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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?

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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

Level Design

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

Level Design

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  - Focus
  - Most ~~~~~~~~~~~~nt of game design

Not in this Lecture

Level Design

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- Games as **Storytelli**
  - Focus
  - Most   of game design

Not in this Lecture

Level Design

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

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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

Level Design

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

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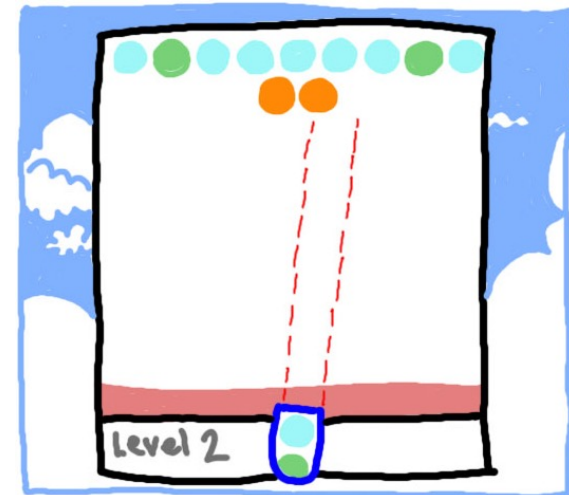
Embodied Action: Single Scene
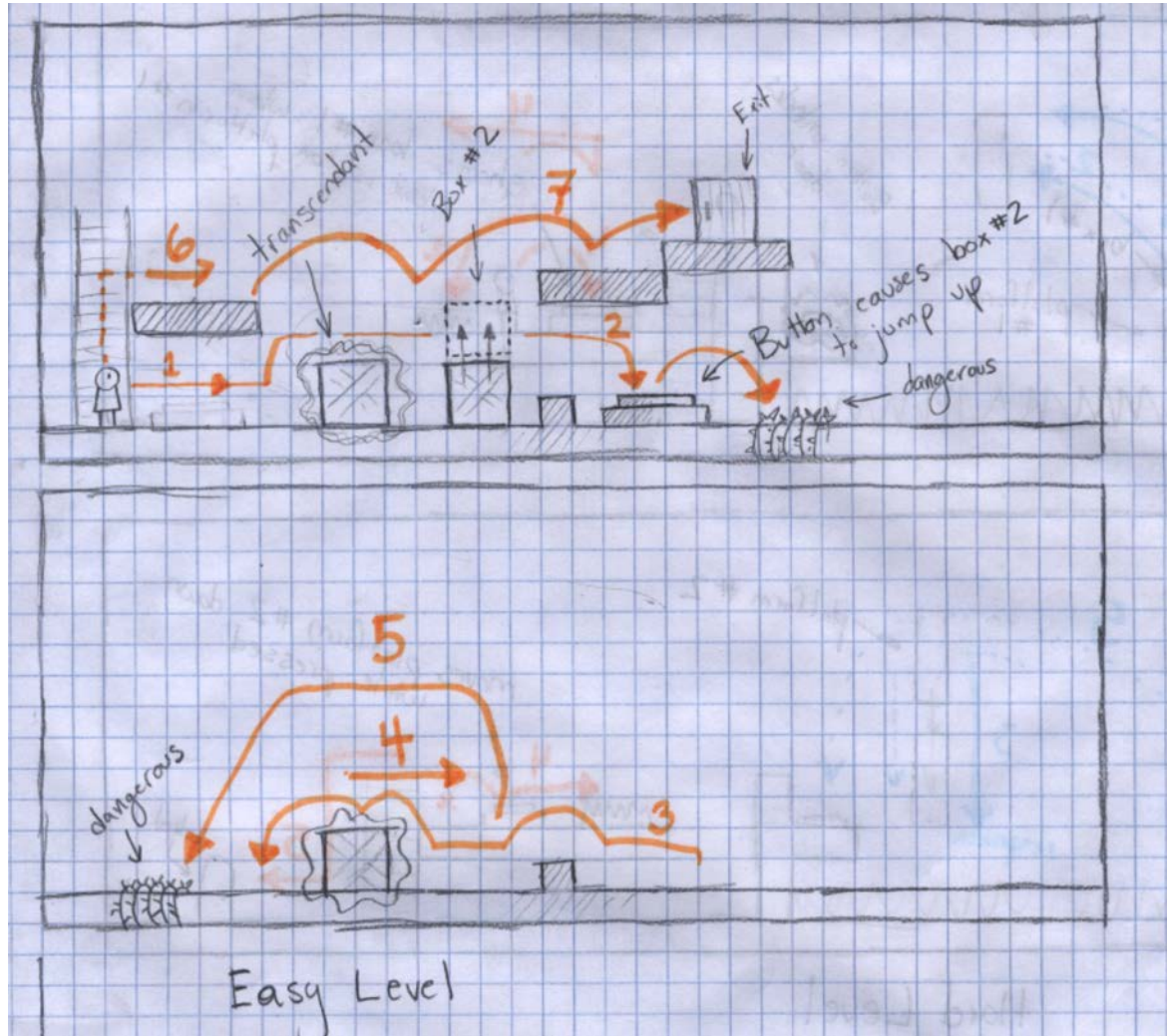
Level Design

Embodied Action: Multiple Scenes
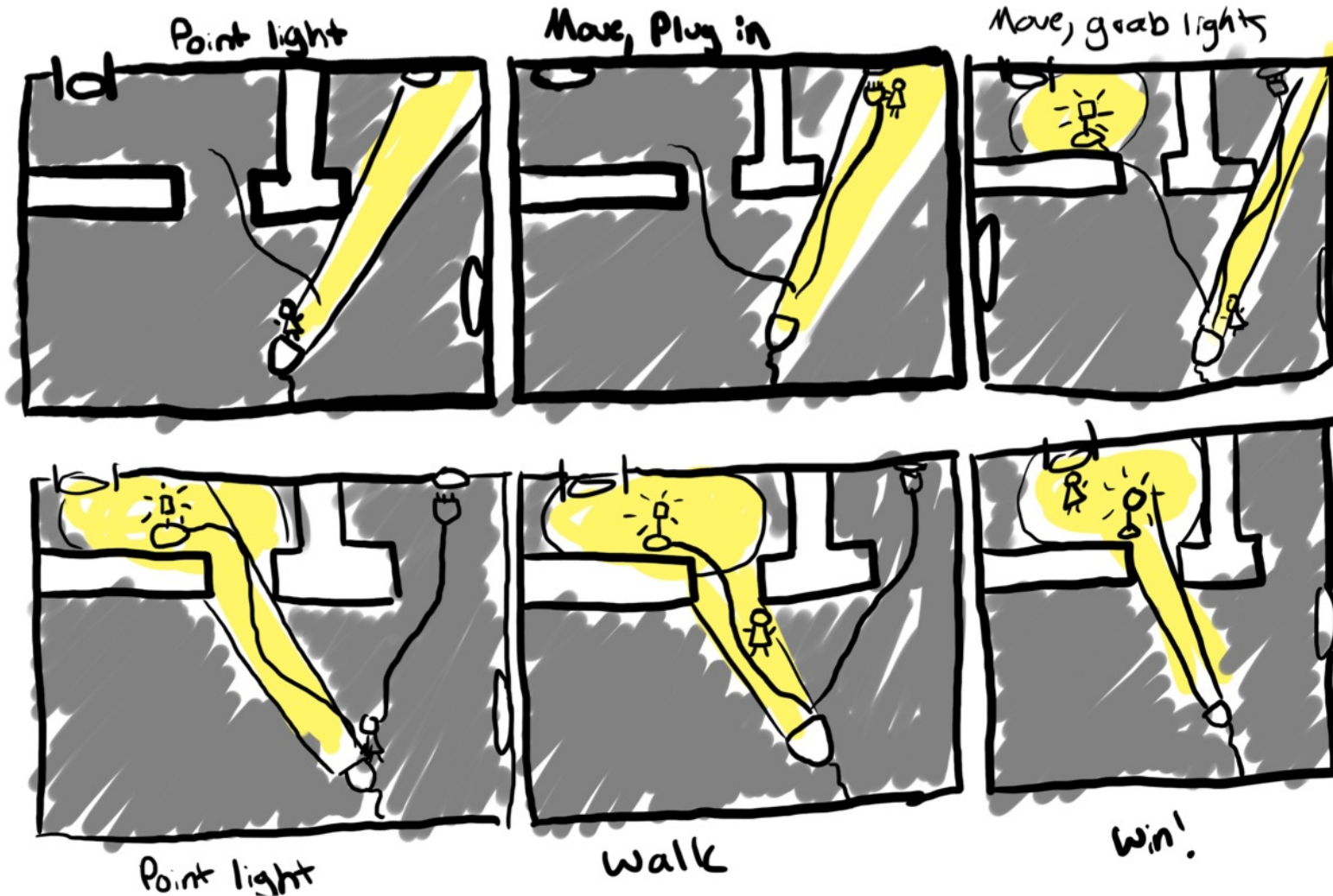
Level Design

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

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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…
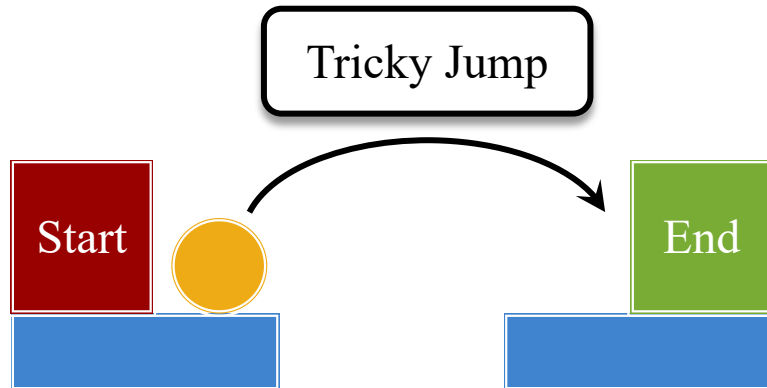 - **Discrete challenges** (doors)
  - Put together **intelligently**

This is How it Ever Was
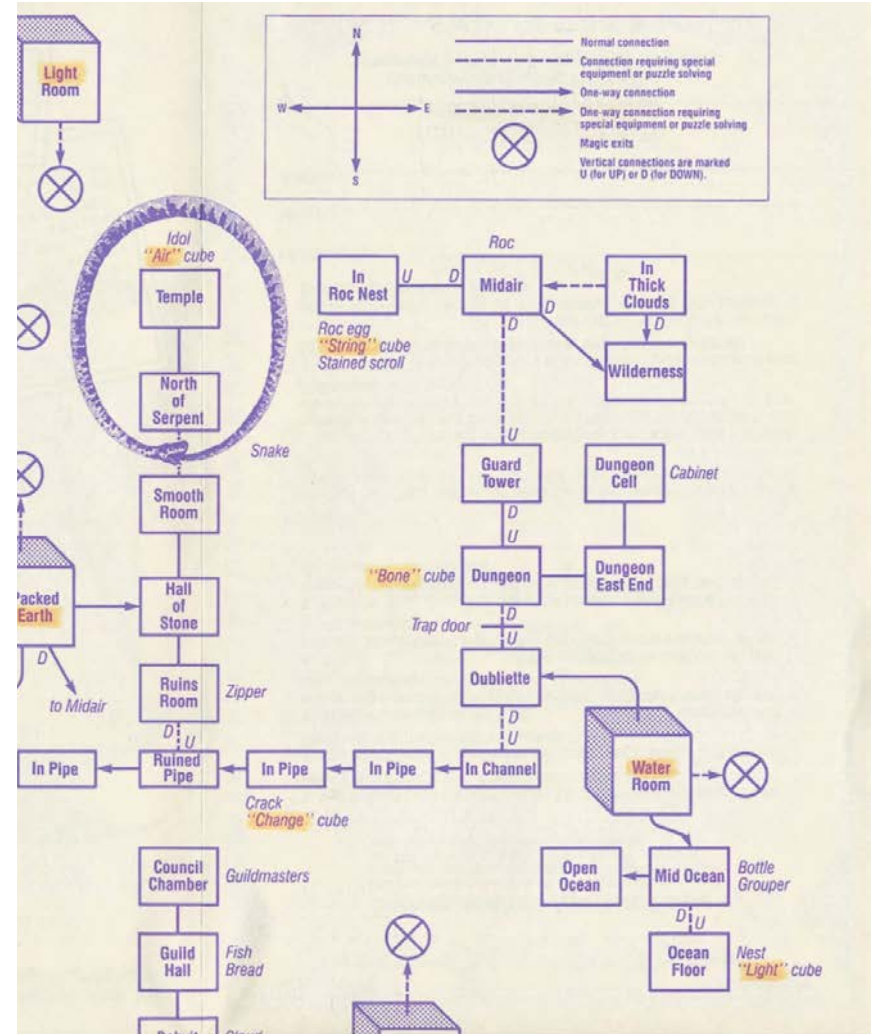
- Classic text adventures…
  - Goal is location to reach
  - Locked doors block progress
  - ~~Use actions to unlock doors~~
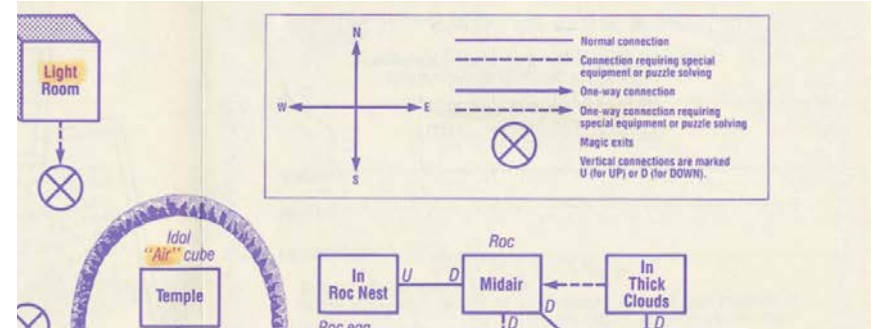
- **Tight Level Design = Tight Challenge Spacing**

  - Use mechanics to overcome

- Design levels with…
  - **Discrete challenges** (doors)
  - Put together **intelligently**
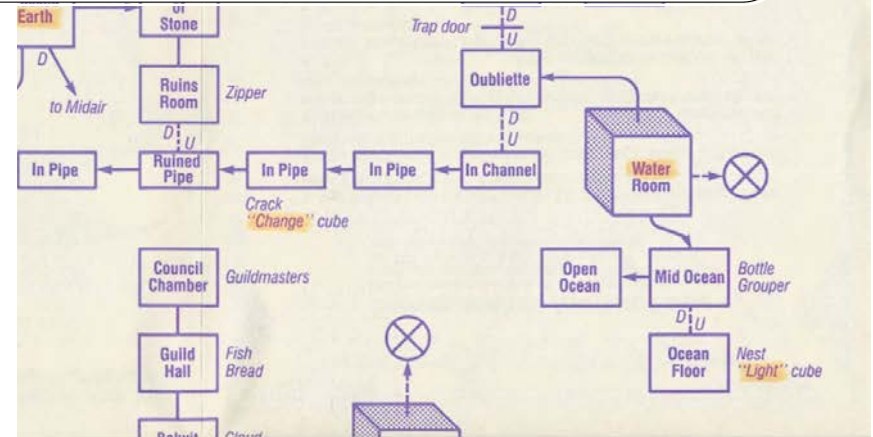
Level Design

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

Start

Challenge

End

Level Design

Design Pattern Examples

Platformer

Tricky Jump

Start

End

Stealth Game

Start

Avoid Detection

End

Level Design
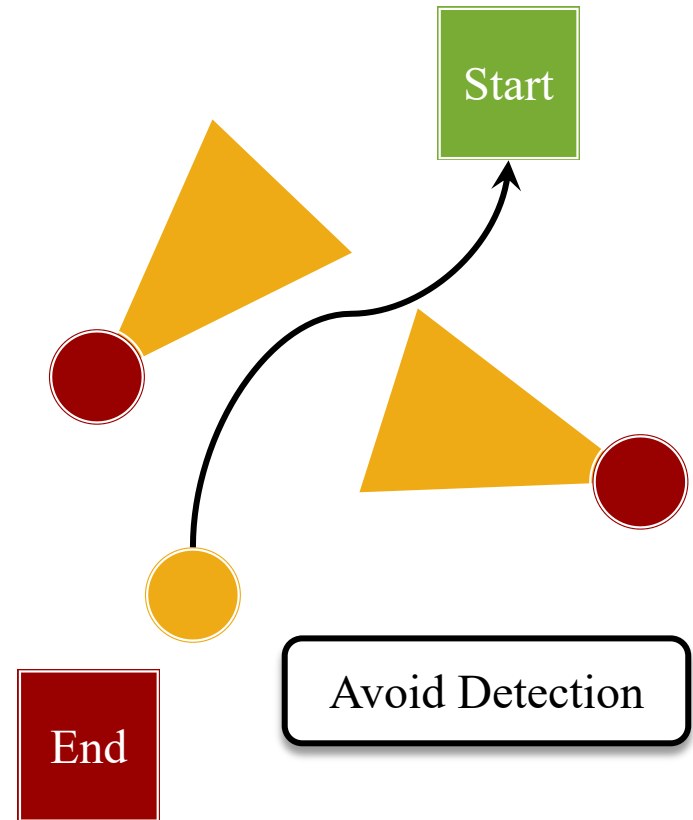
Design Pattern Examples

Shooter/Action Game

Cover

Cover

Cover

Kill Enemies

Cover

Racing Game

Brake

Gain Speed

Level Design
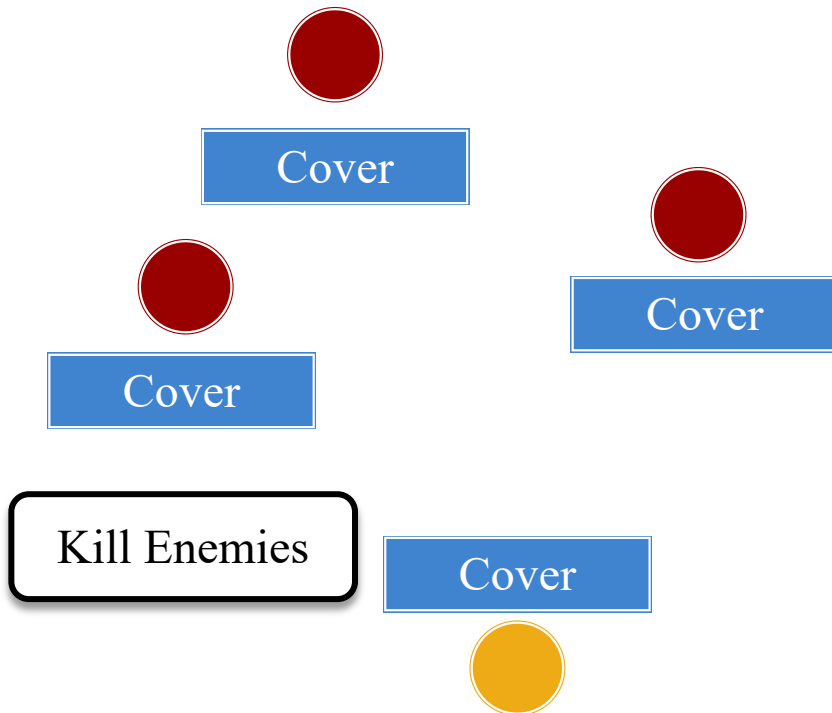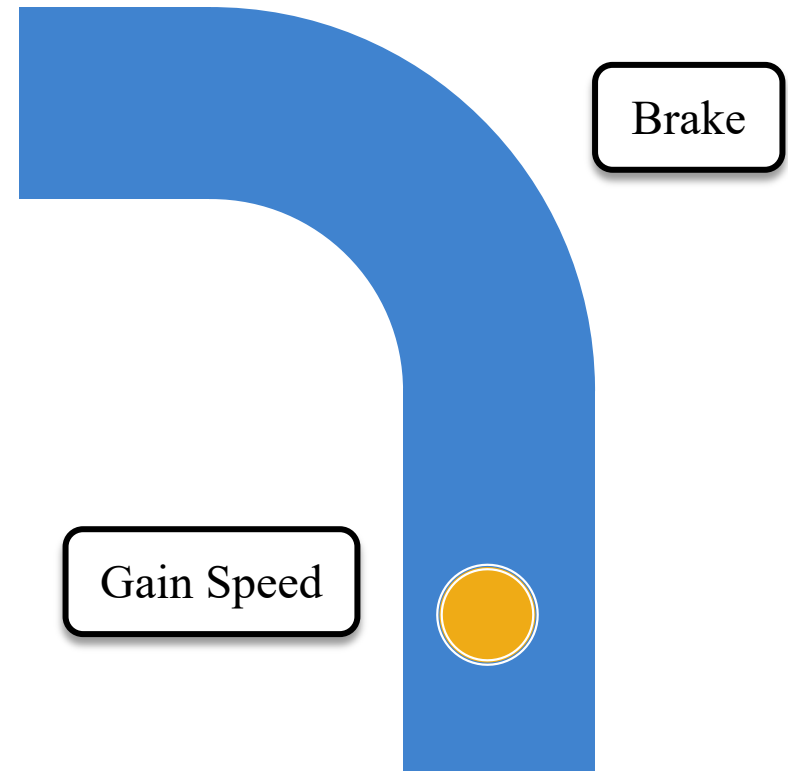
Dash: Basic Design Patterns

Dash: Putting it All Together

Level Design

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Dash: Putting it All Together

Level Design

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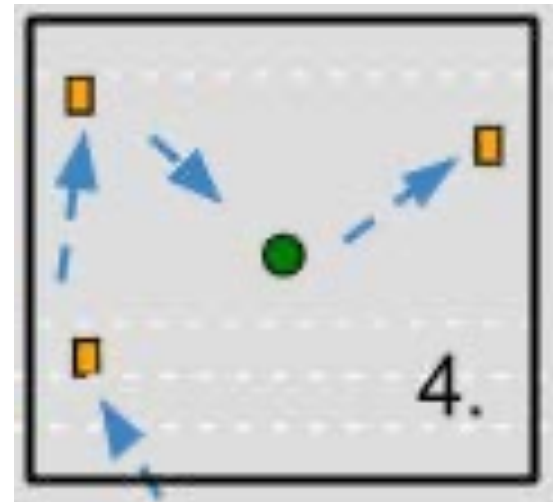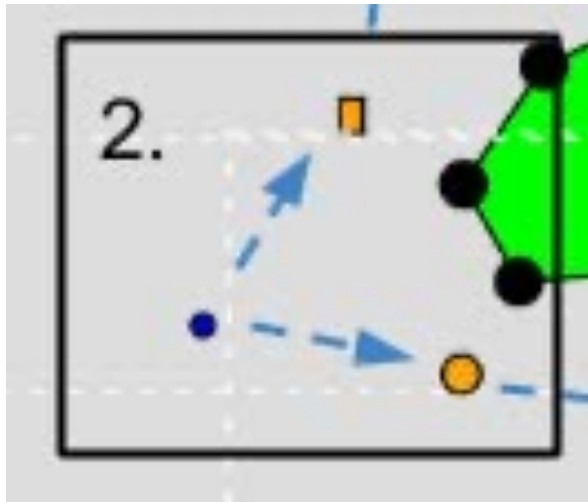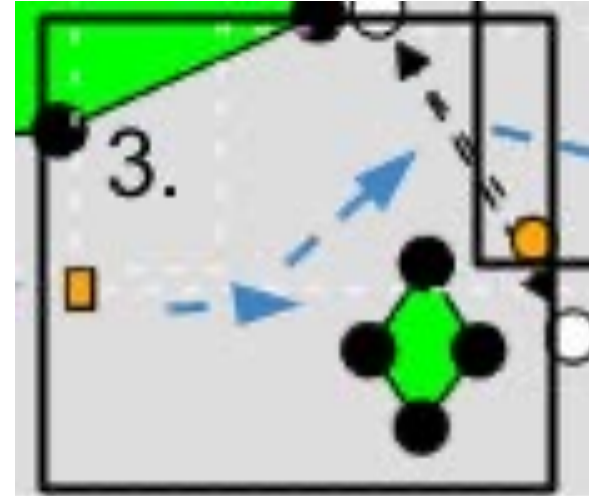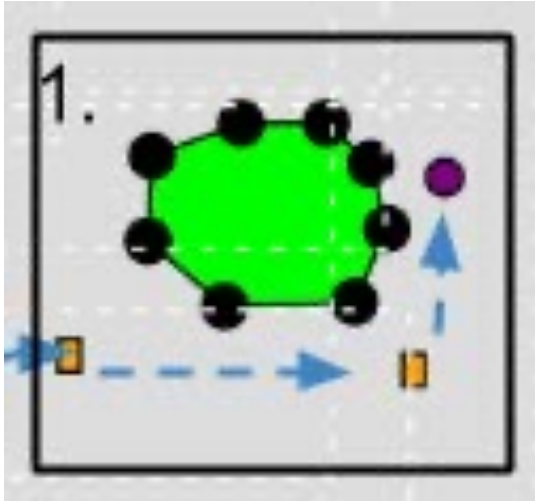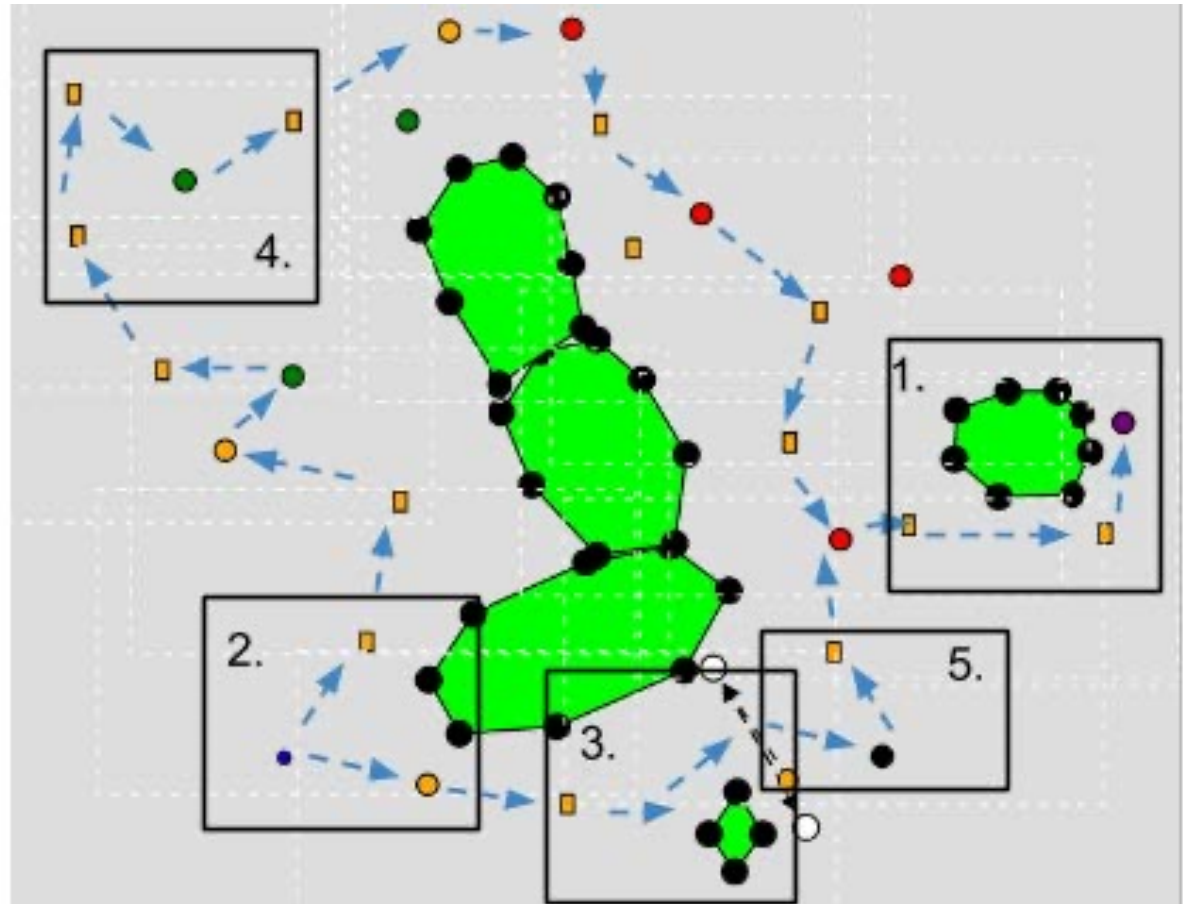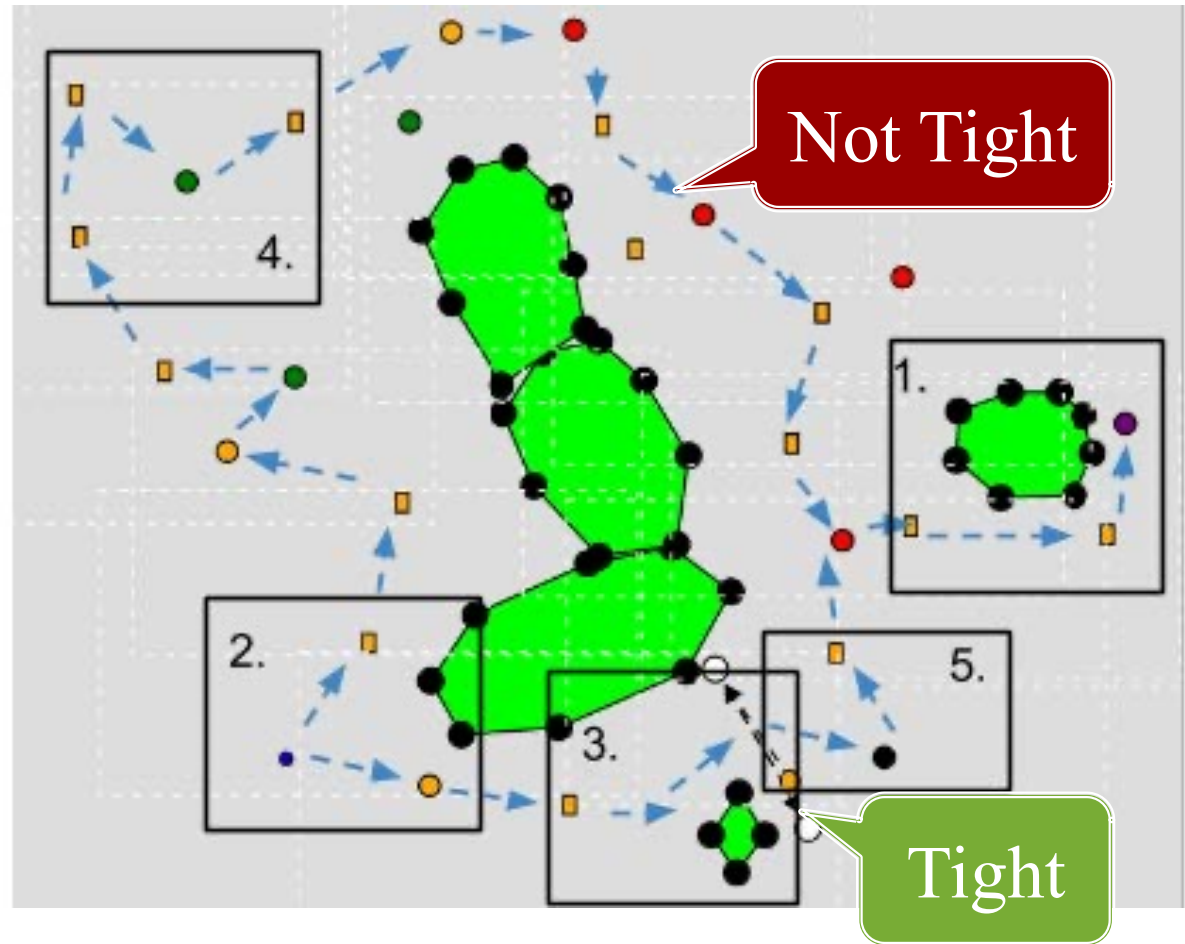
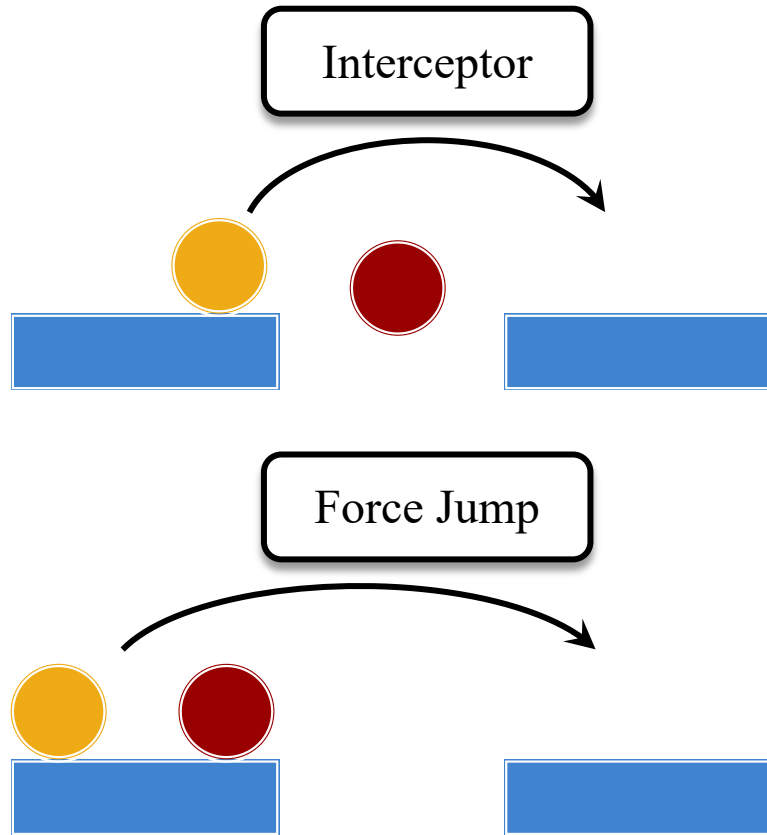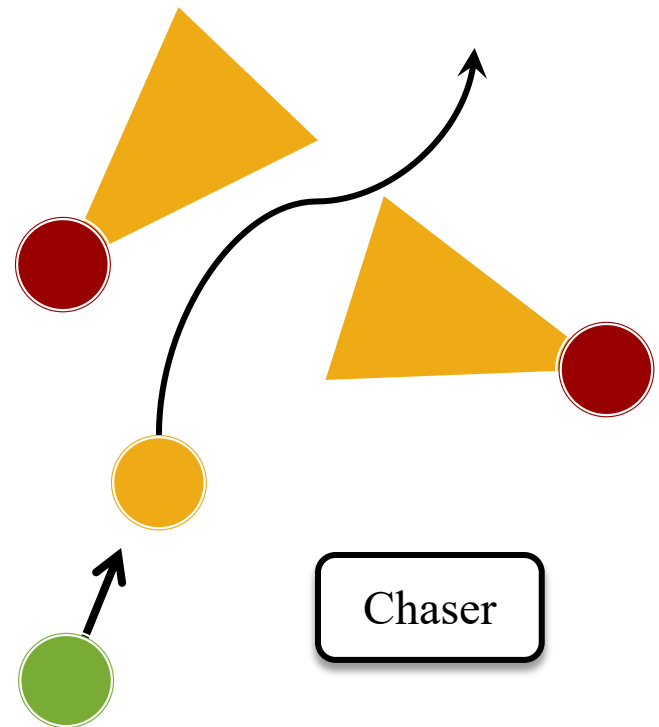# Composite Patterns

- 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
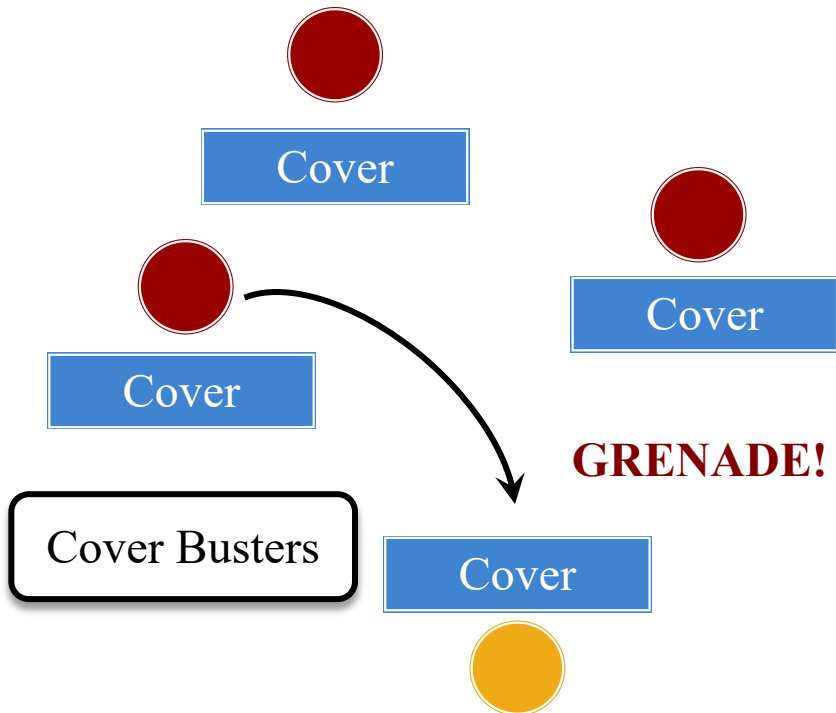
- **Reading:** Extended/Evolutionary Challenge

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Composite Patterns

Platformer

Interceptor

Force Jump

Stealth Game

Chaser

Level Design

Composite Patterns

Shooter/Action Game

Cover

Cover

Cover

GRENADE!

Cover Busters

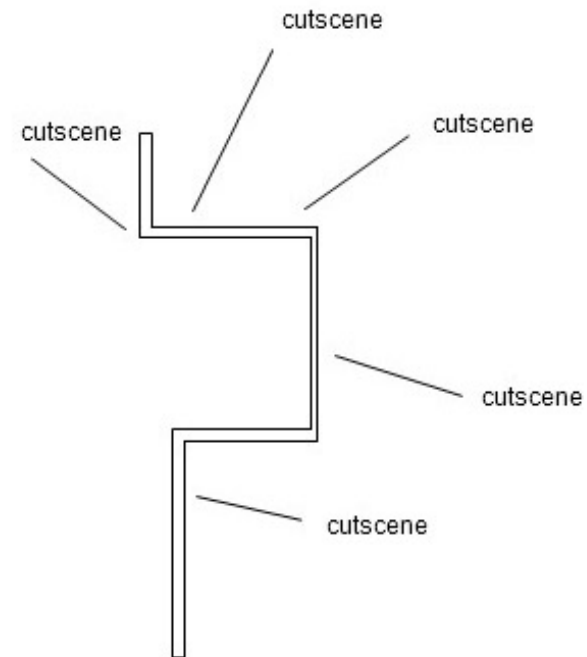Cover

Racing Game

Restrict Positions

Level Design
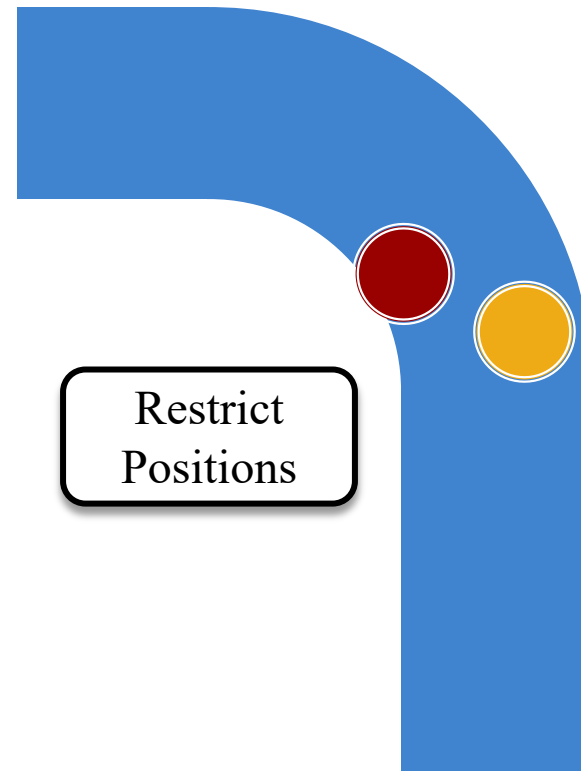
Is Linearity a Problem?

[Image attribution unknown]

FPS map design

1993

2010

cutscene

cutscene

cutscene

cutscene

cutscene

Level Design

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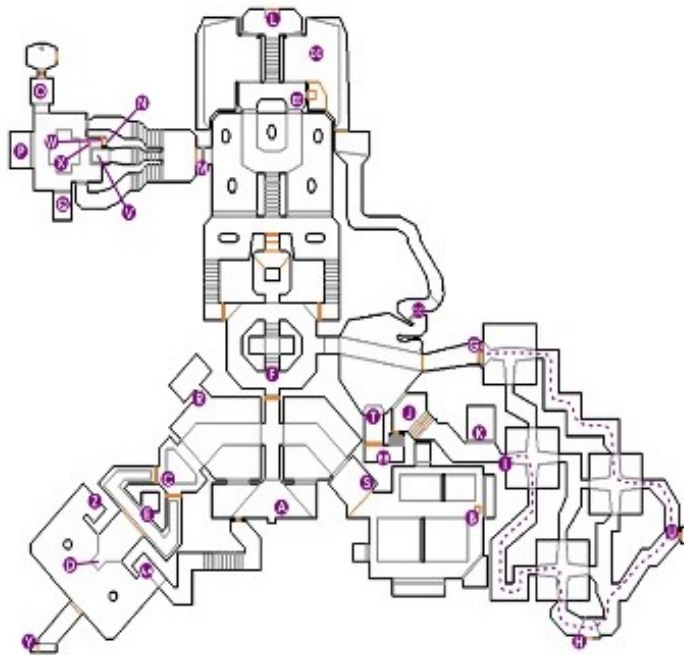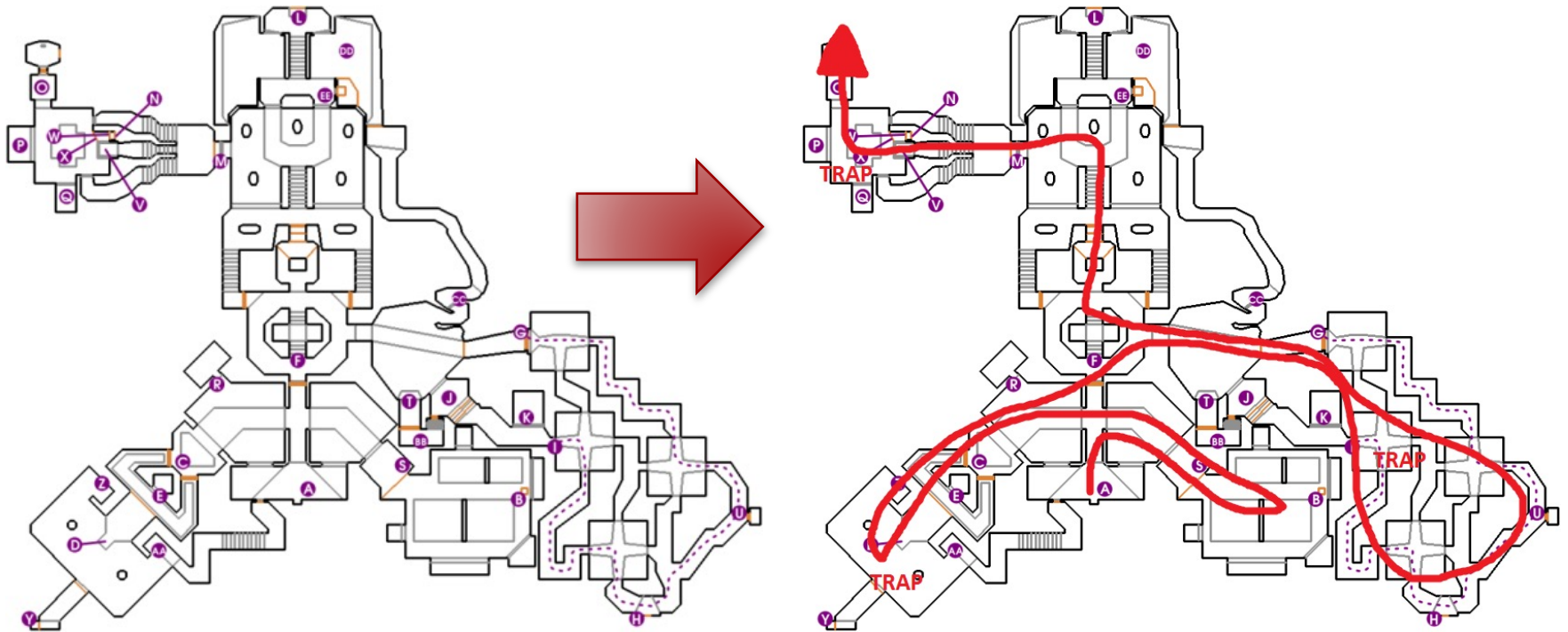
But Actually…

[refugeinaudacity.wordpress.com]
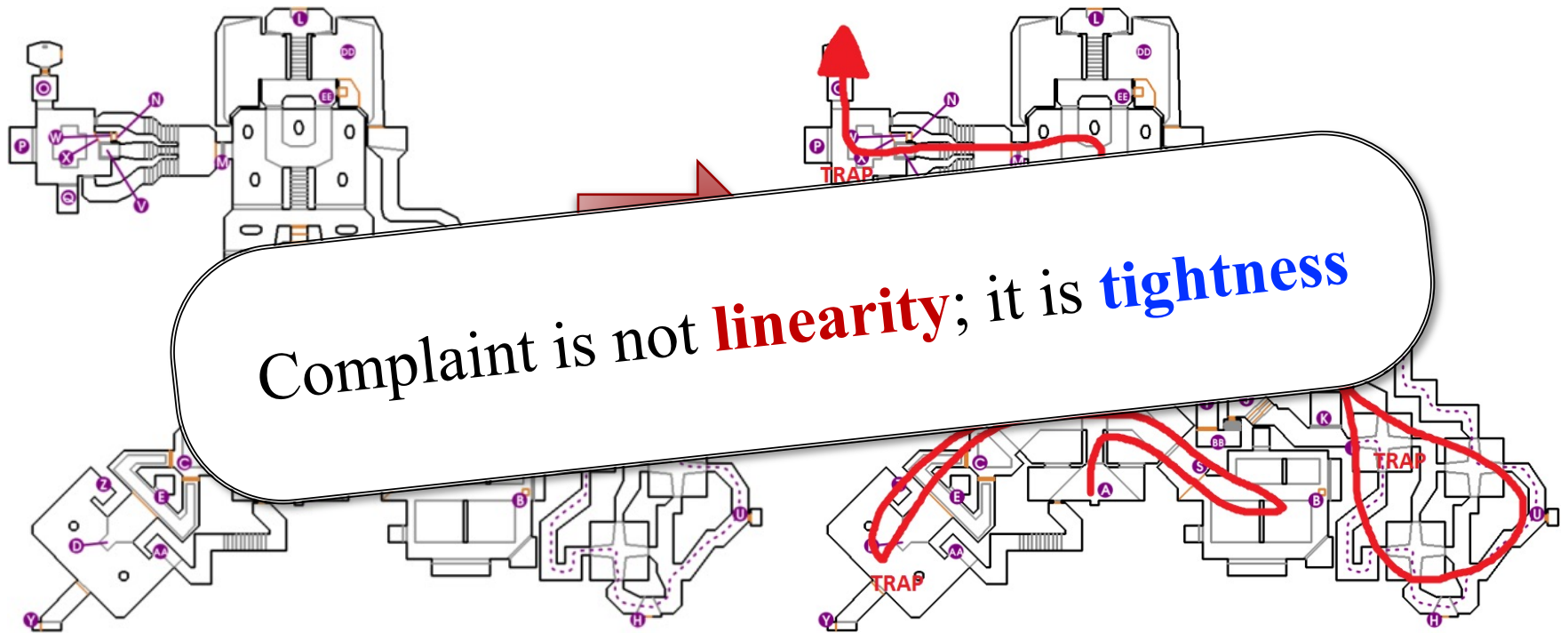
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But Actually…

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

[refugeinaudacity.wordpress.com]

Level 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

Level Design

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)

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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)

Level Design

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*

Level Design

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

Level Design

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The Tyranny of Choice

- Too much choice can make us unhappy
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- But ⬤ **Limiting choice helps train player**
  - P
  - Go
  - **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

Level Design

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

Reinforcement

A A A B B B

A A B B AB AB

A B C D E

**A   AB   ABC
ABCD ABCDE**
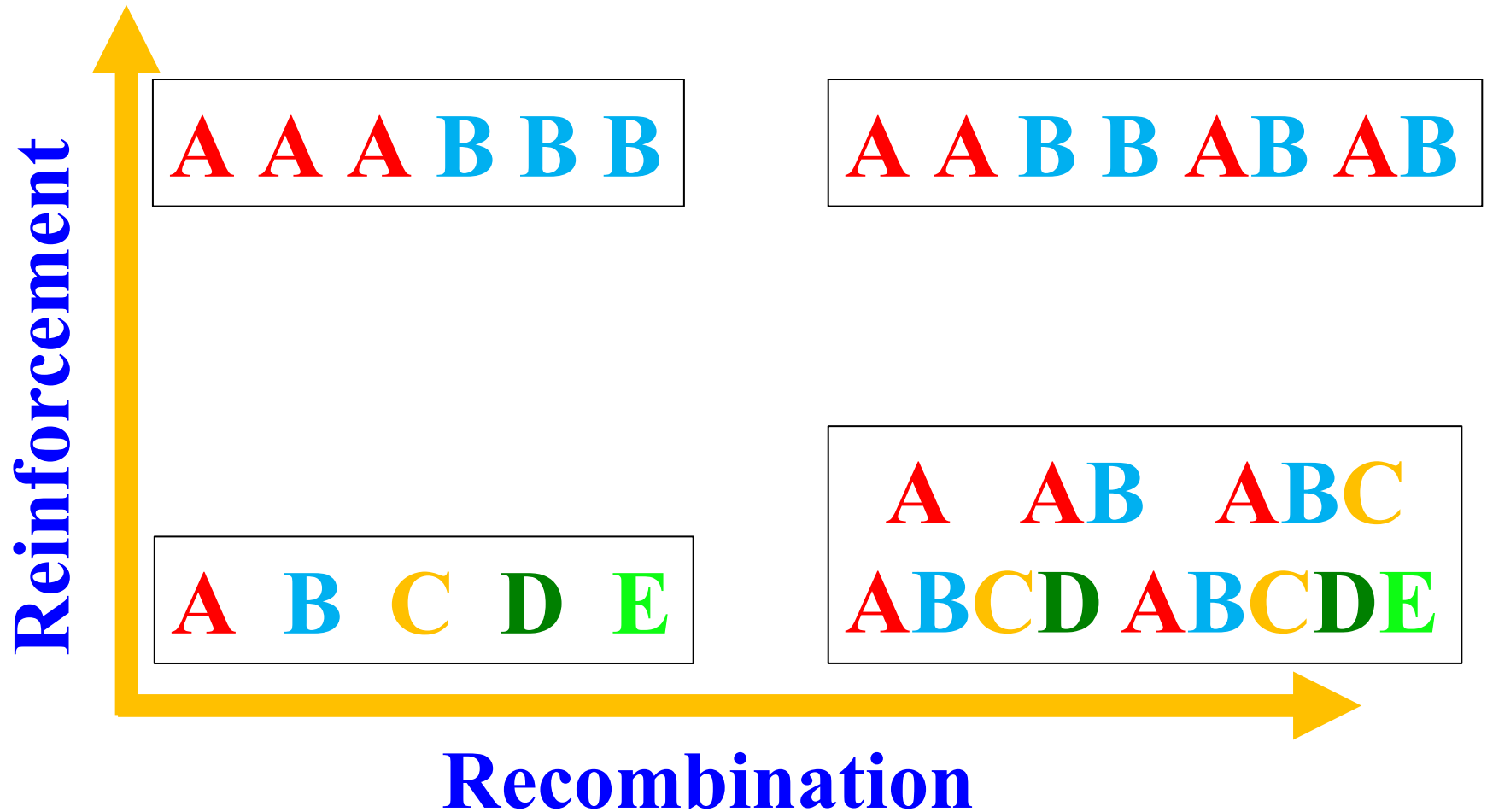
Recombination

Robot Unicorn Attack

Level Design

Mechanics:

A = jump   **B** = dash

A A A B A A B

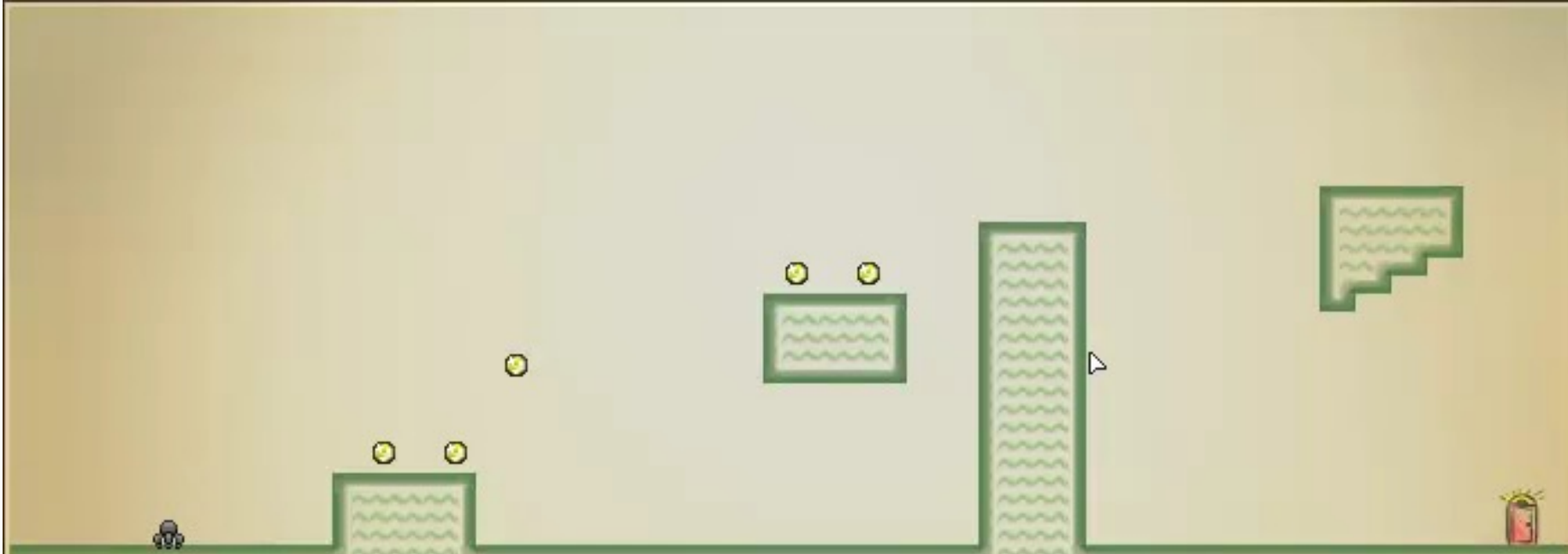## High reinforcement, low recombination

Hello Worlds!

COMBO(C)   REWIND(V)

QUIT   RESTART(R)

TIME: 7
PAR TIME: 45
SPEED TIME: 12

ALPHA

COINS ◯: 1/6
STARS ☆: 0
POINTS: 0

A
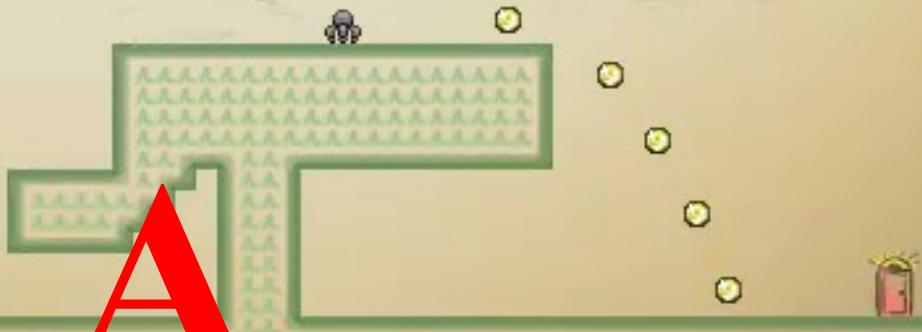
COMBO(C)   REWIND(V)

QUIT   RESTART(R)

TIME: 7
PAR TIME: 45
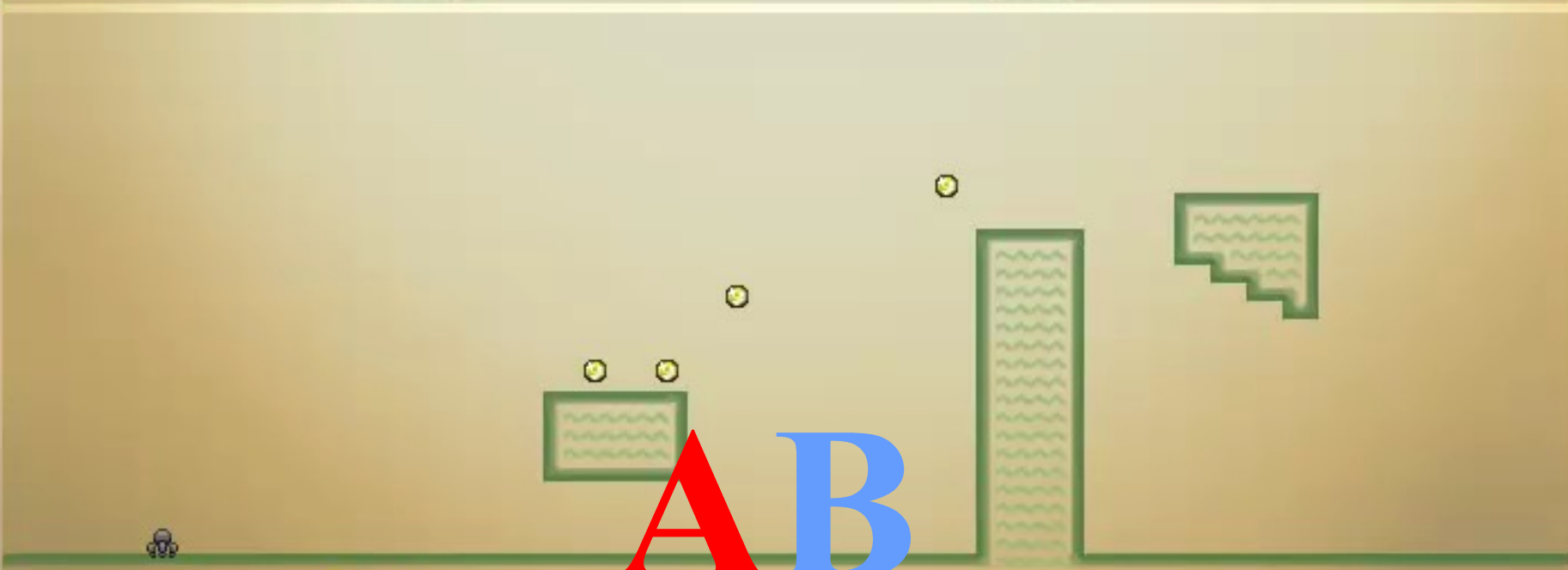SPEED TIME: 12

ALPHA

COINS ◎: 1/6
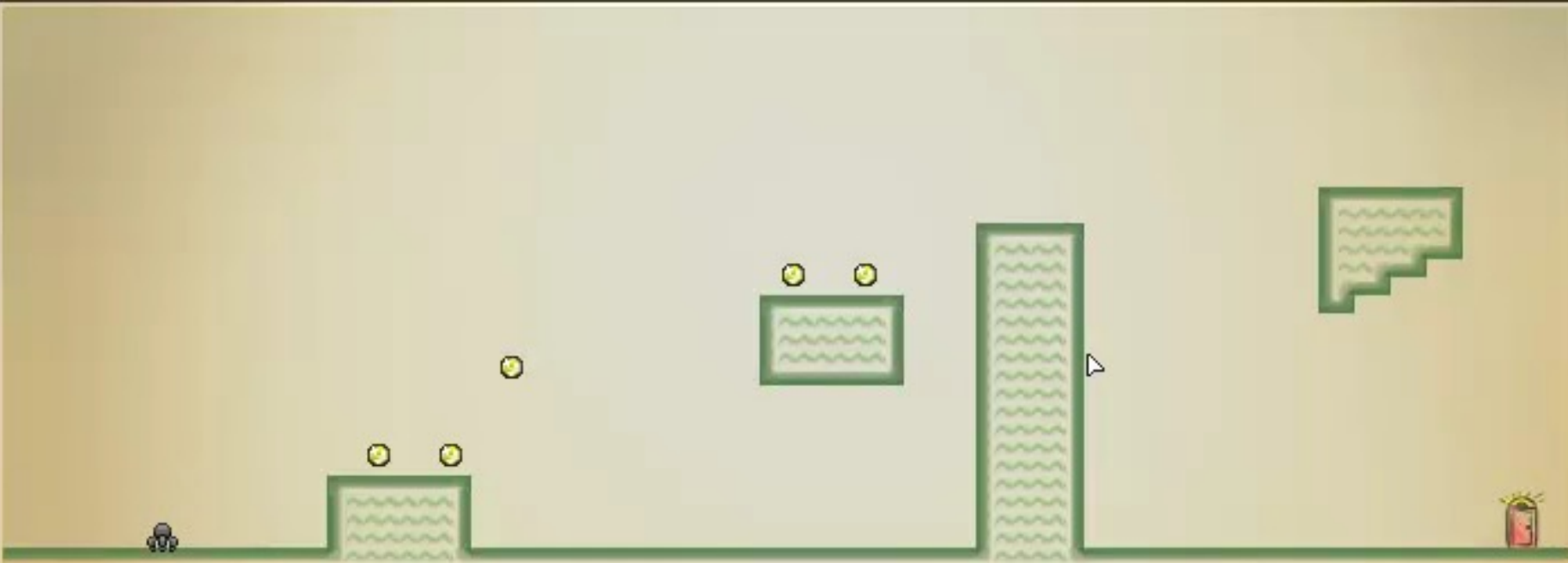STARS ☆: 0
POINTS: 0

COMBO(C)   REWIND(V)

QUIT   RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 10
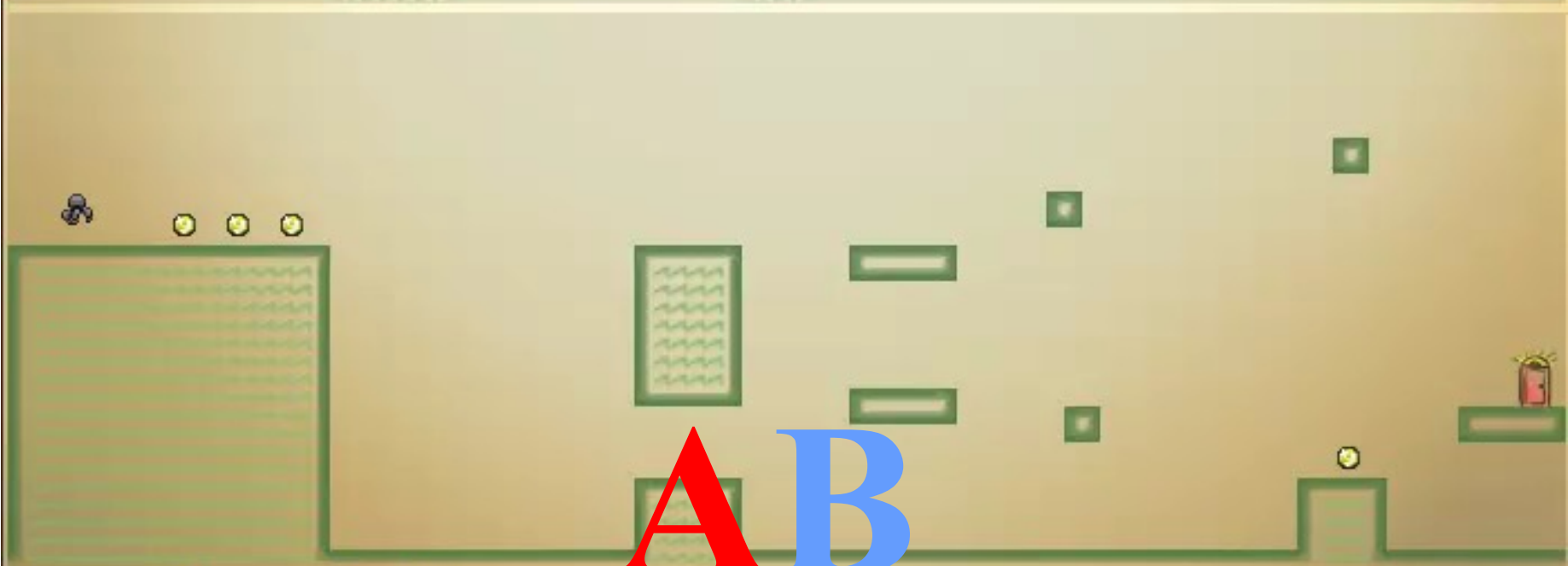
BETA

COINS ⊙: 0/9
STARS ☆: 3
POINTS: 255

AB
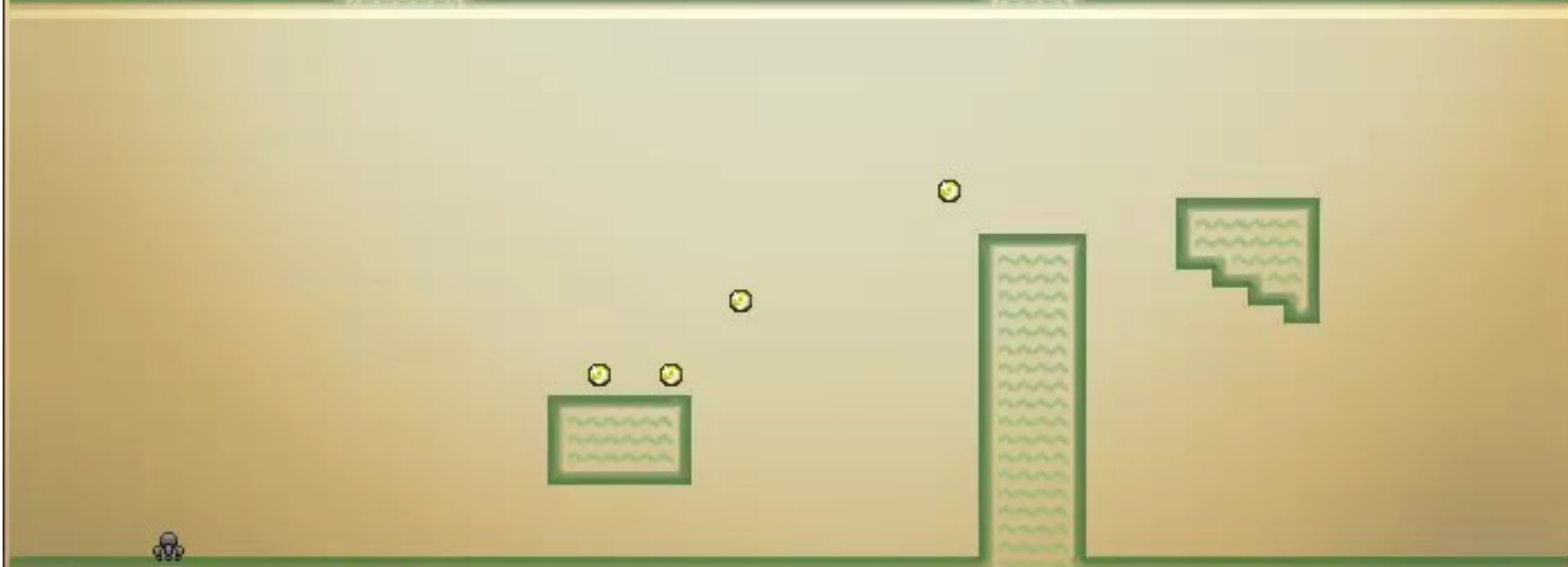
COMBO(C)   REWIND(V)

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
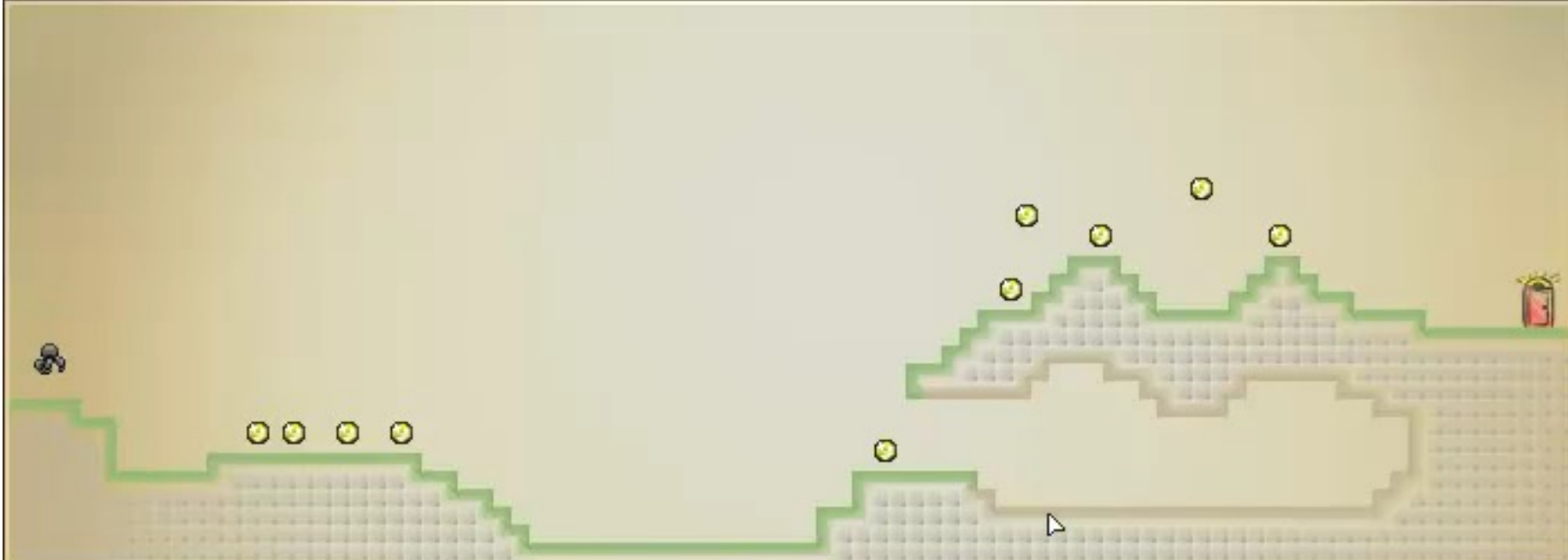
GAMMA

COINS ◎: 0/6
STARS ☆: 6
POINTS: 573

COINS ◎: 0/6
STARS ☆: 6
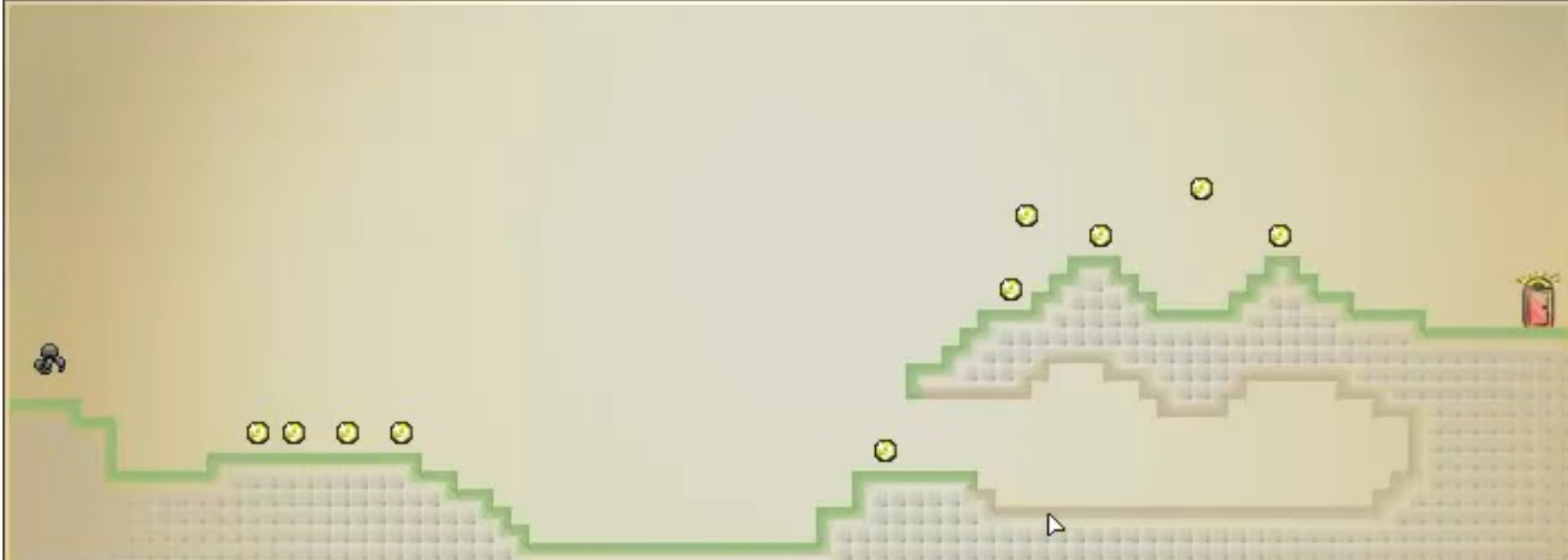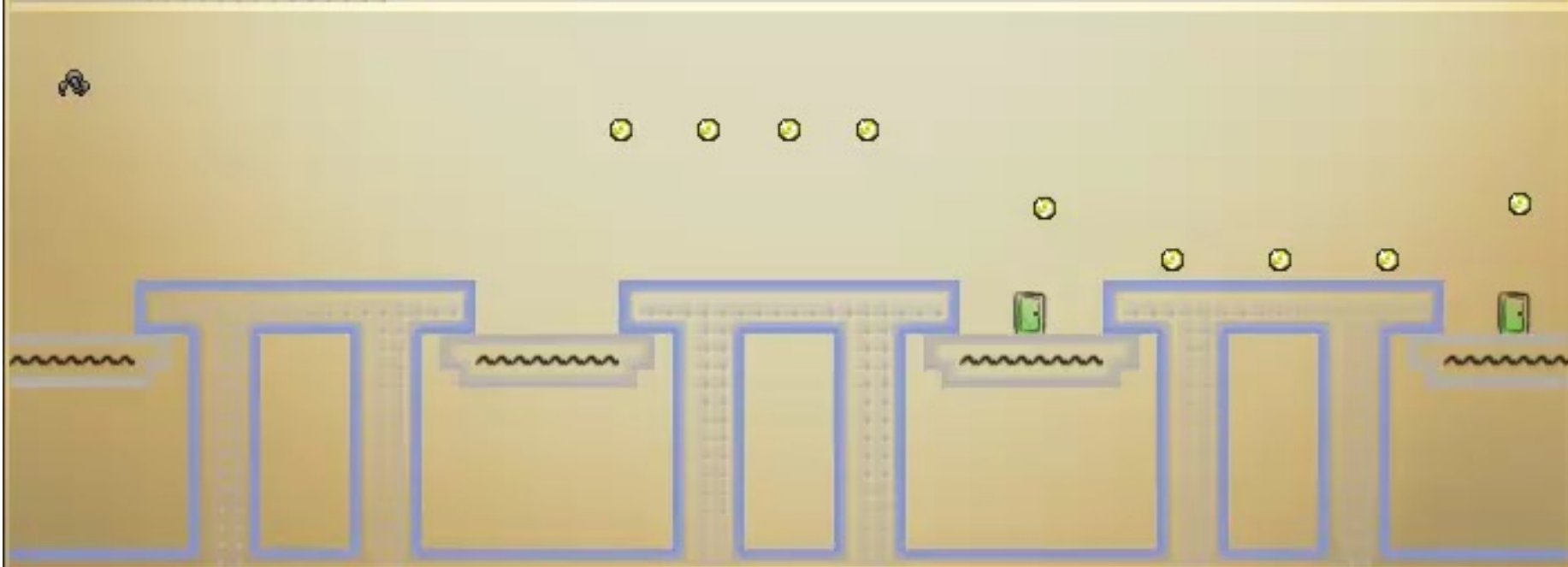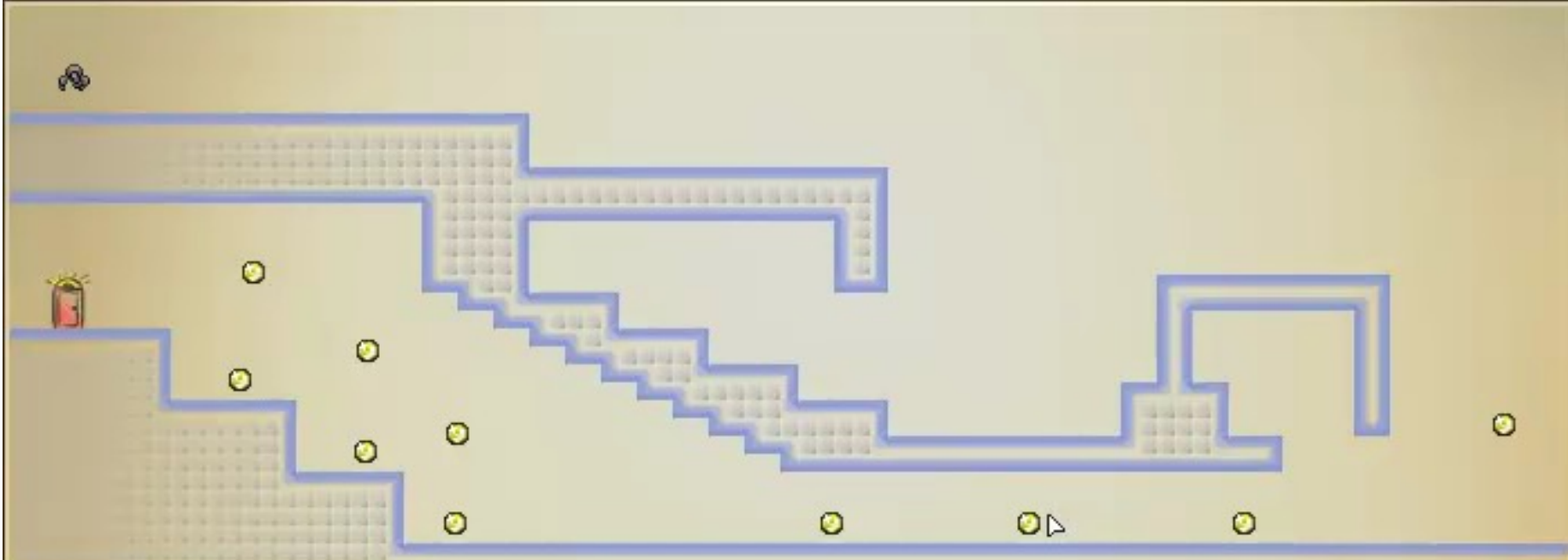POINTS: 573

A B

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
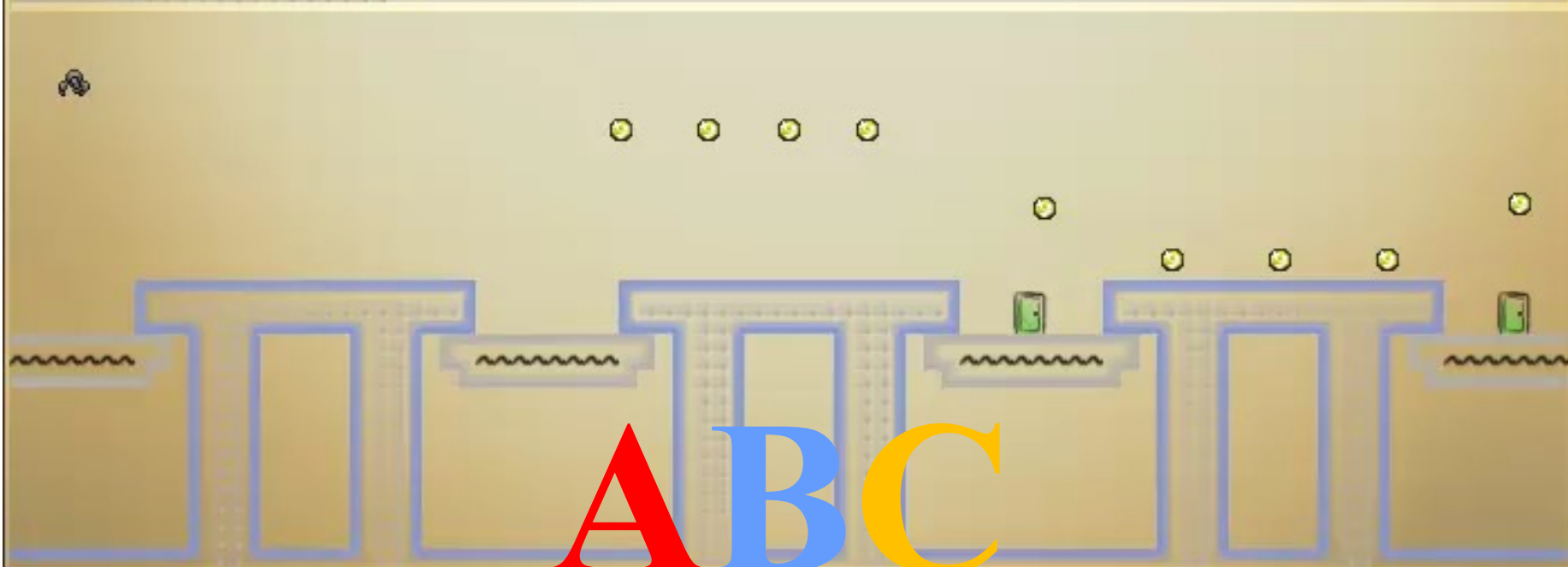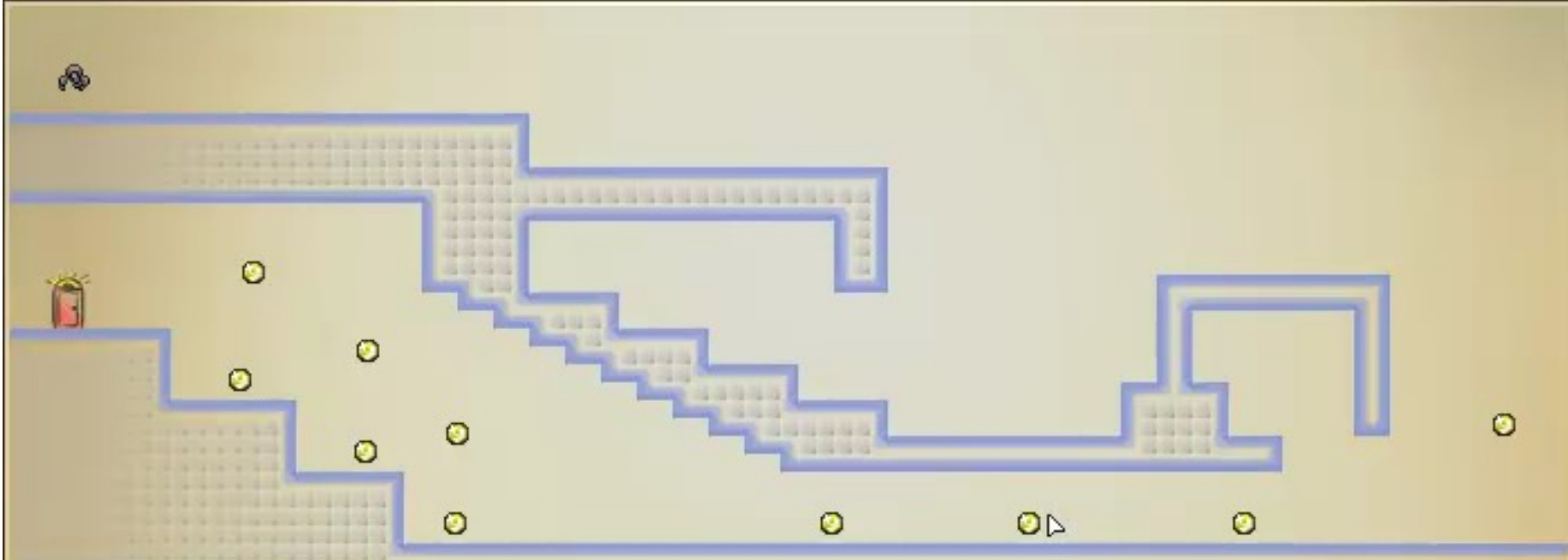STARS ☆: 9
POINTS: 879

COMBO(C)   REWIND(V)

QUIT   RESTART(R)

TIME: 0
PAR TIME: 60
SPEED TIME: 30

PILLARS

COINS ⊙: 0/19
STARS ☆: 12
POINTS: 1203

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

TIME: 0
PAR TIME: 60
SPEED TIME: 30

PILLARS

COINS ◎: 0/19
STARS ☆: 12
POINTS: 1203

Mechanics:
A = move   **B** = two worlds   **C** = close world

A   AB   AB   ABC   ABC

Moderate reinforcement, high recombination

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Starcraft

Level Design

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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*

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