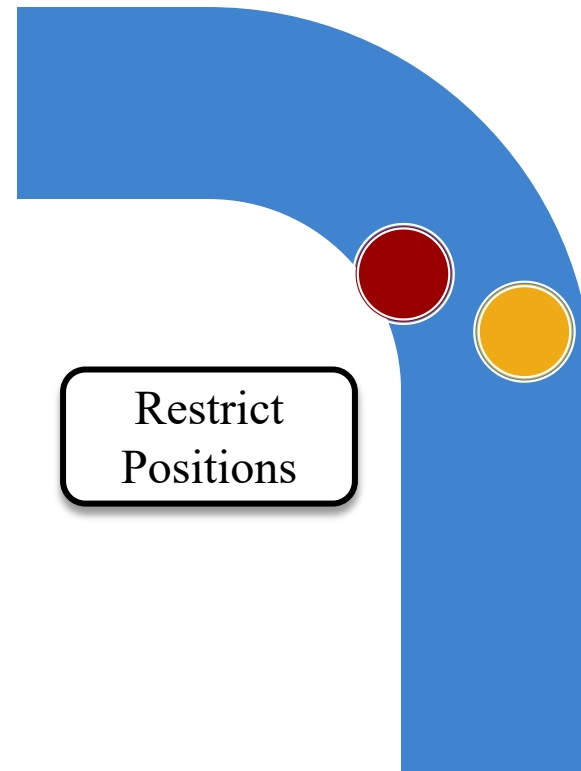


Composite Patterns

Shooter/Action Game



Racing Game



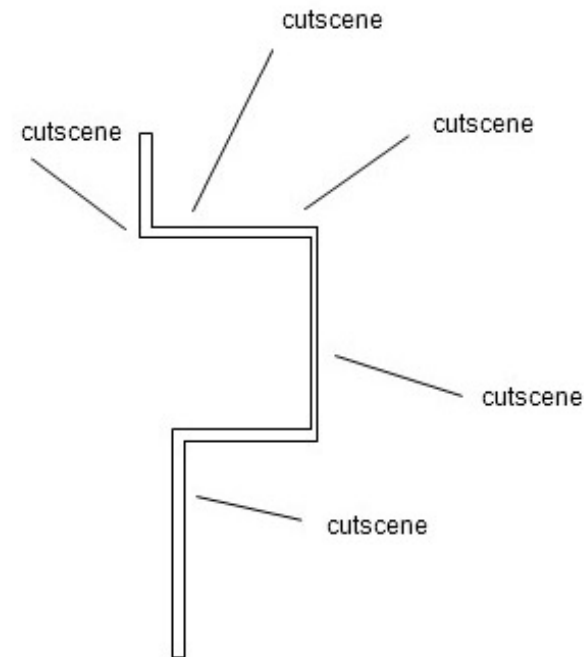
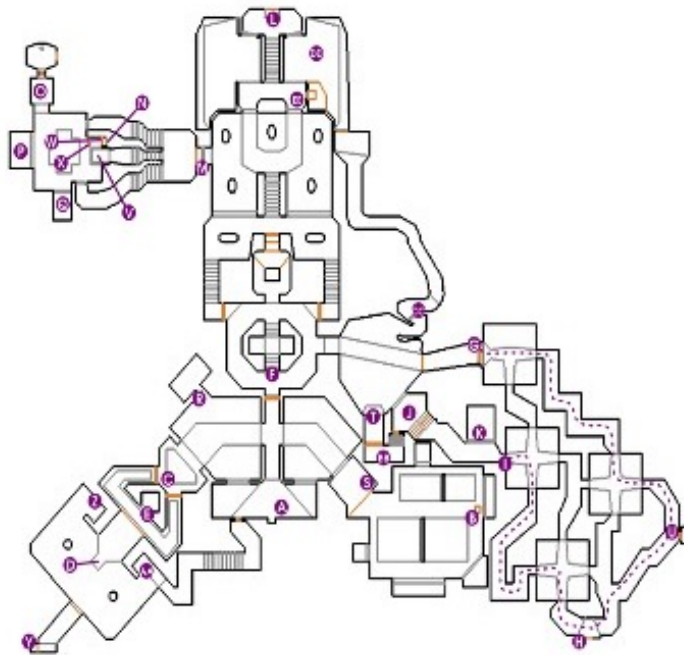
Is Linearity a Problem?

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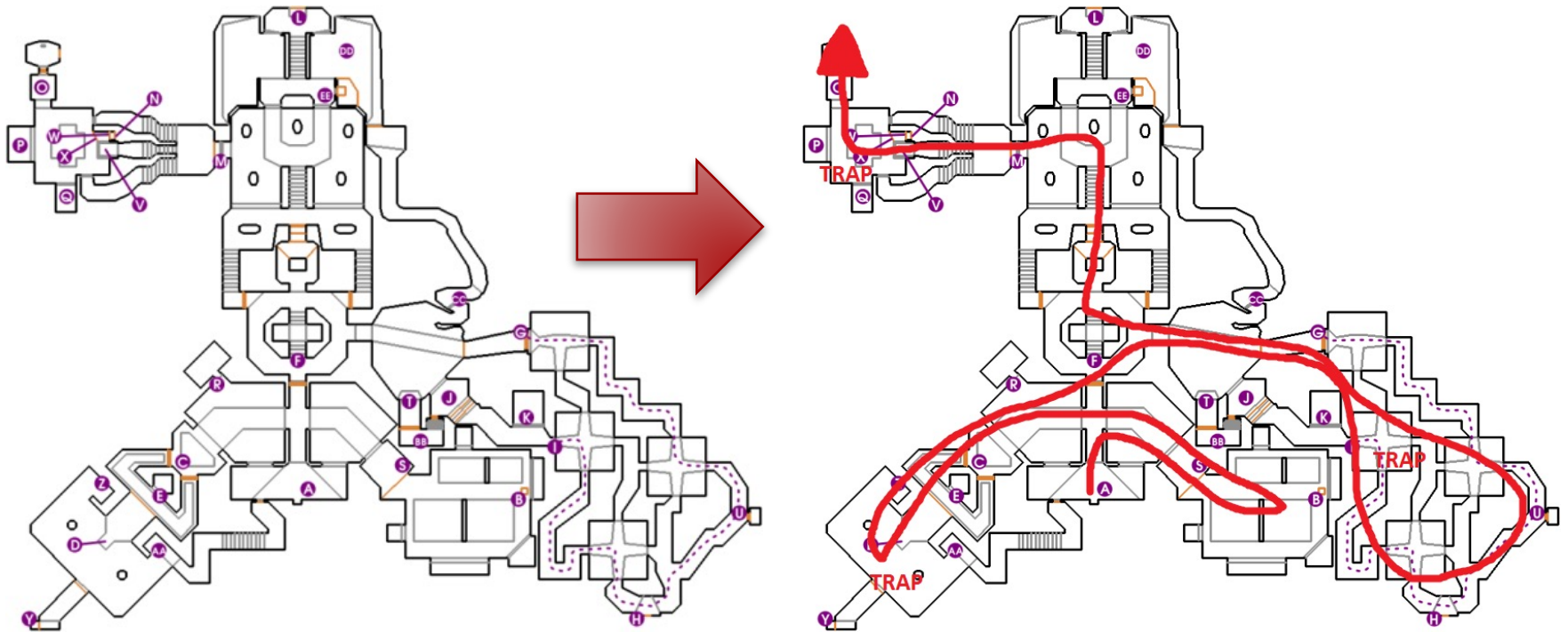
FPS map design

1993

2010

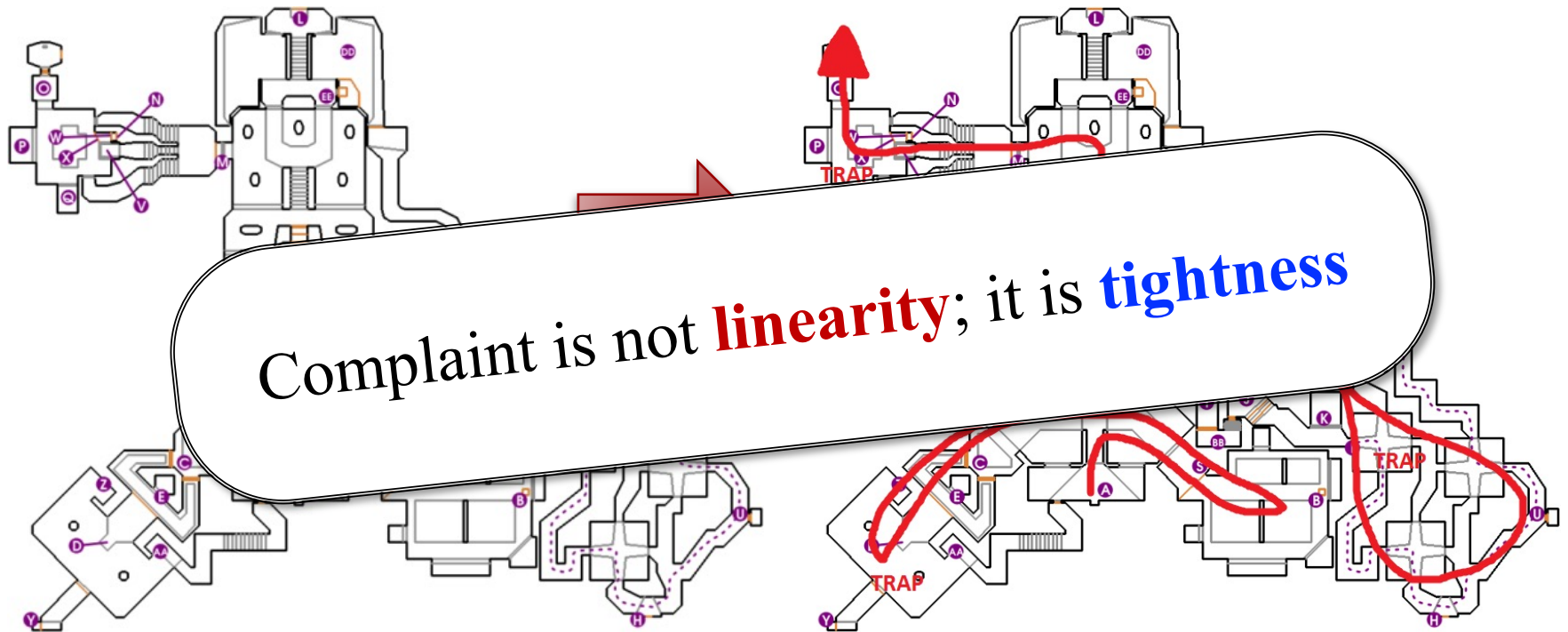


But Actually...



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But Actually...



[refugeinaudacity.wordpress.com]

Aspects of Game Design

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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



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

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 choice is also important
 - **Limiting choice helps train player**
 - Good choices are often limited
 - **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



Mechanics

● Introduction

● Variation

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 B

Recombination

How often to combine with other mechanics

Actions:

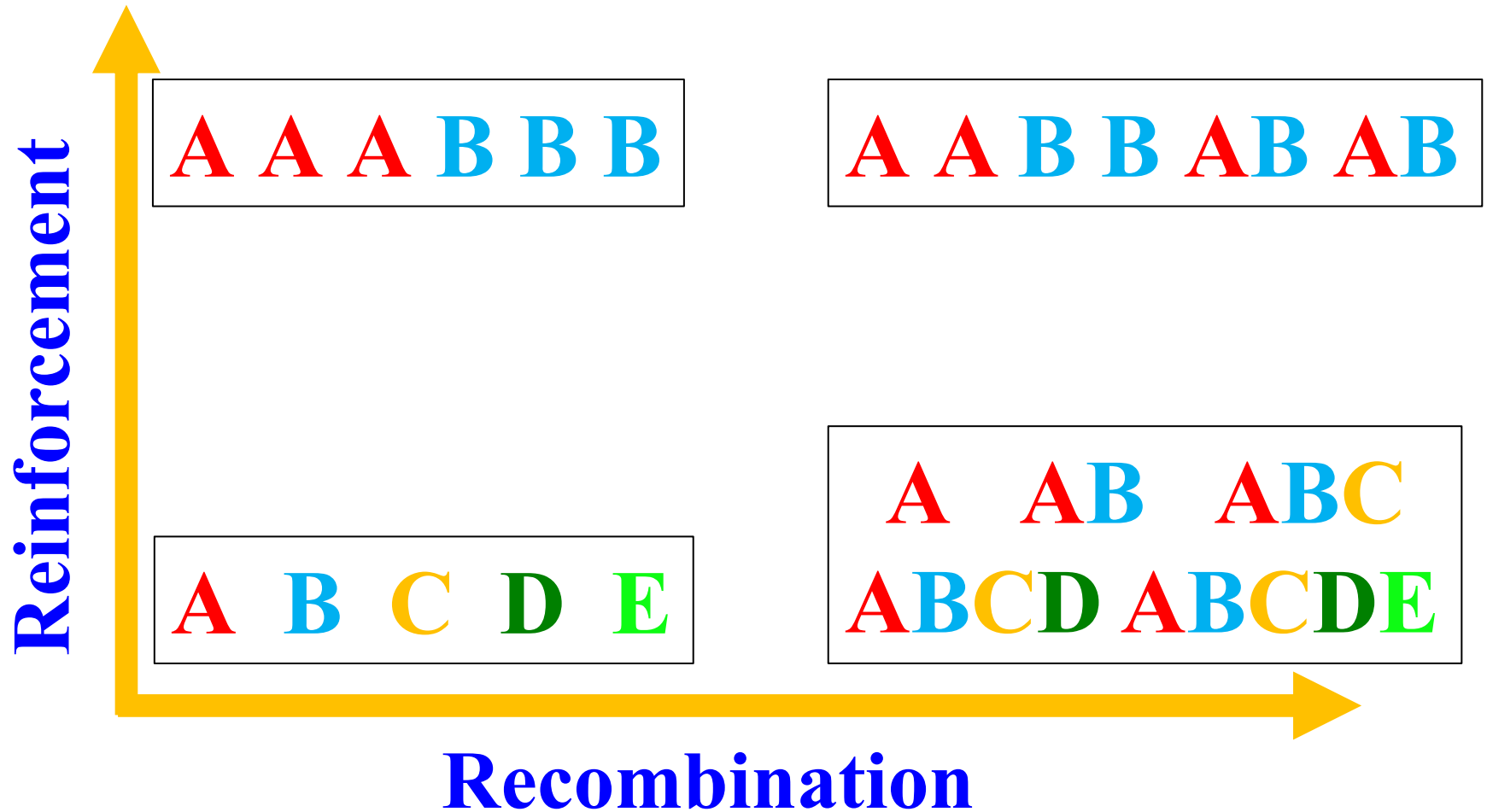
A = jump

B = dash

C = shoot fireball

A B C vs. **A AB ABC**

Reinforcement vs. Recombination



Robot Unicorn Attack



Robot Unicorn Attack Progression

Mechanics:

A = jump

B = dash

A A A B A A B

High reinforcement, low recombination

Hello World!



COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 7
PAR TIME: 45
SPEED TIME: 12

ALPHA

COINS 🟡: 1/6
STARS ⭐: 0
POINTS: 0

Hello World!

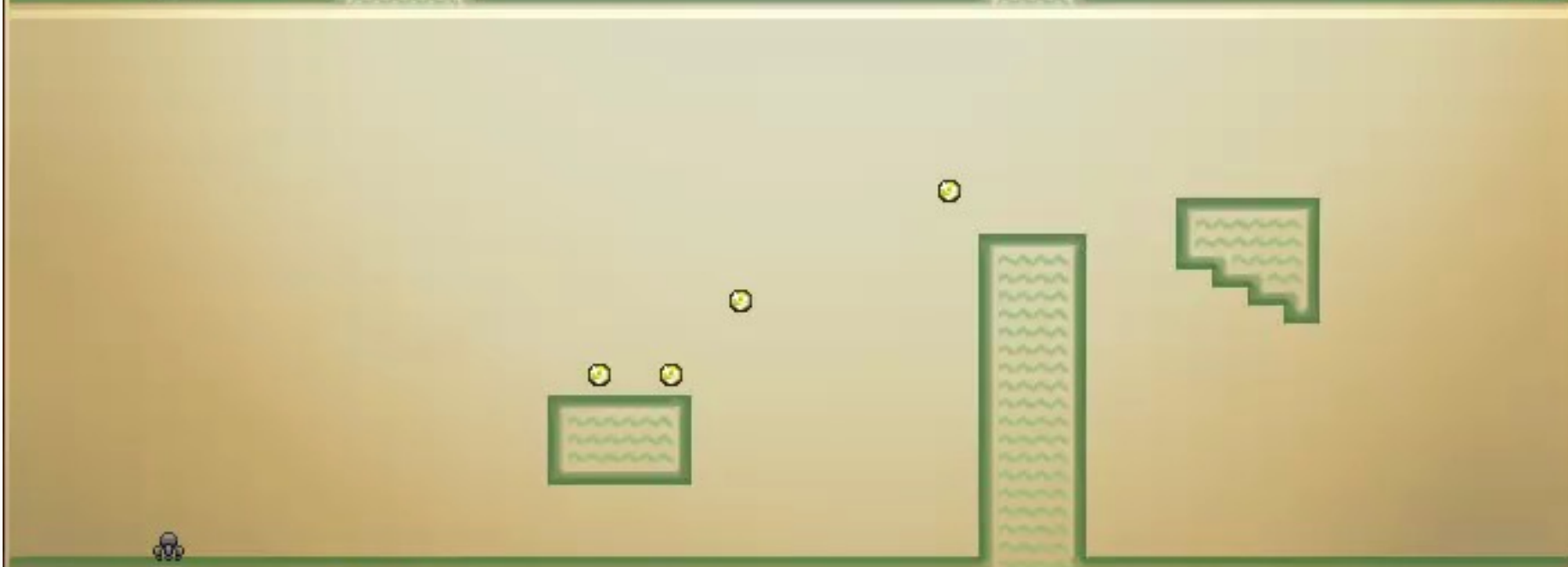
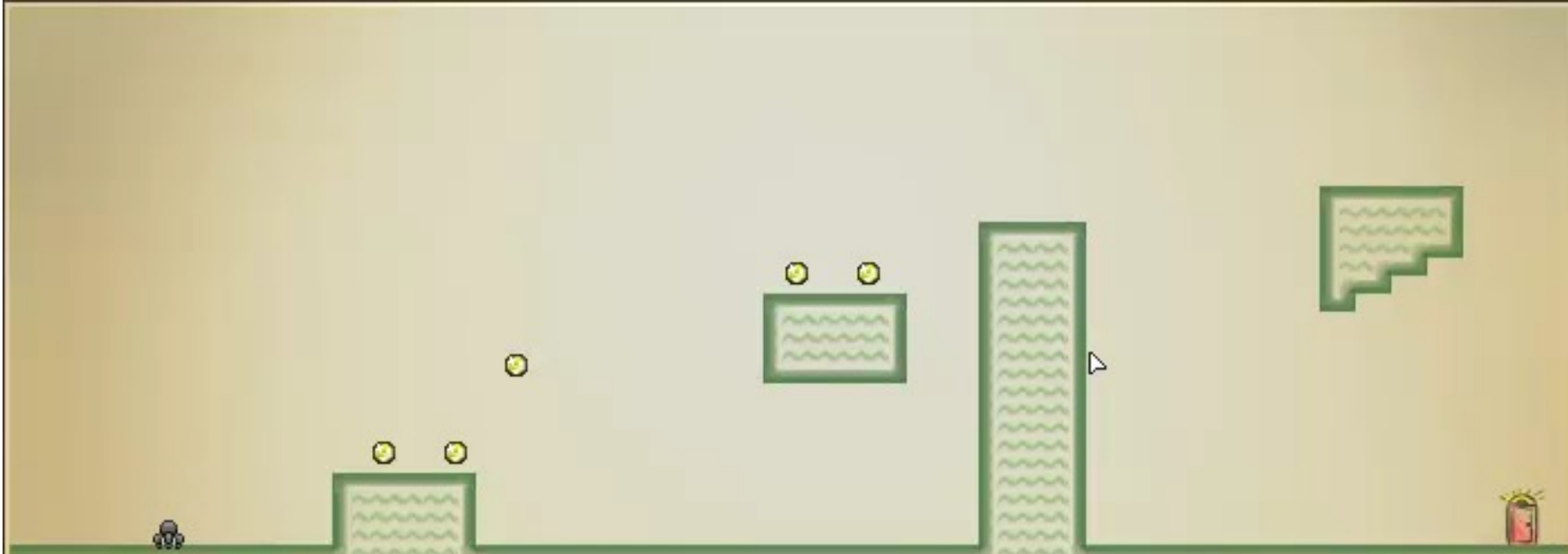


COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 7
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ALPHA

COINS 1/6
STARS 0
POINTS: 0

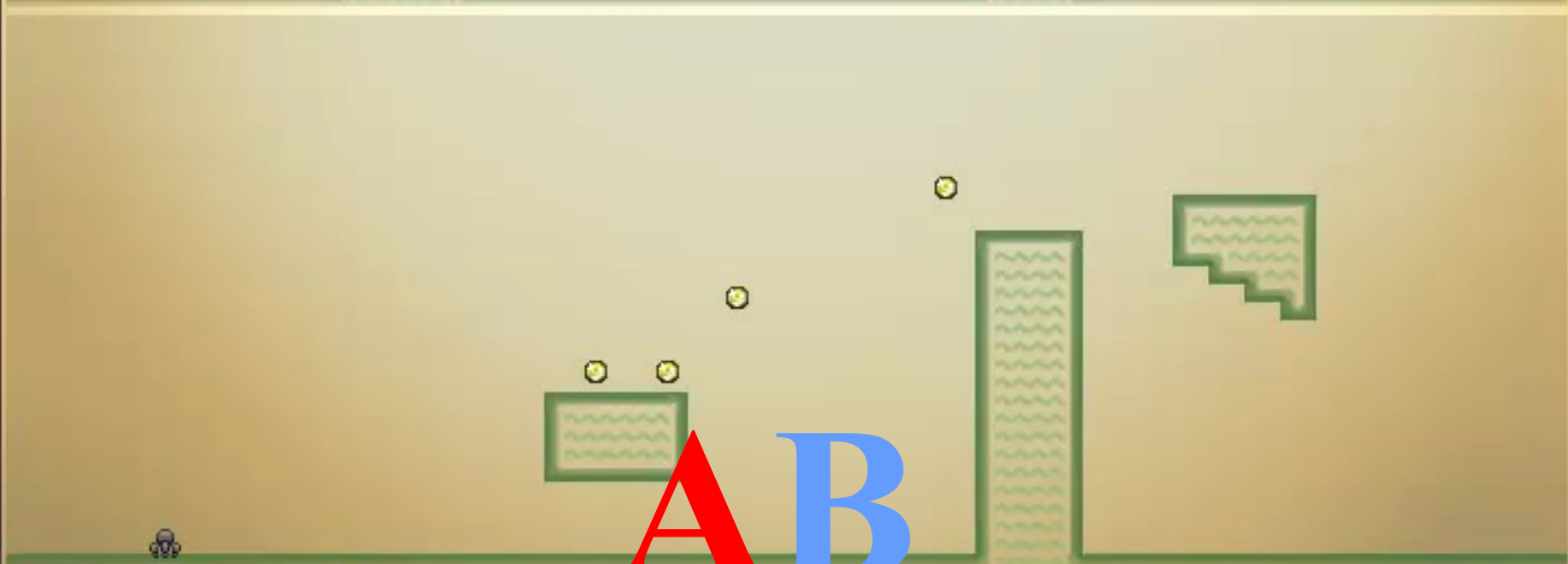
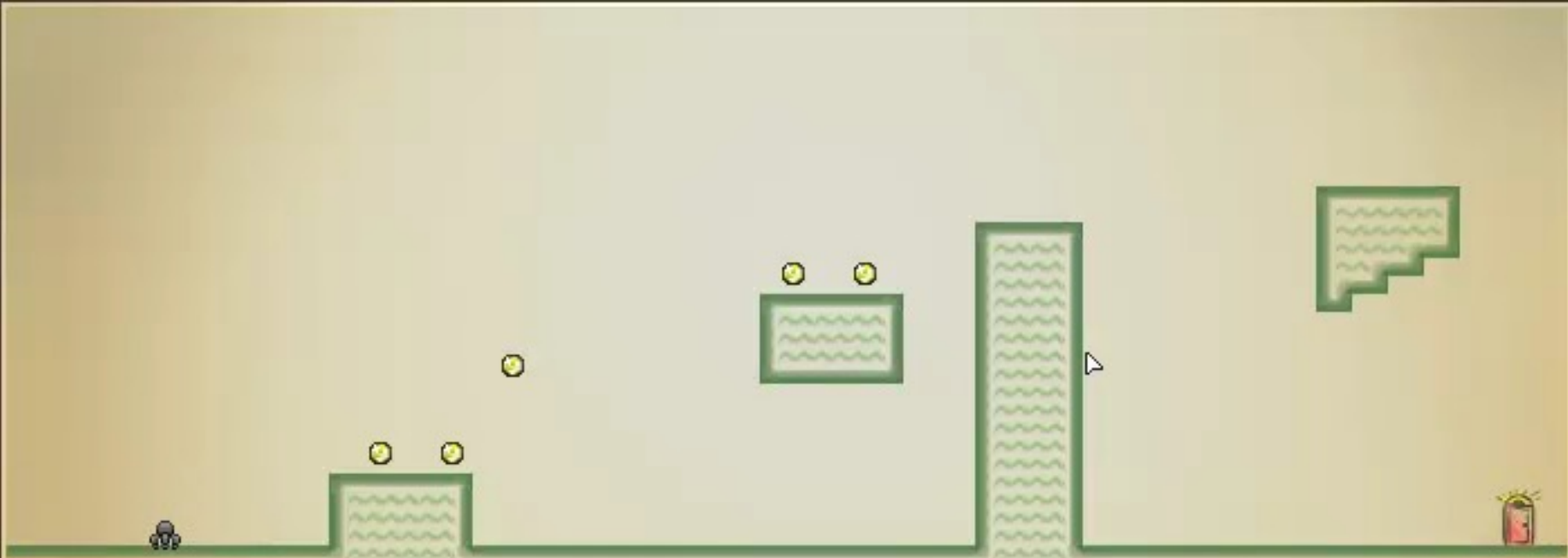


COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 10

BETA

COINS 0/9
STARS 3
POINTS: 255



COMBO(C) REWIND(V)  

QUIT RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 10

BETA

COINS : 0/9
STARS : 3
POINTS: 255

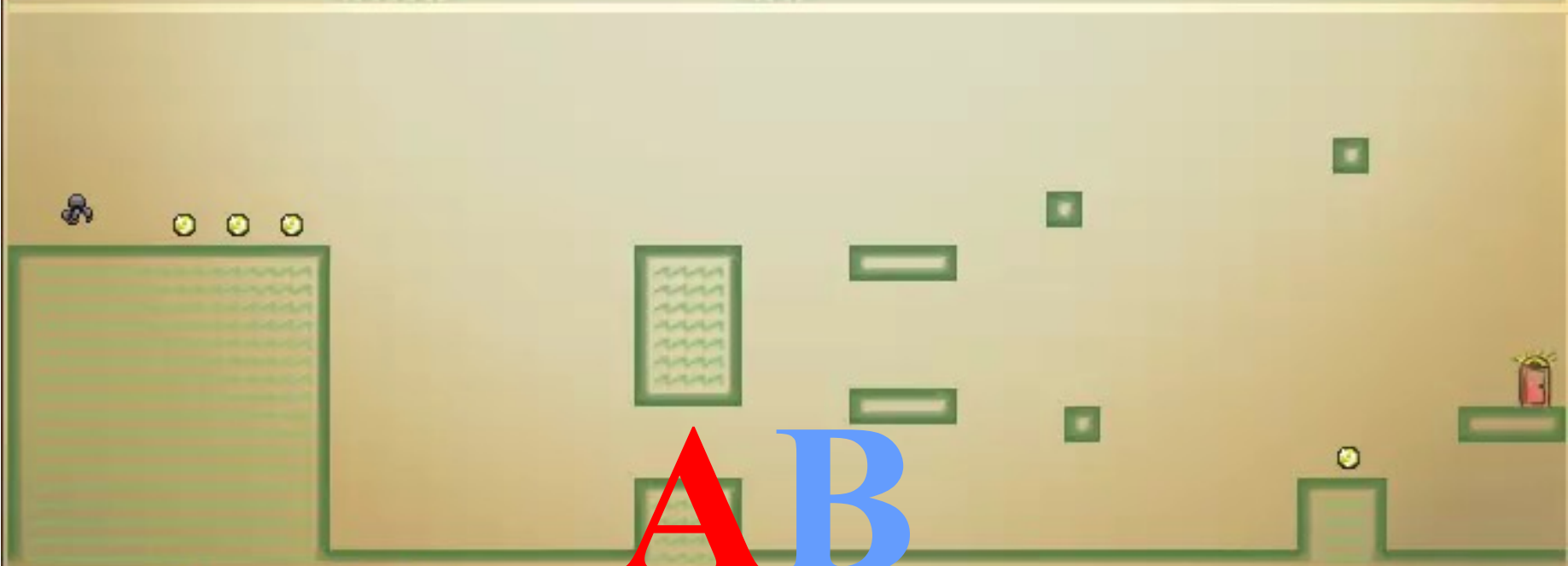


COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 15

GANNA

COINS 0/6
STARS 6
POINTS: 573



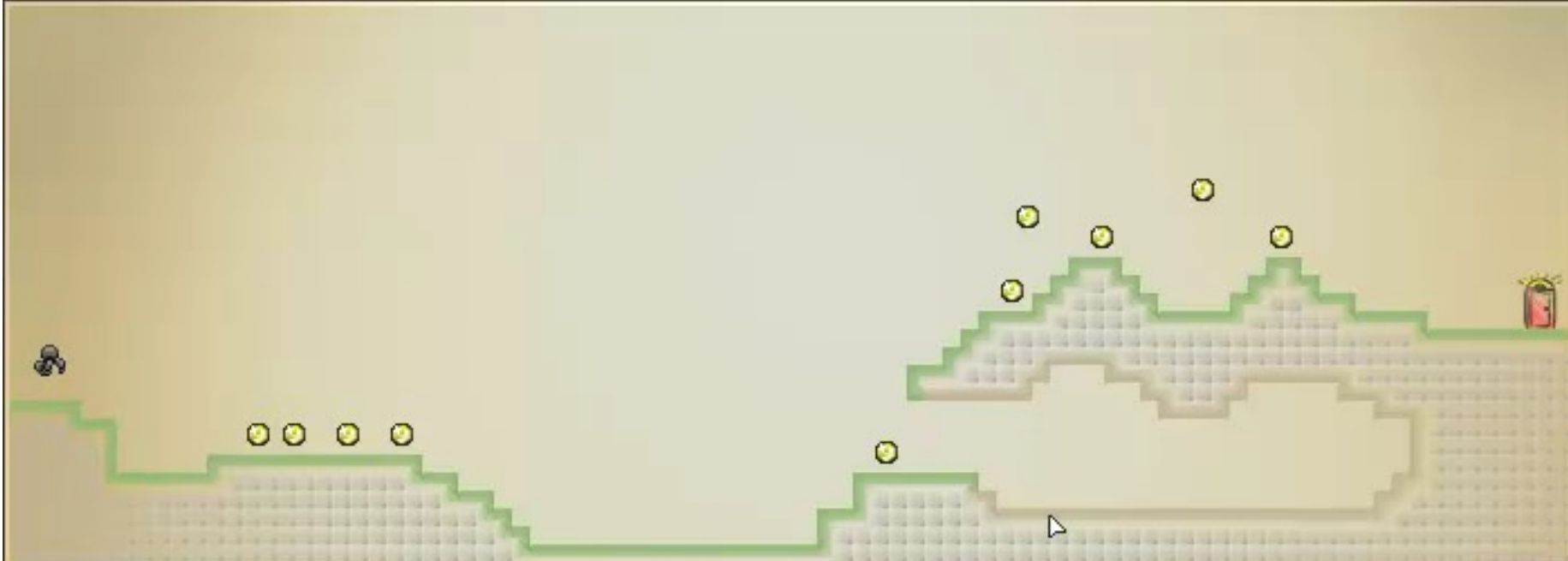
AB

COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 15

GAMMA

COINS 0/6
STARS 6
POINTS: 573



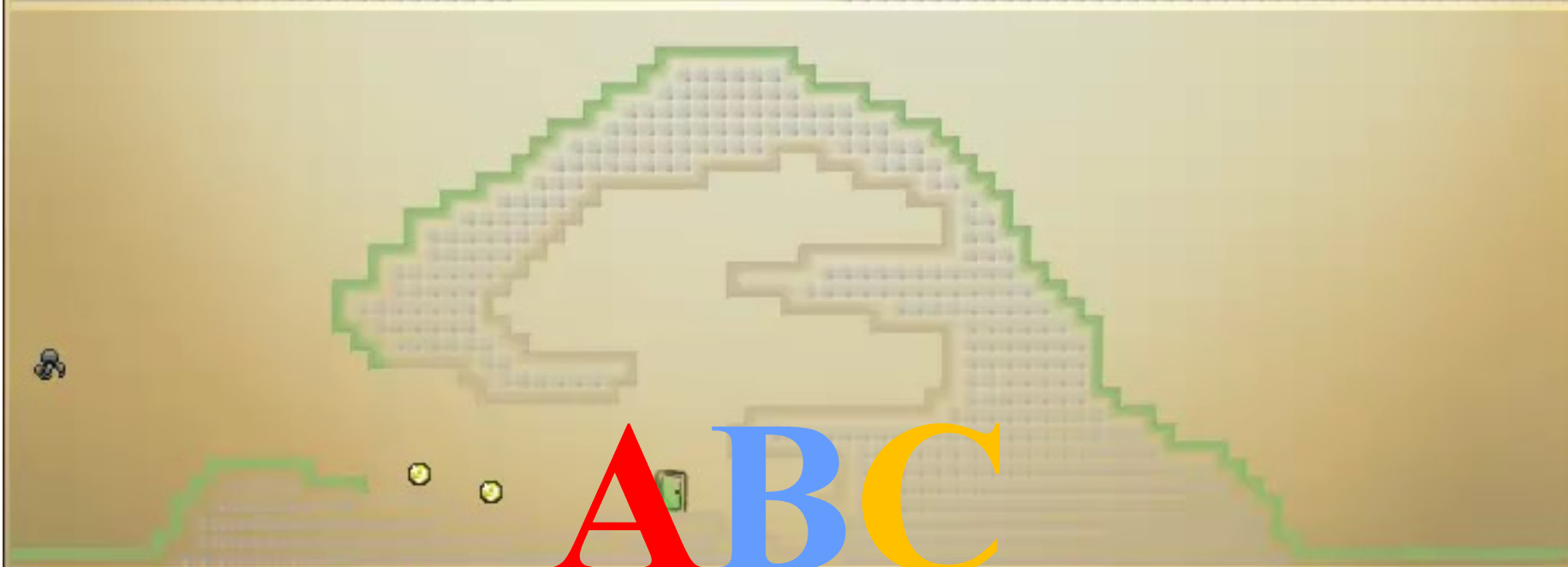
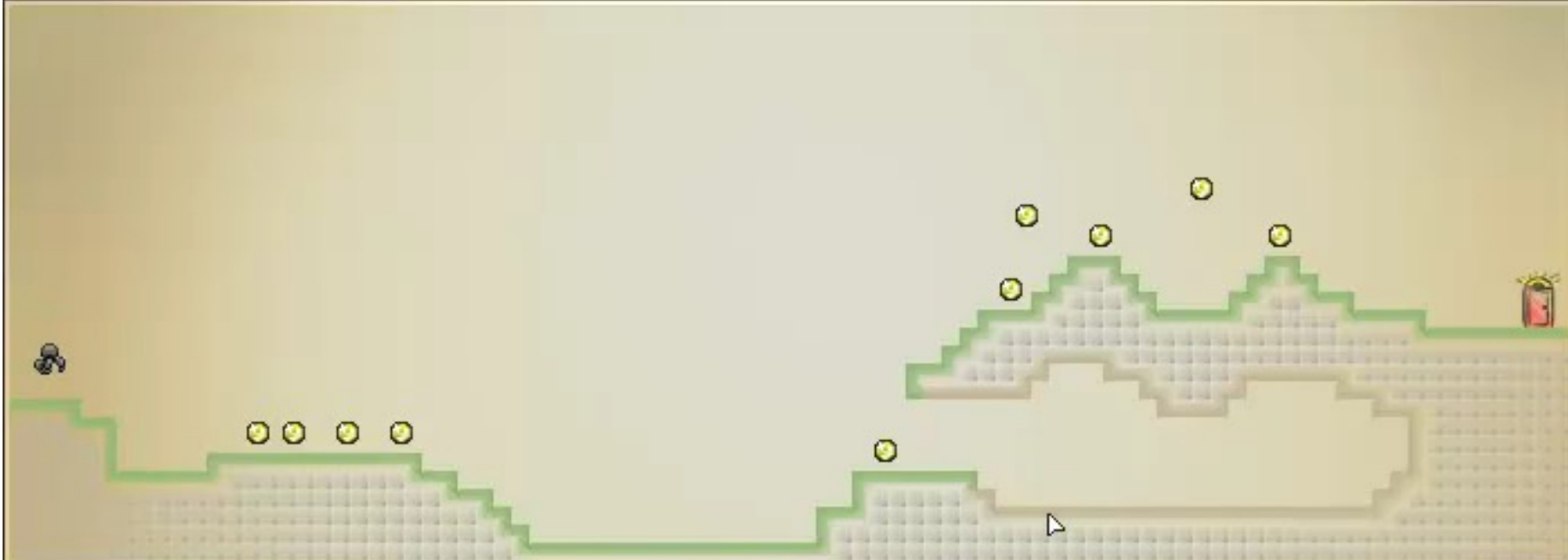
COMBO(C) REWIND(V)
QUIT RESTART(R)



TIME: 0
PAR TIME: 60
SPEED TIME: 26

MOUNTAINSIDE

COINS 0/12
STARS 9
POINTS: 879

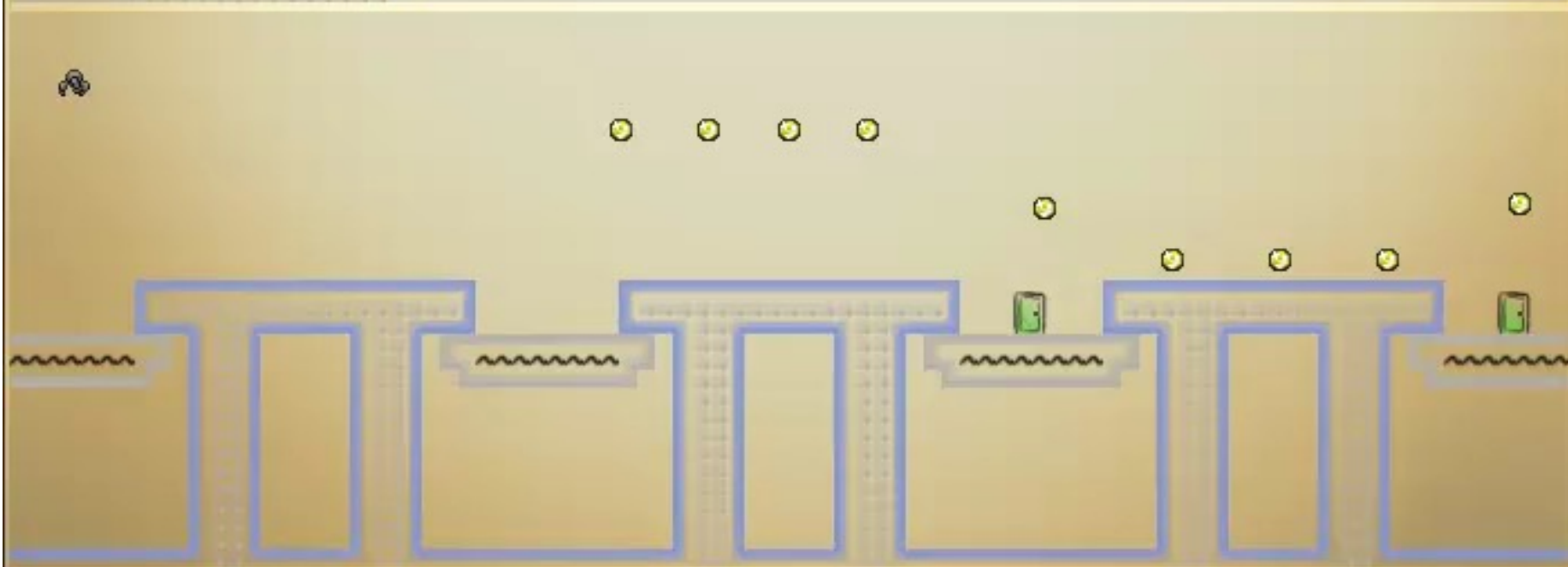
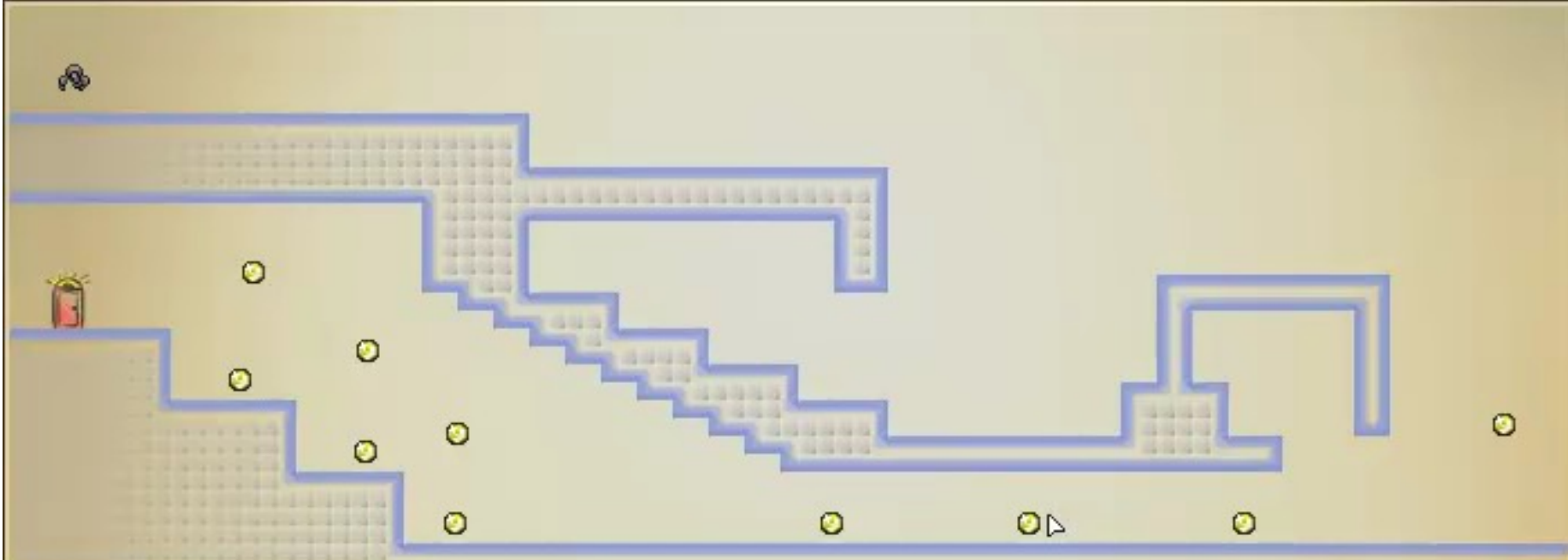


COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 26

MOUNTAINSIDE

COINS 0/12
STARS 9
POINTS: 879



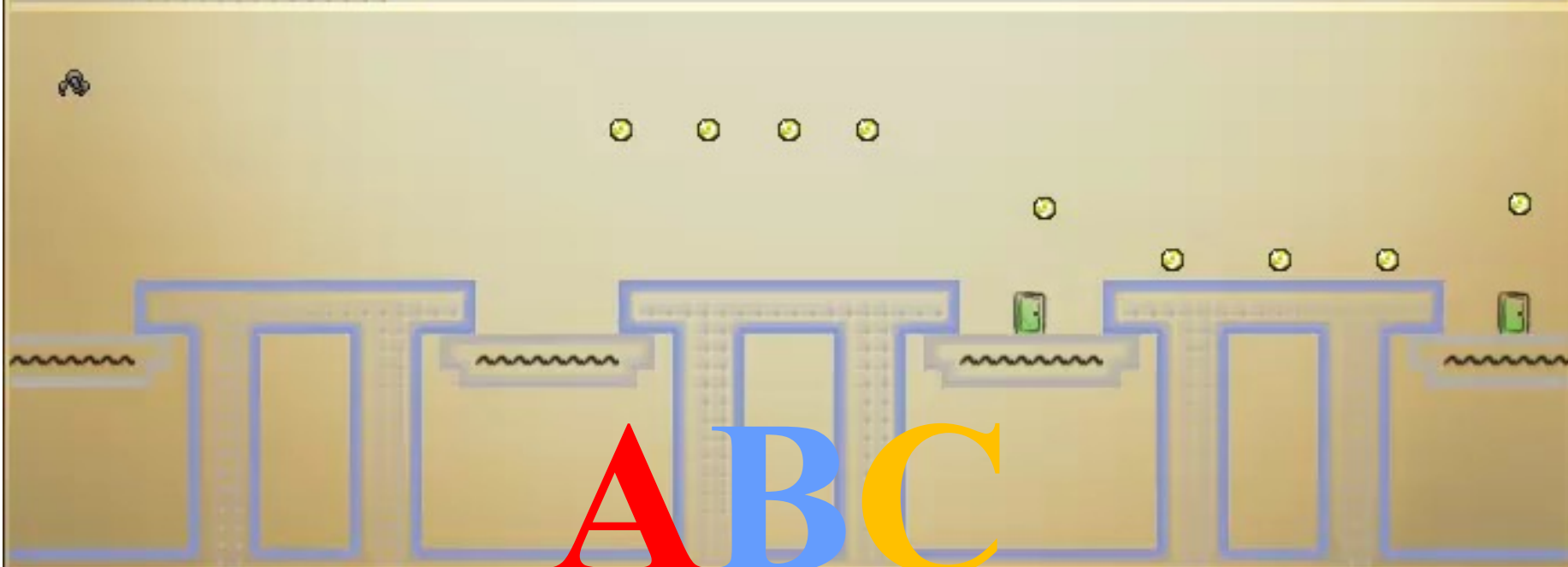
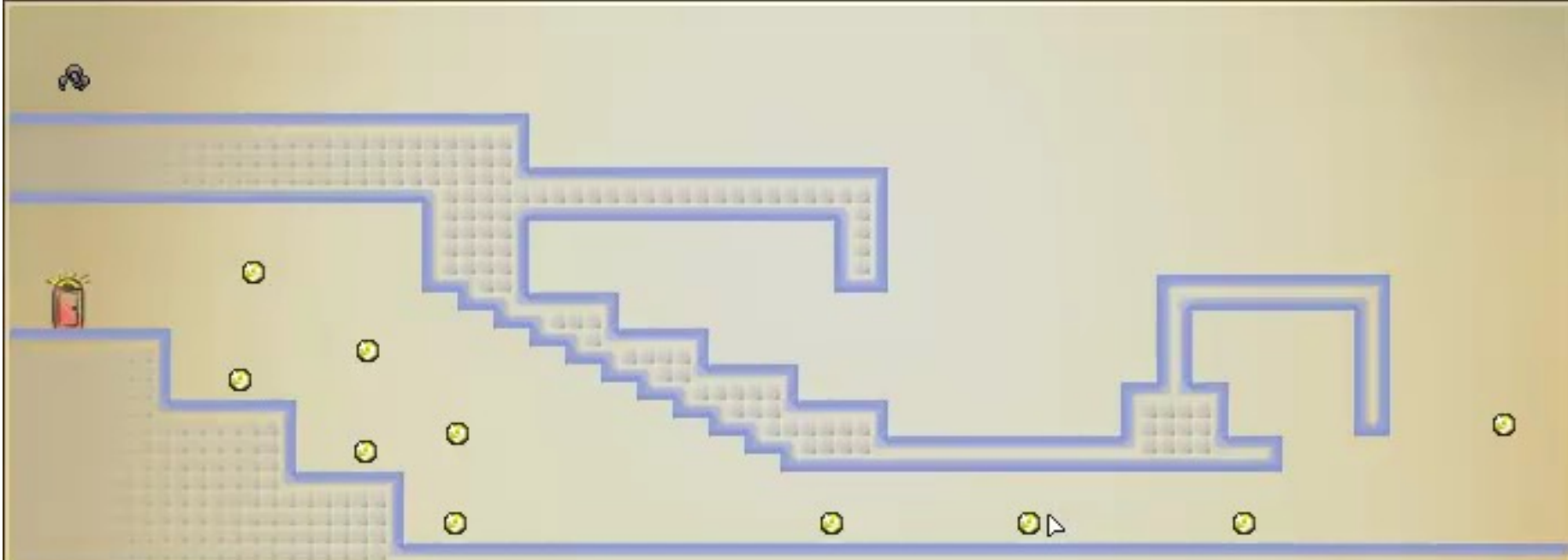
COMBO(C) REWIND(V)
QUIT RESTART(R)



TIME: 0
PAR TIME: 60
SPEED TIME: 30

PILLARS

COINS 0/19
STARS 12
POINTS: 1203



A B C

COMBO(C) REWIND(V)
QUIT RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 30

PILLARS

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

A AB ABC ABCD

Low reinforcement, high recombination

A B C D

A A A A

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*