

A screenshot from the game Pyrokid showing a character on the left and three vertical wooden structures of increasing height against a dark, rocky background. The structures are made of wooden planks and have a small window at the top.

CS/INFO 4154:

Analytics-driven Game Design

Class 8:

Progressions

Pyrokid, 2014

Mon

Wed

Fri

9/11
Progressions

9/13
Achievement Mechanisms

9/15
Throwaway Testing 1

9/18
Throwaway Testing 2

9/27
Alpha Testing 1

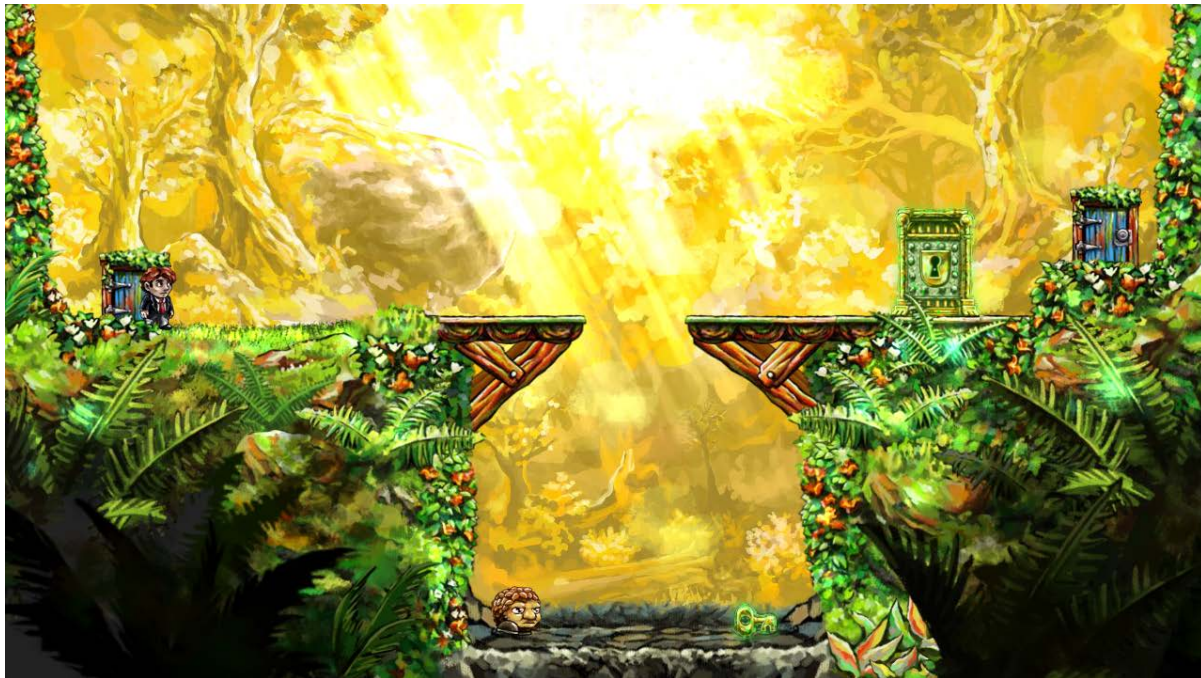
9/29
Alpha Testing 2

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*

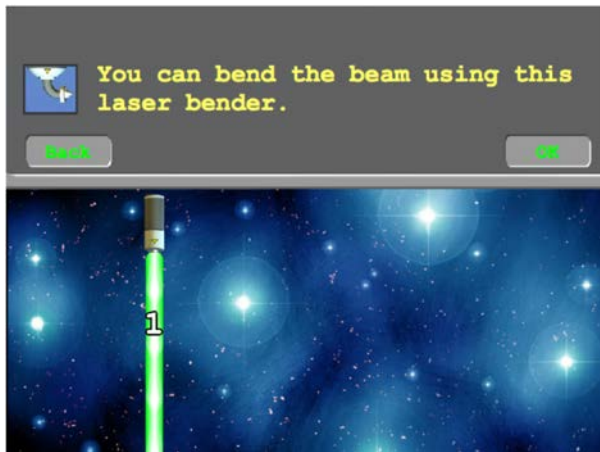
- *Impossible to pass* without experiencing interaction
- *Isolated* from other actions and interactions
- Player is relatively *safe*



Review: User Interfaces



Impact of animations



Refraction

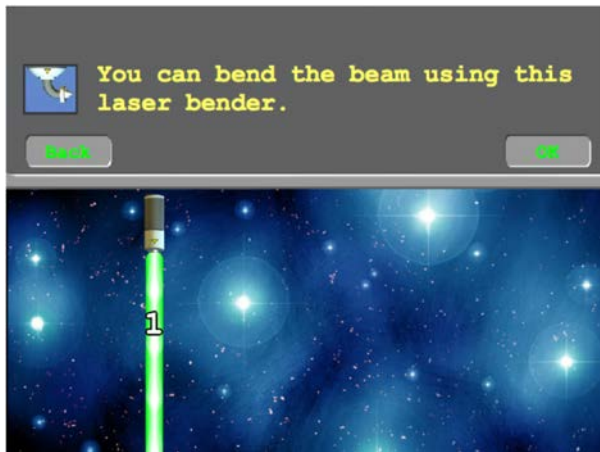


Hello Worlds

Impact of animations



Impact of animations



Refraction

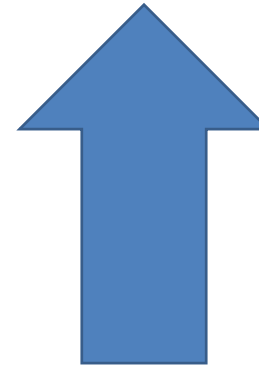
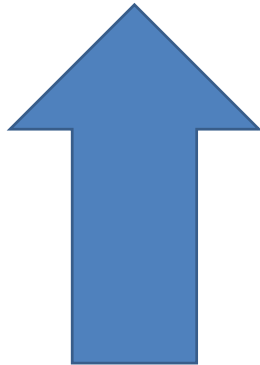
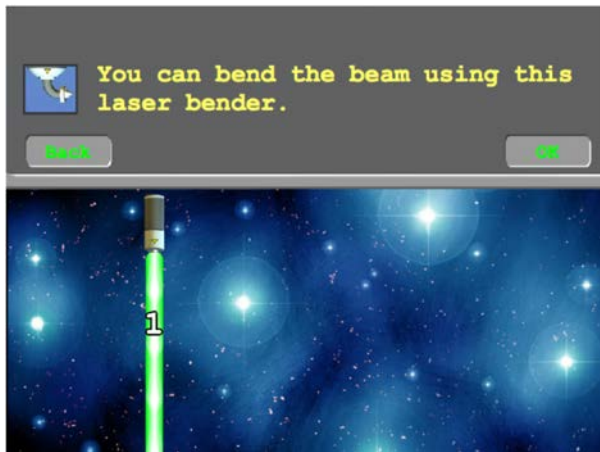
7,765 players



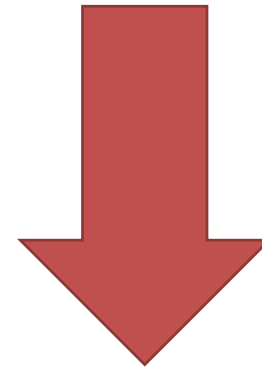
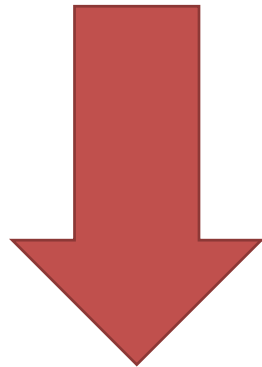
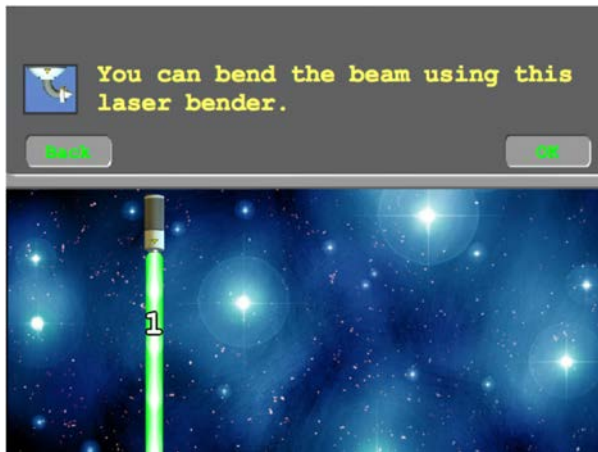
Hello Worlds

5,050 players

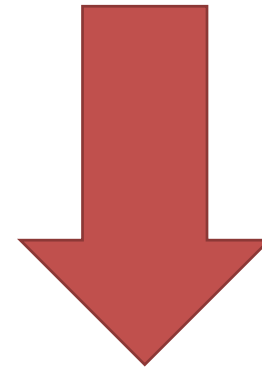
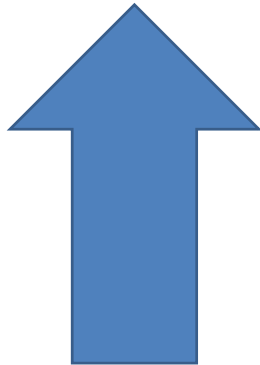
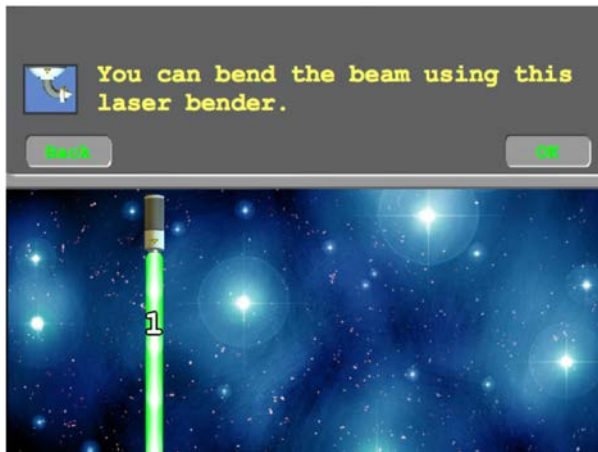
With animations, engagement...



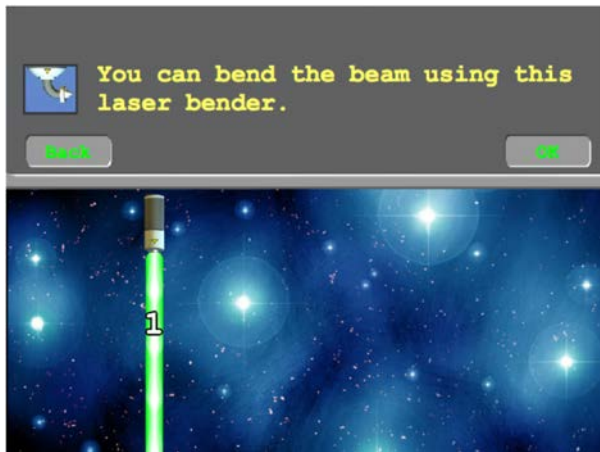
With animations, engagement...



With animations, engagement...



With animations, engagement...

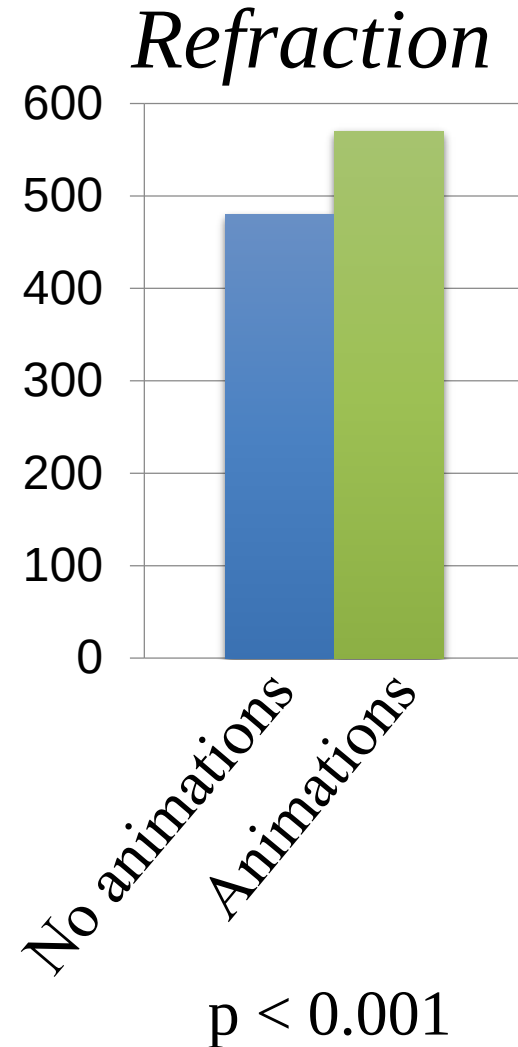
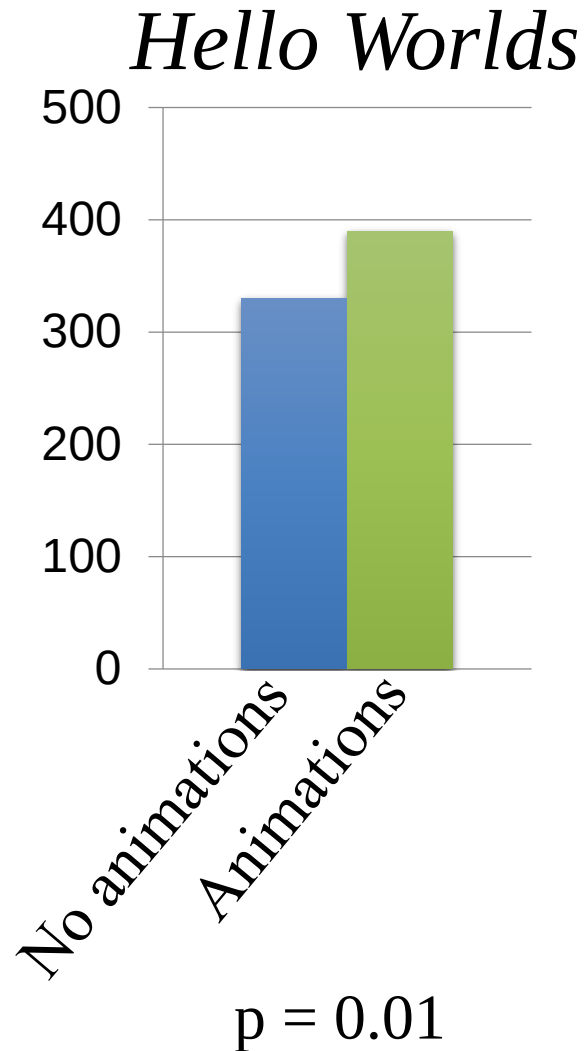


no change

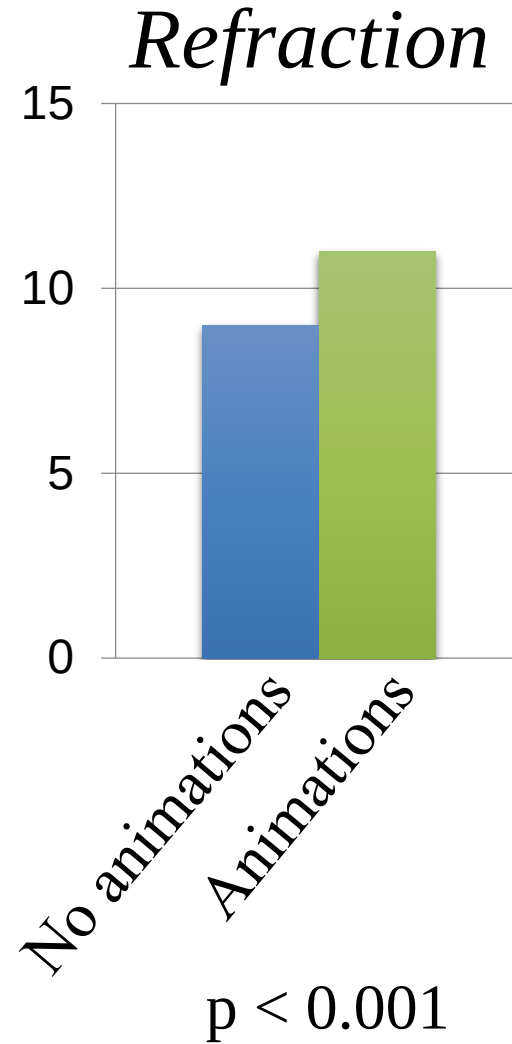
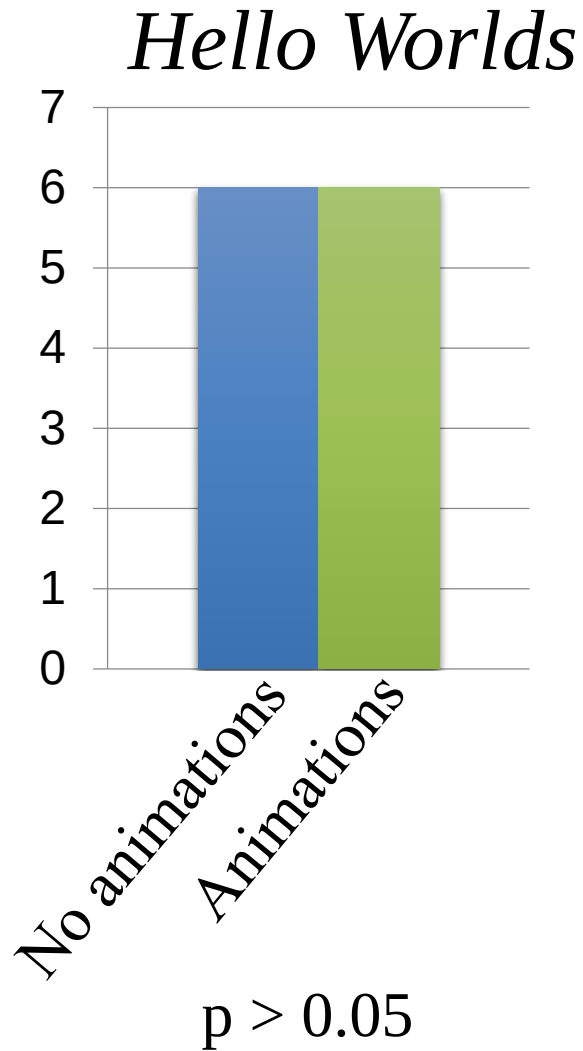


no change

Engagement (time played, seconds)



Performance (levels completed)



Now: Learning and Engagement



Outline

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

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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

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

Trivia: *ThatGameCompany*



Journey (2012)



Flower (2009)

Trivia: *Flow*



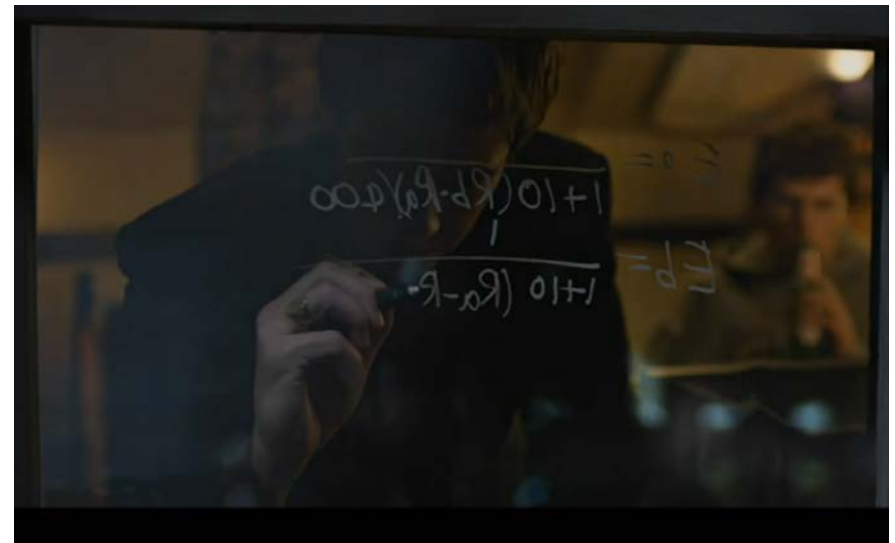
Jenova Chen



Flow (2006)

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:
 - $+0 = 50\%$
 - $+200 = 16\%$
 - $+400 = 3\%$



The Social Network

Abuhamdeh and Csikszentmihalyi 2012

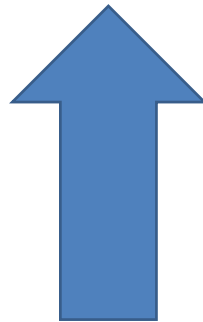
Players preferred playing players ranked:

-1000 -500 0 +500 +1000

Abuhamdeh and Csikszentmihalyi 2012

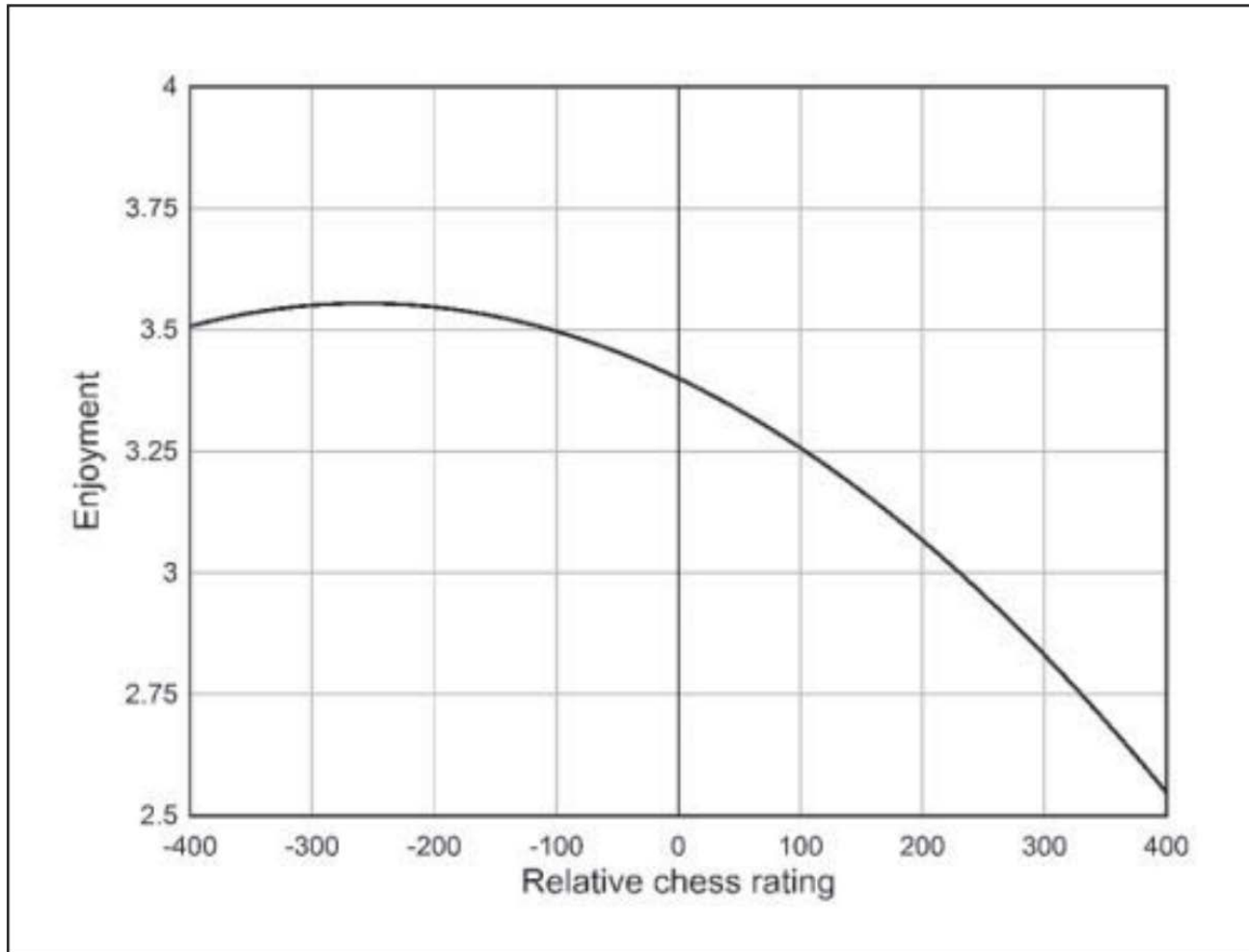
Players preferred playing players ranked:

0 +125 +250 +375 +500



262 points

Abuhamdeh and Csikszentmihalyi 2012

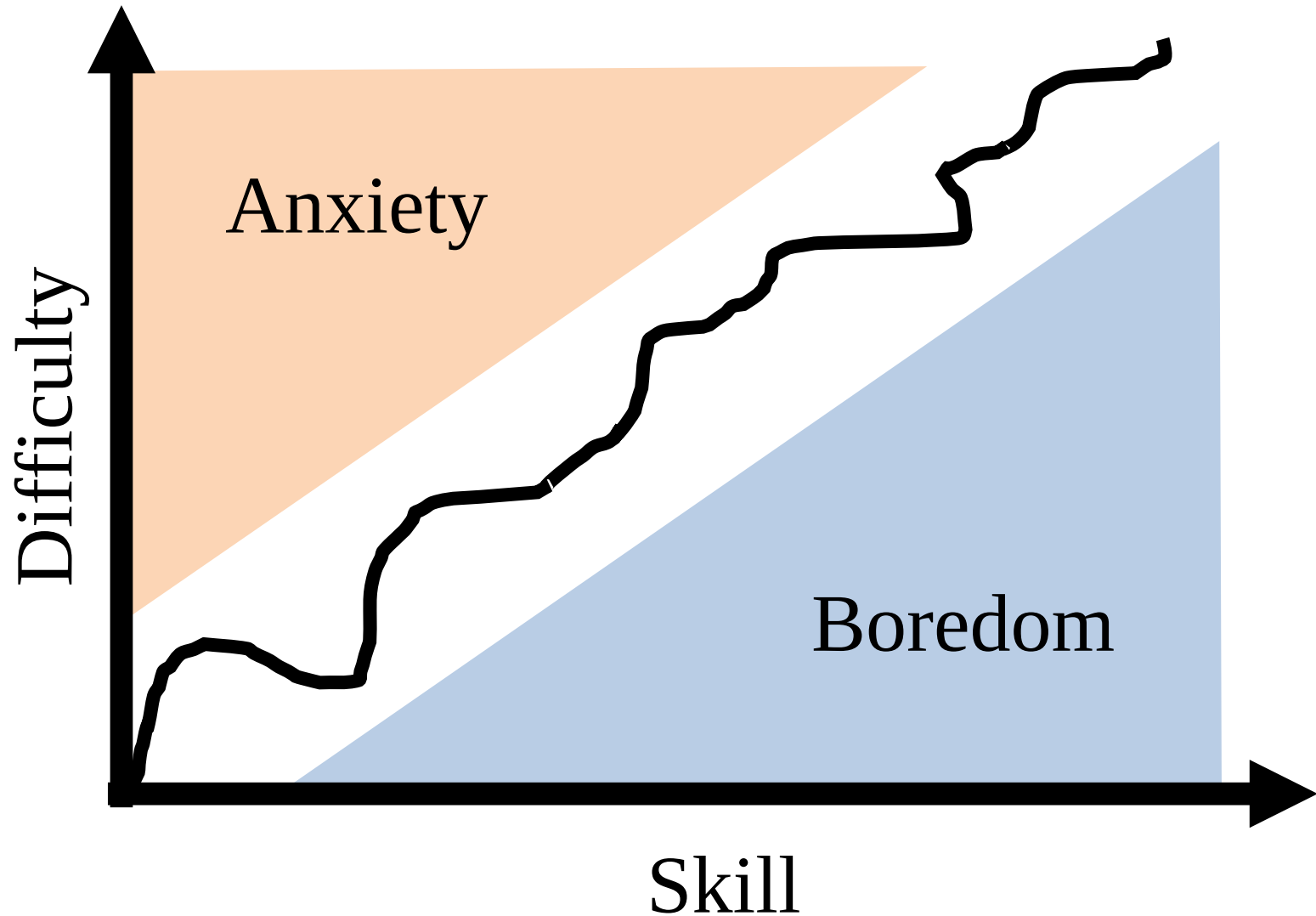


Abuhamdeh and Csikszentmihalyi 2012

“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

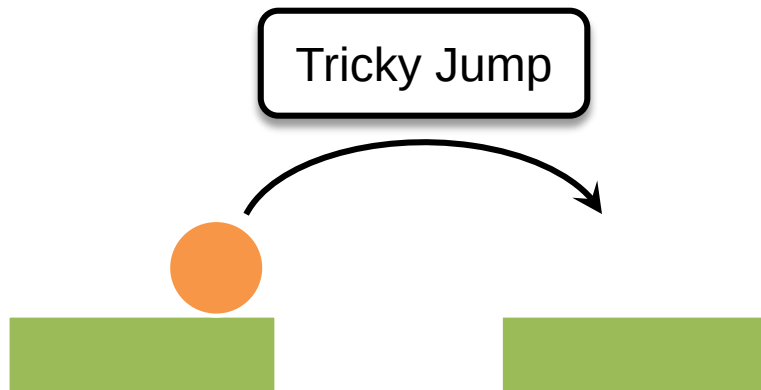


Challenge: manage complexity

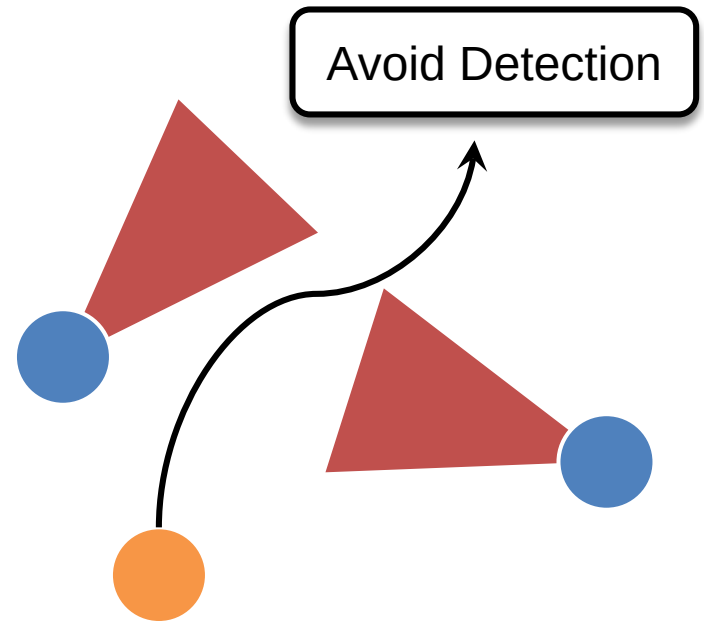
- **Break down** complexity into *discrete* and *recognizable* components
- *Systematically* and *gradually* introduce components
 - this is called a ***progression***

Units of Challenge: Design Patterns

Platformer: Jump



Stealth Game: Avoidance



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

Robot Unicorn Attack



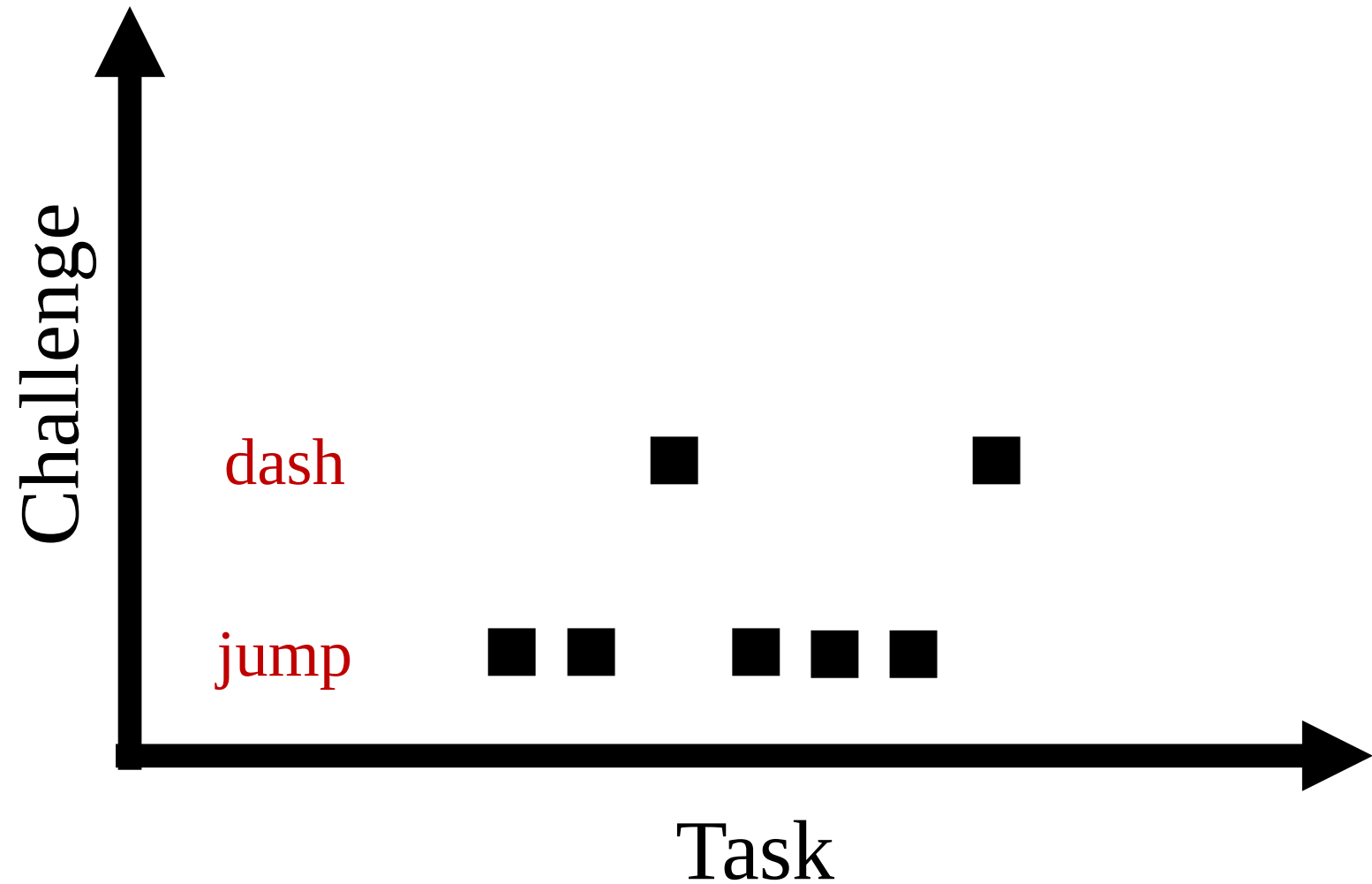
Robot Unicorn Attack Progression

Challenges:

A = jump **B** = dash

A A A B A A B

Robot Unicorn Attack Progression

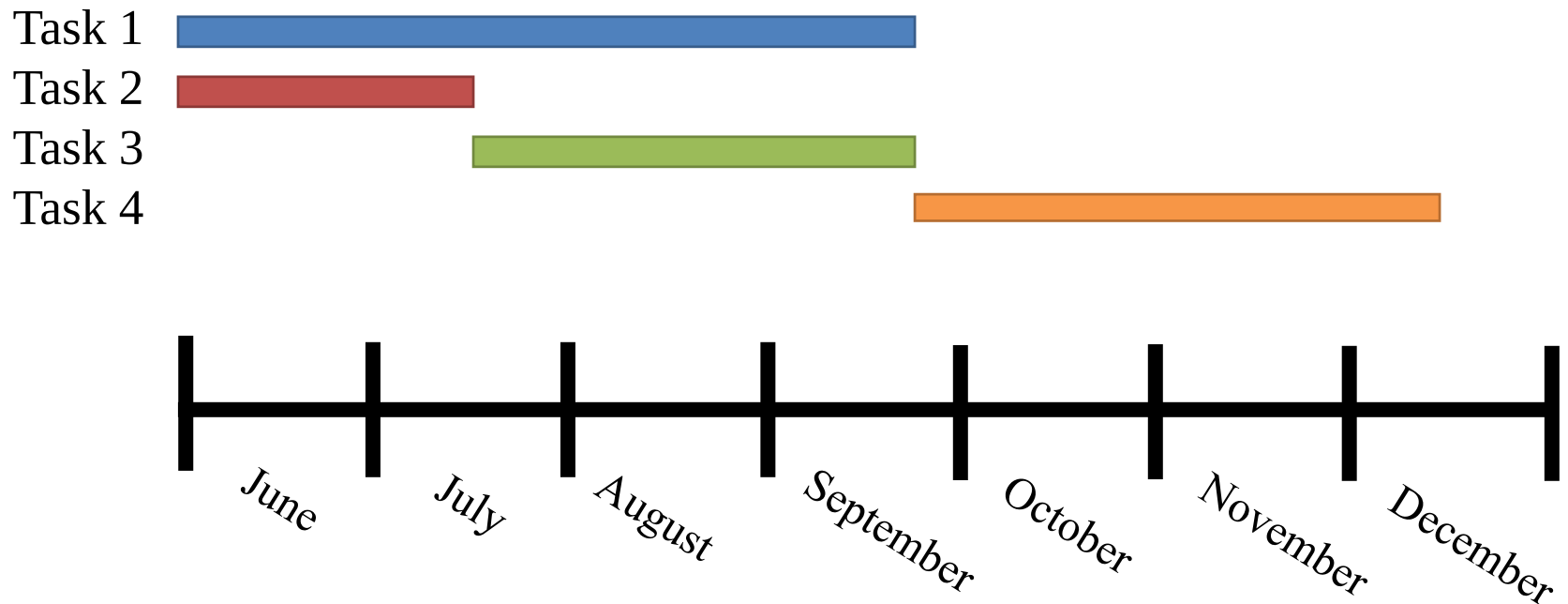


Outline

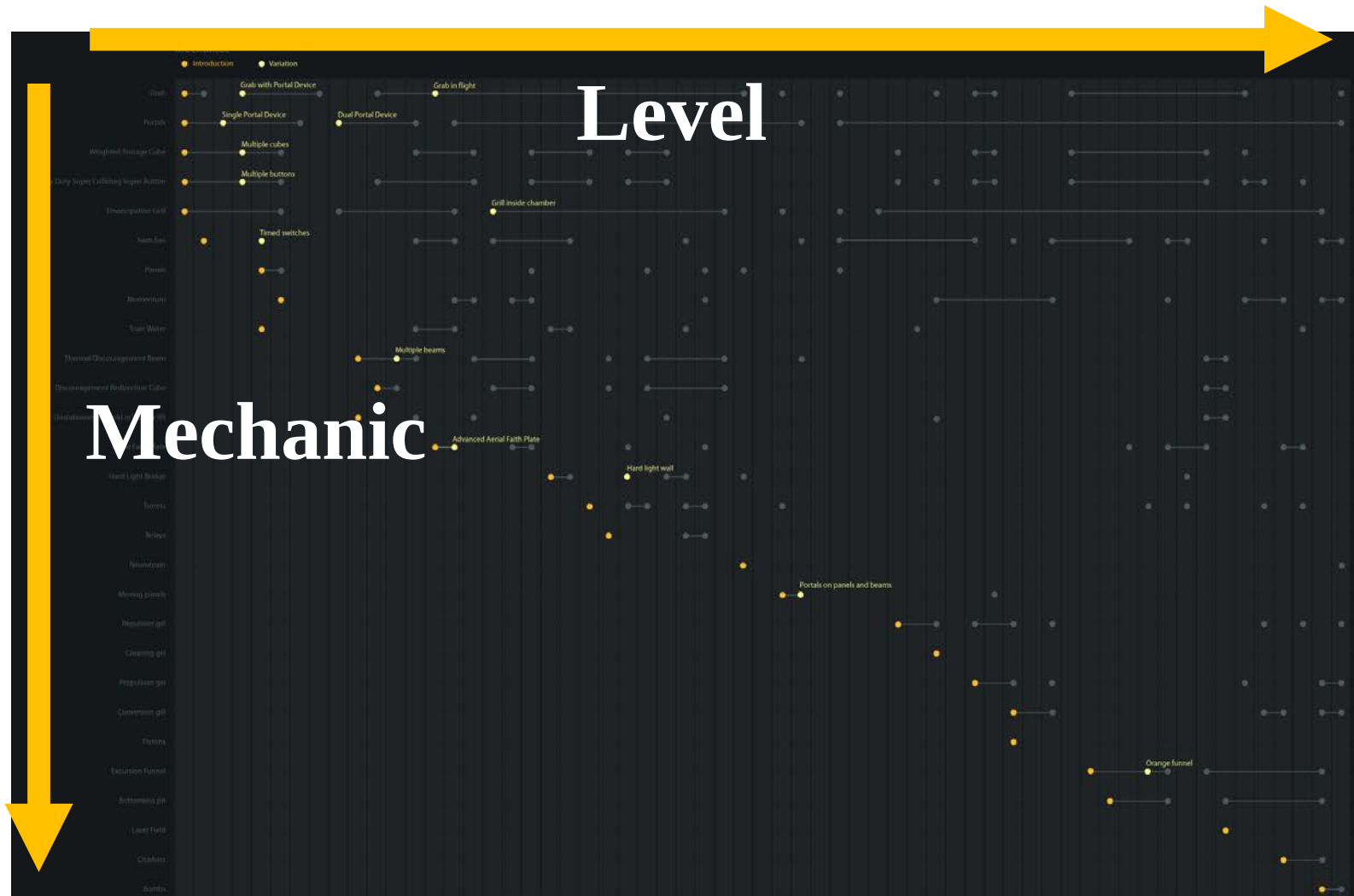
1. Flow and units of challenge
2. Progression metrics and Gantt charts
3. Group activity: *progression analysis*

Gantt Chart

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



Portal 2 Gantt Chart



Source: Piotr Bugno

<https://www.behance.net/gallery/4434779/Portal-2-timelines>

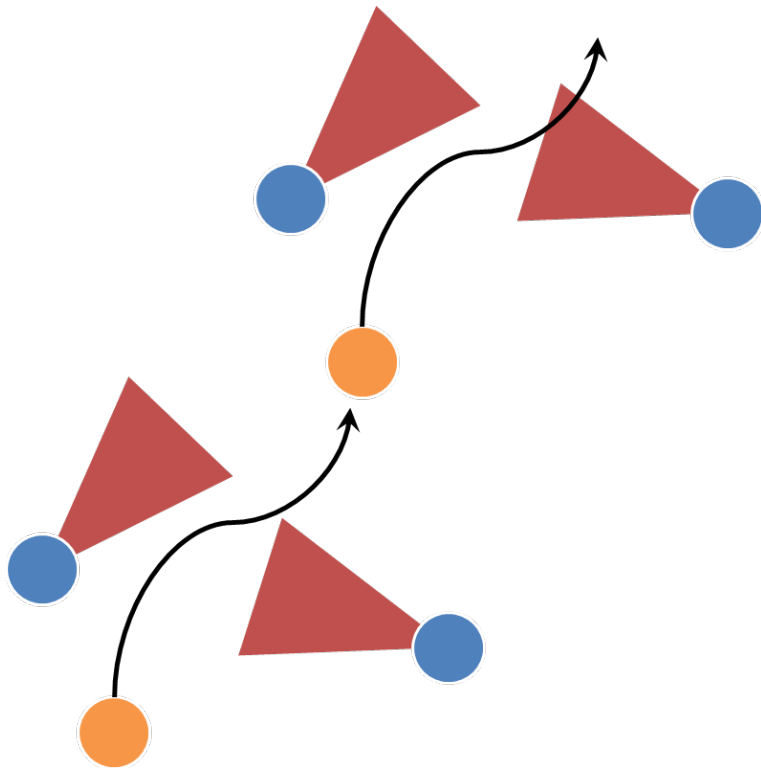
Mechanics

- Introduction

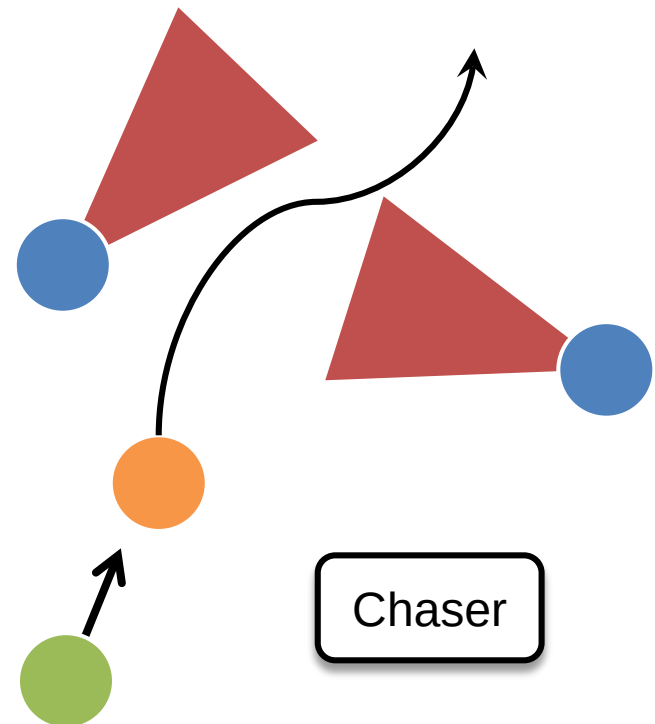
- Variation

Design Patterns *Compose*

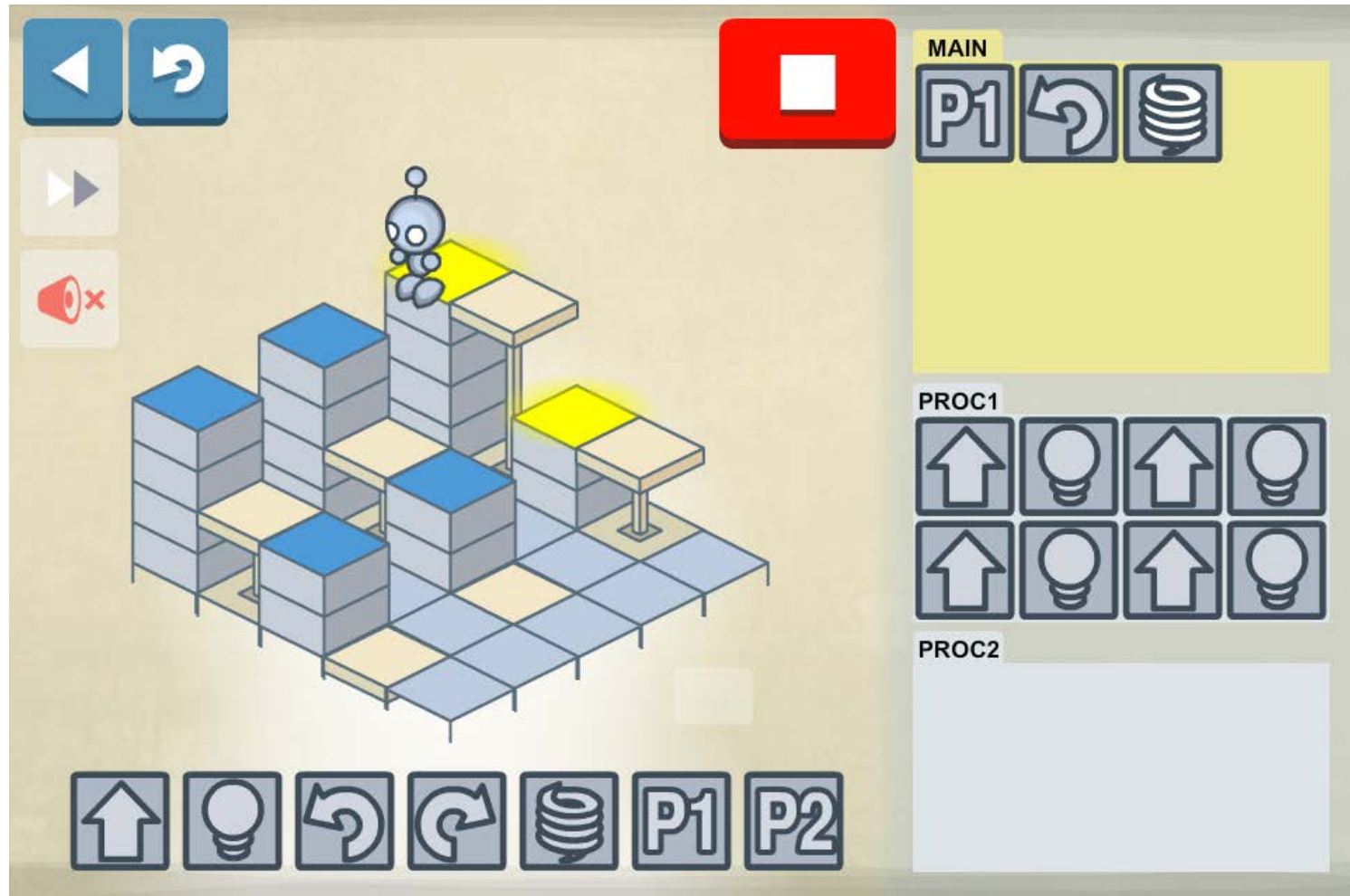
Avoidance + Avoidance



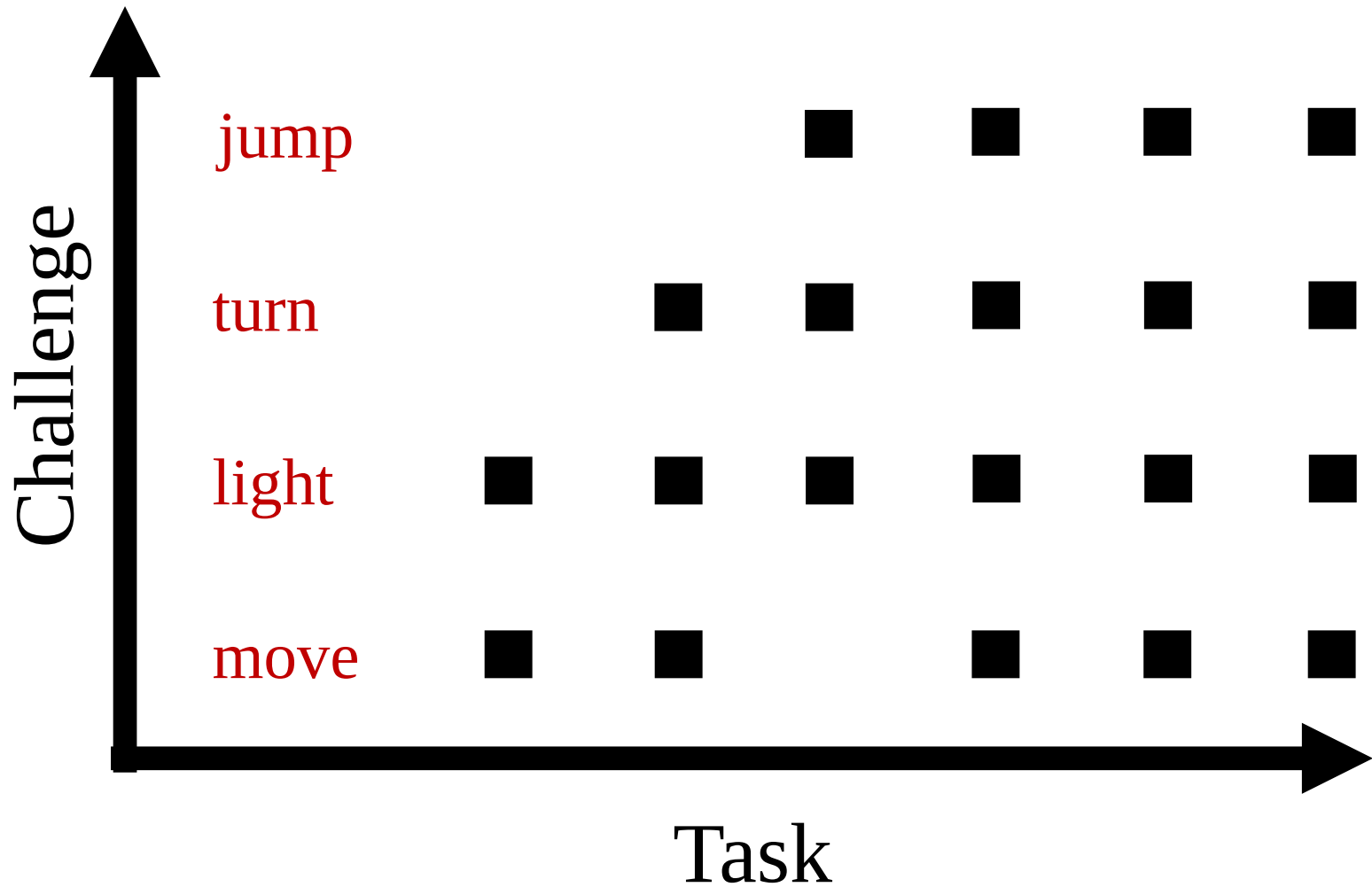
Avoidance + Chasing



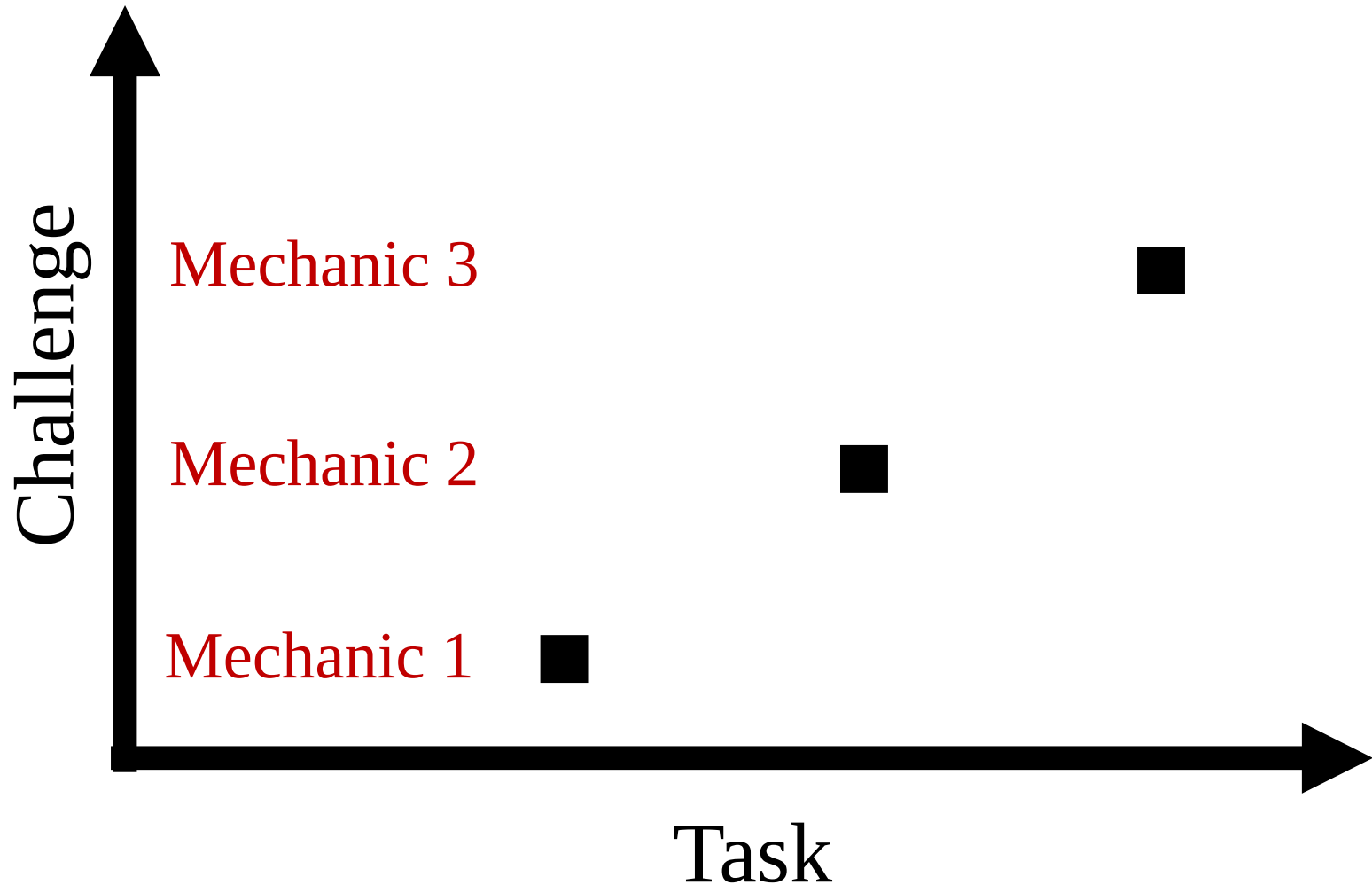
LightBot Playthrough



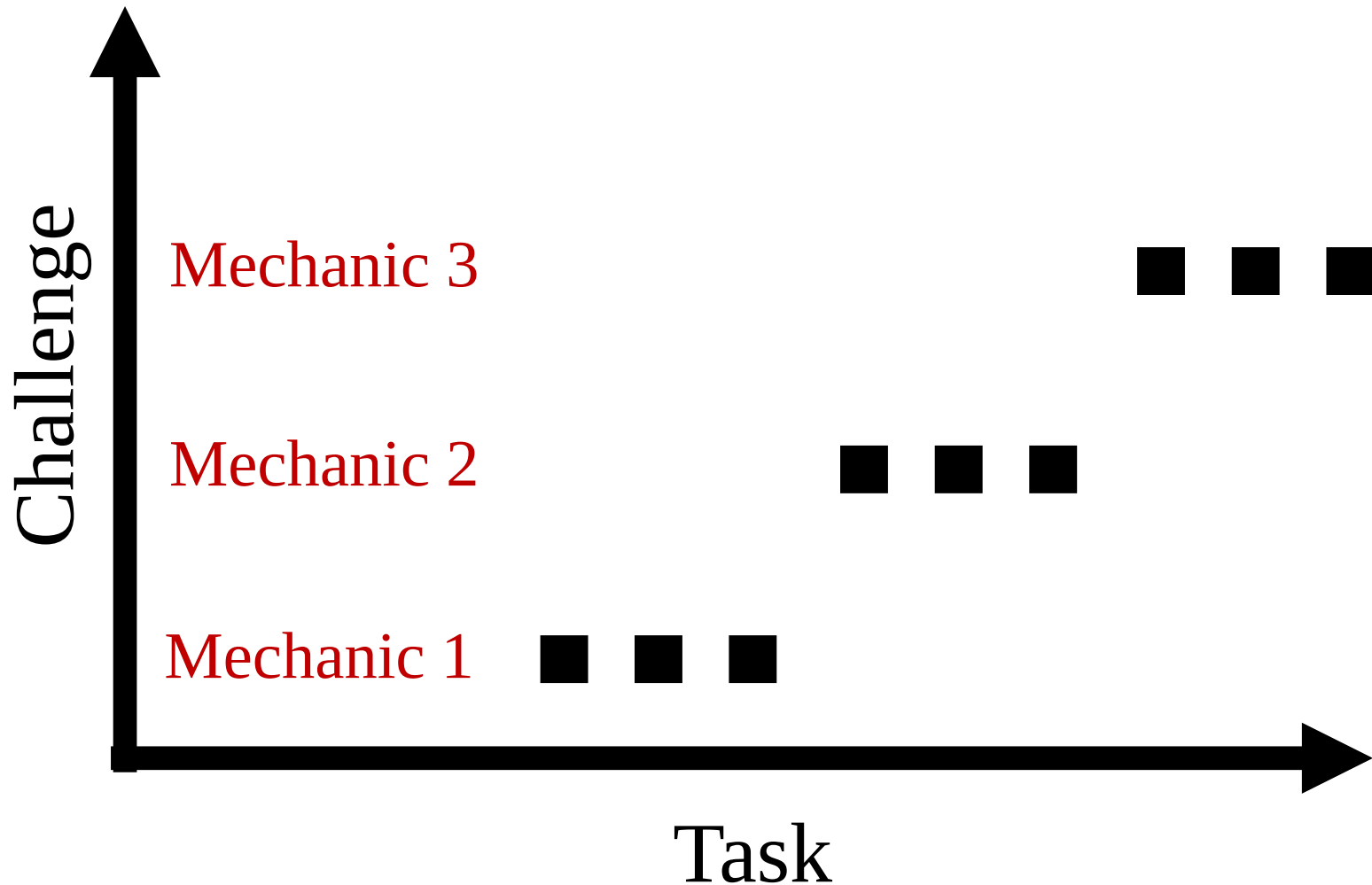
LightBot Progression

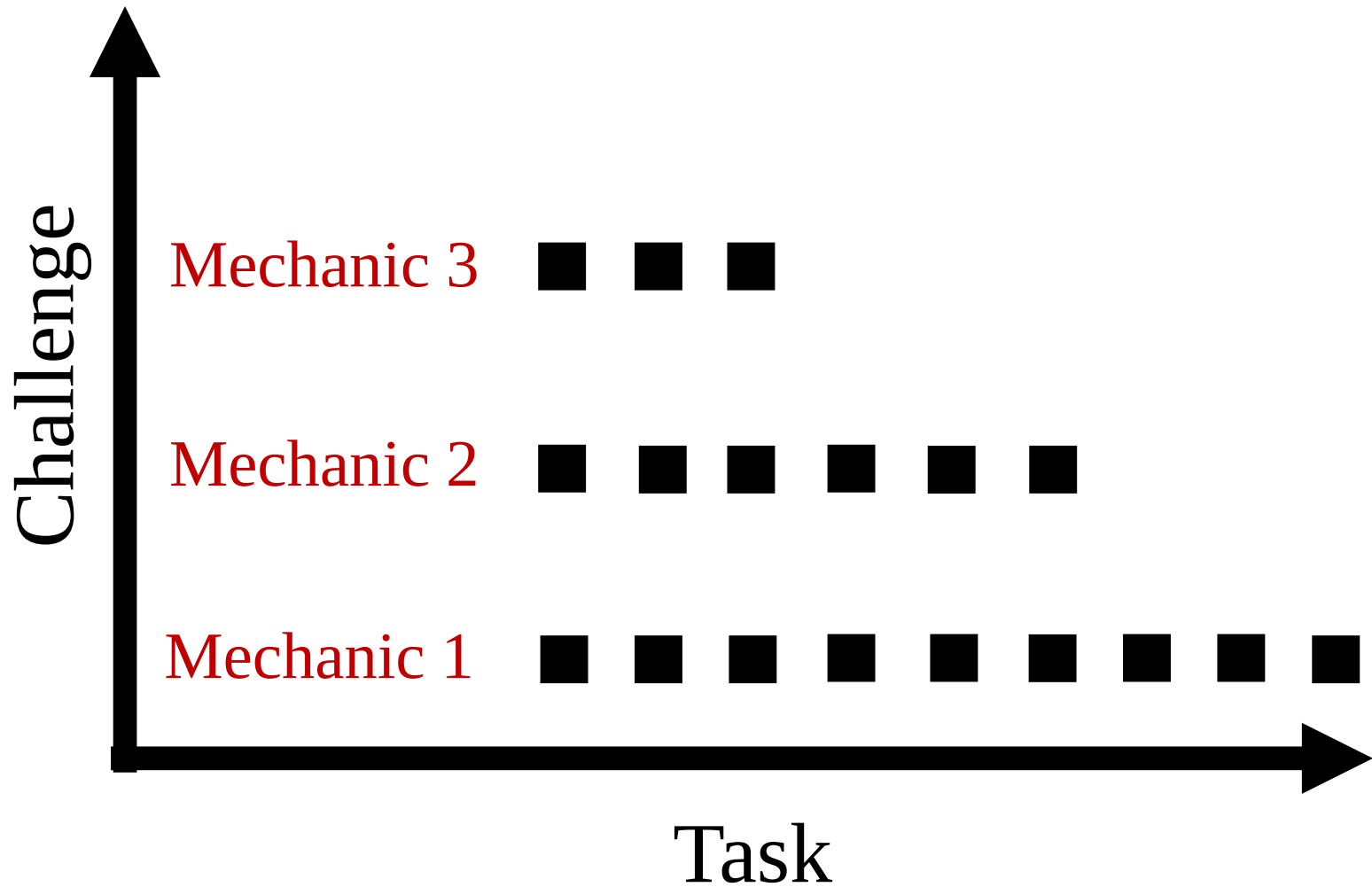


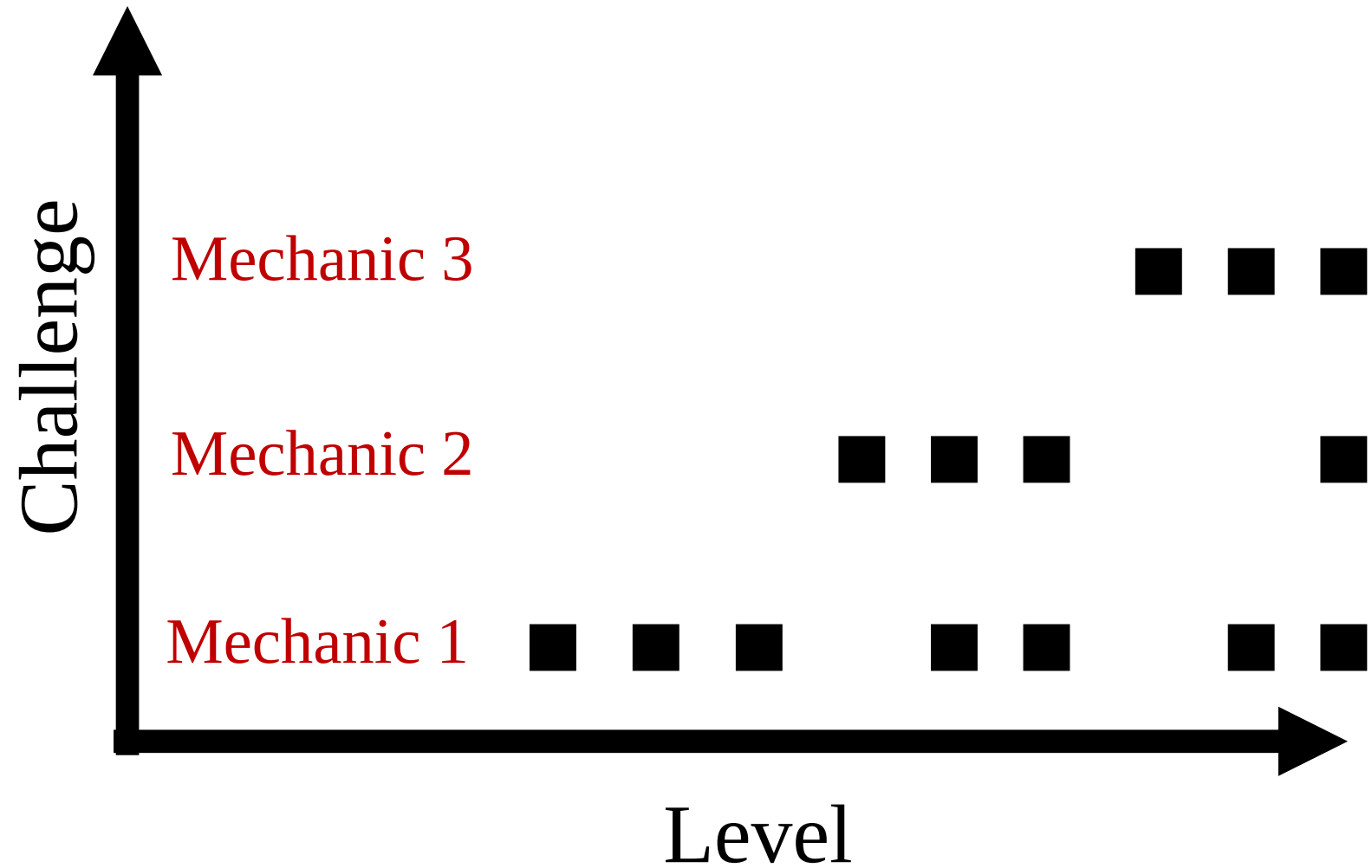
This tends not to happen



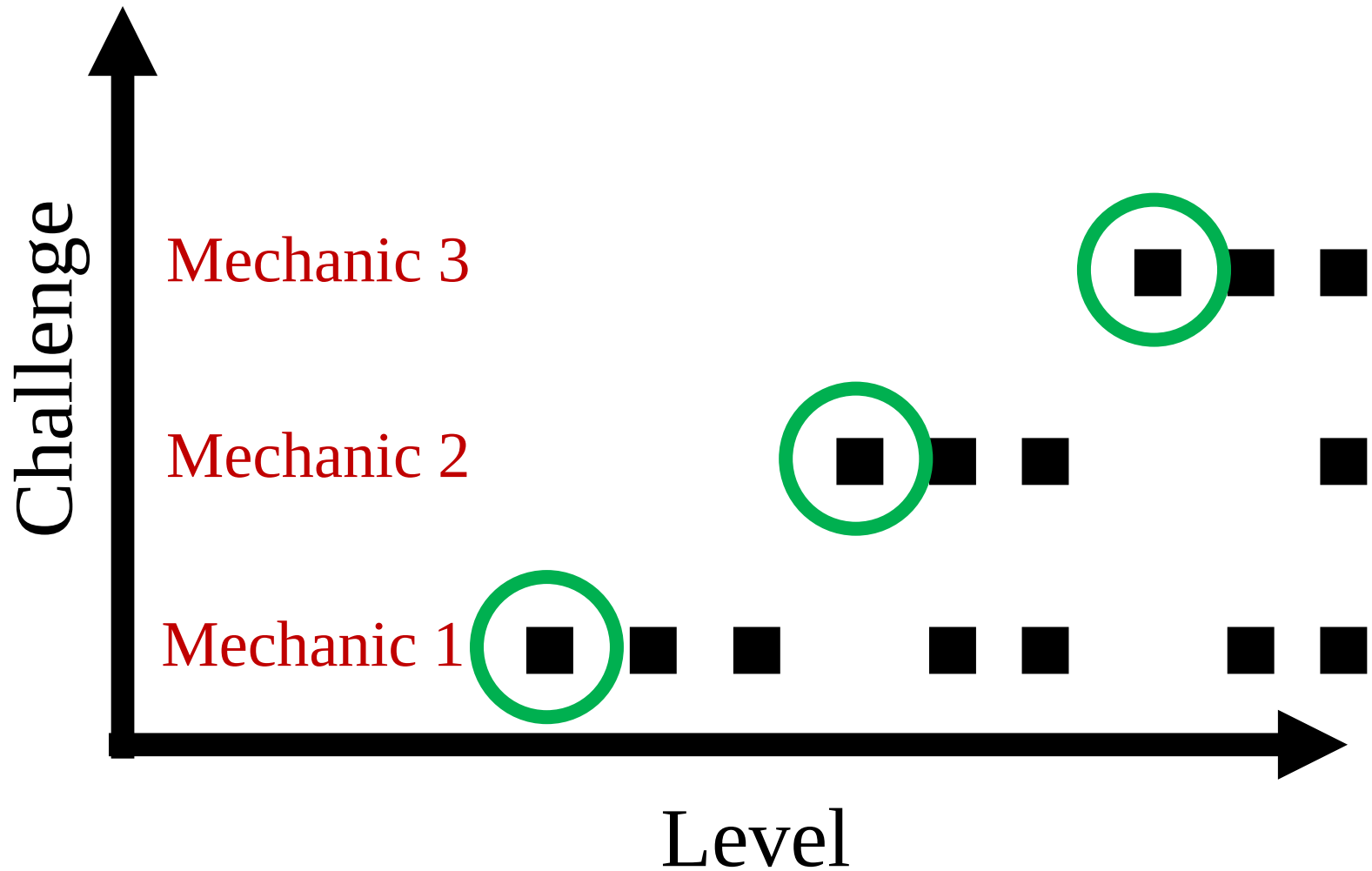
This tends not to happen



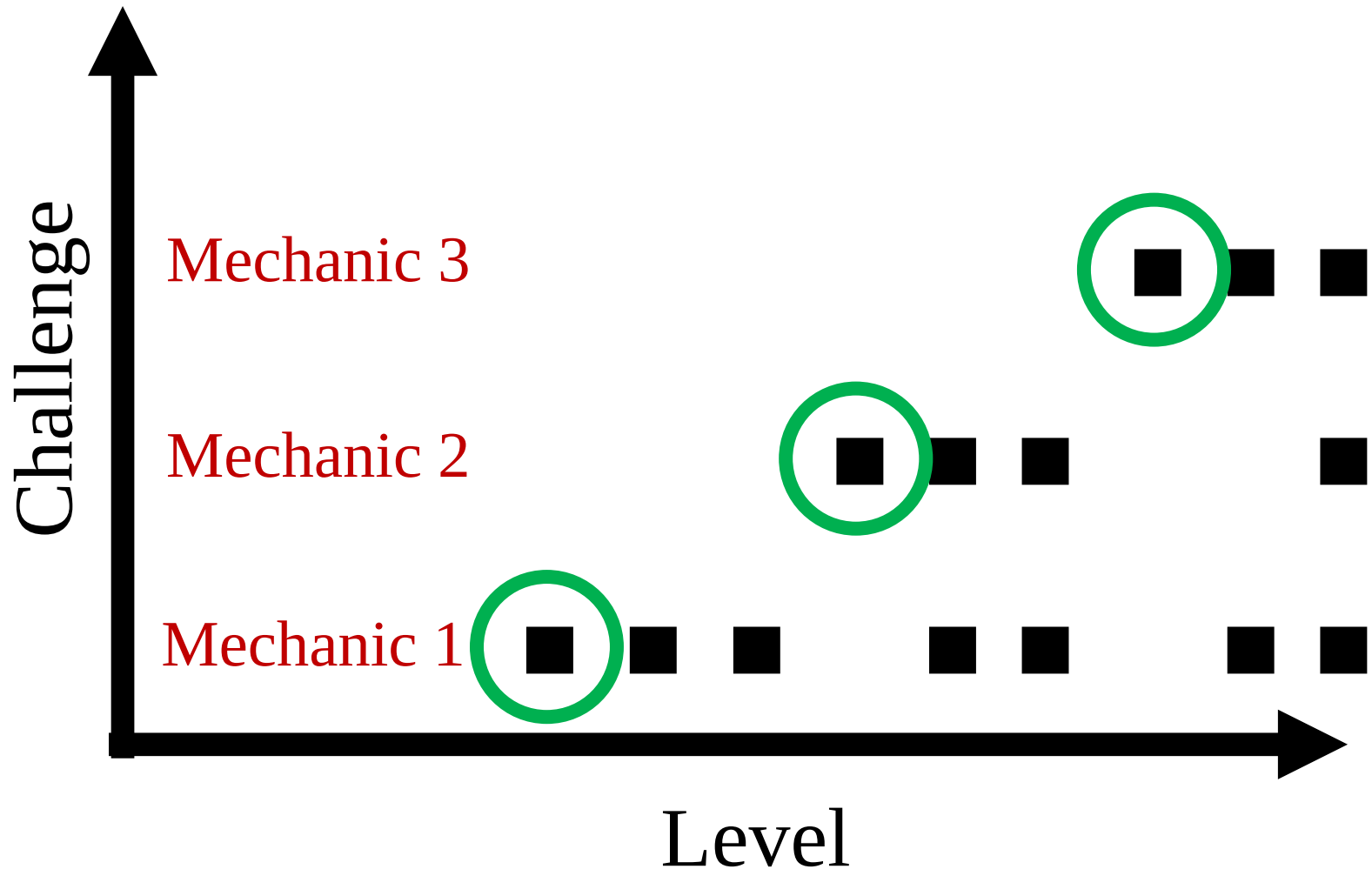




Note: put tutorials here



What metrics define a progression?



Mechanics

● Introduction

● Variation

New Mechanics

Recombination



Mechanics

● Introduction ● Variation



Learning Pace

Learning Pace

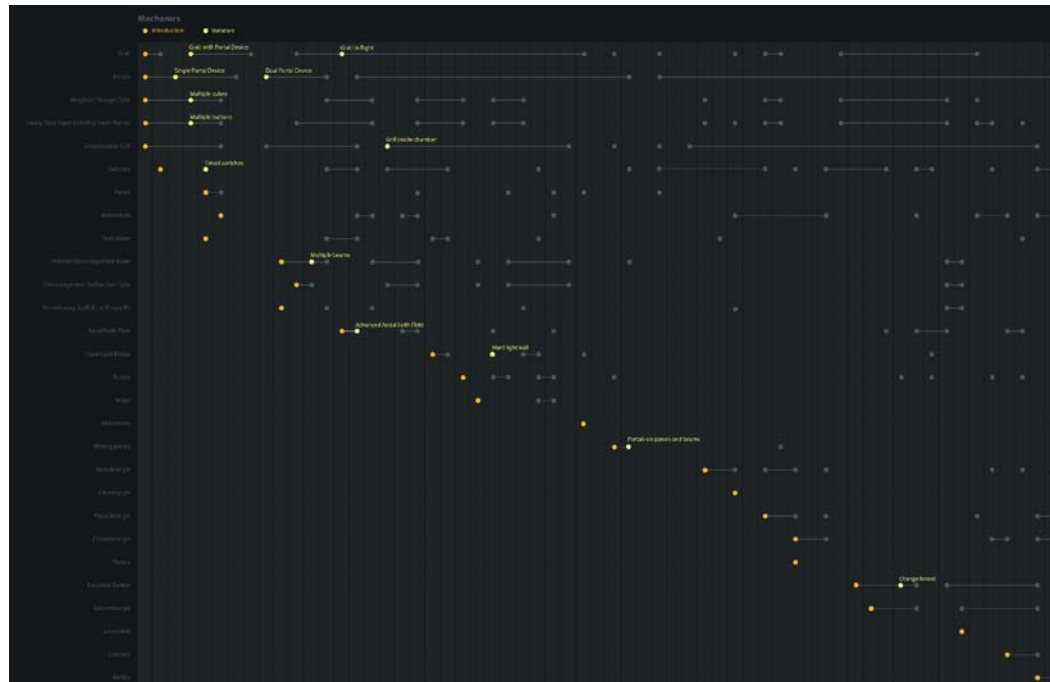
- How frequently to introduce new mechanics?

$$\frac{\# \text{ of mechanics}}{\# \text{ of tasks}}$$

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 B

Recombination

- How often to combine mechanics with other mechanics?

Challenges:

A = jump

B = dash

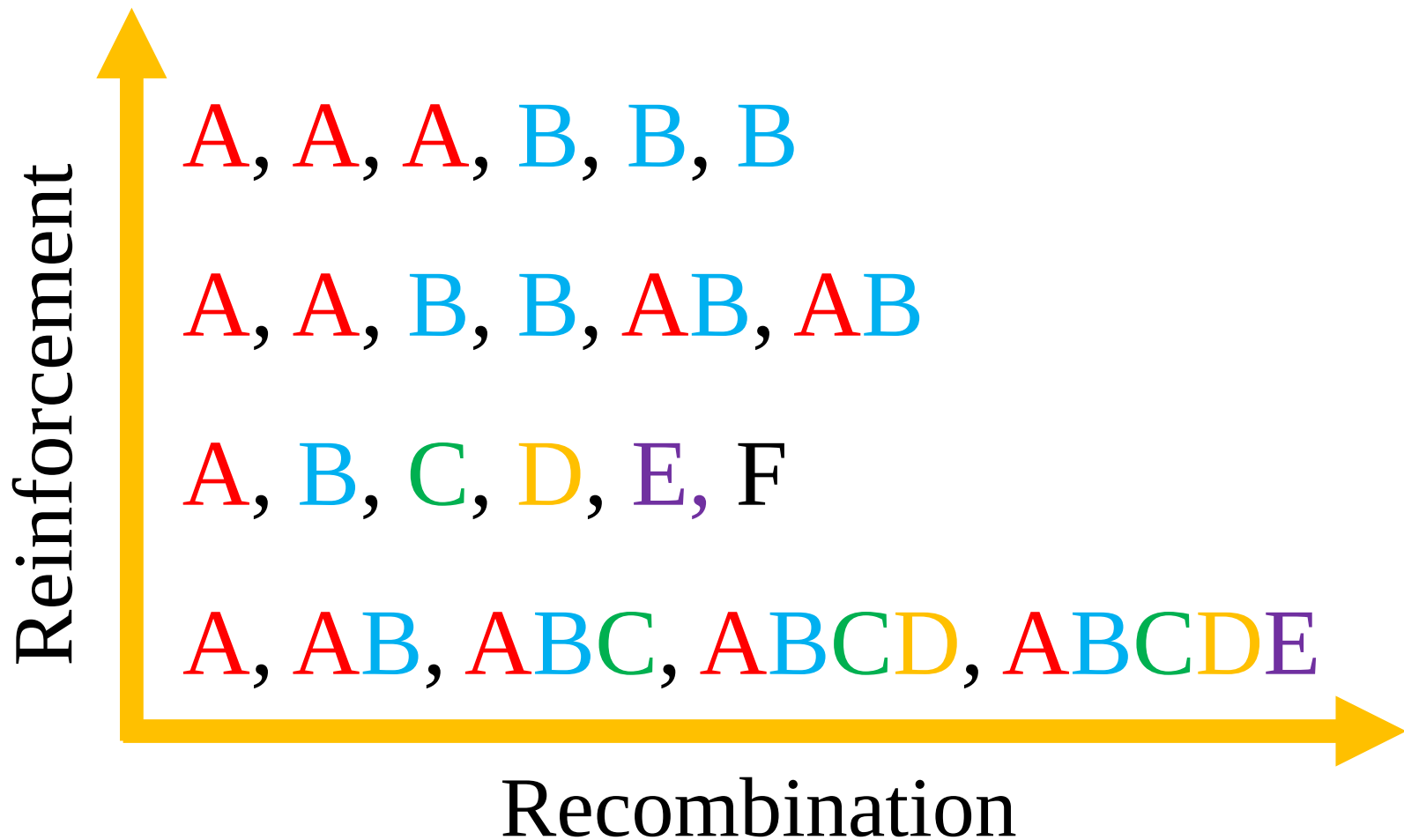
C = shoot fireball

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

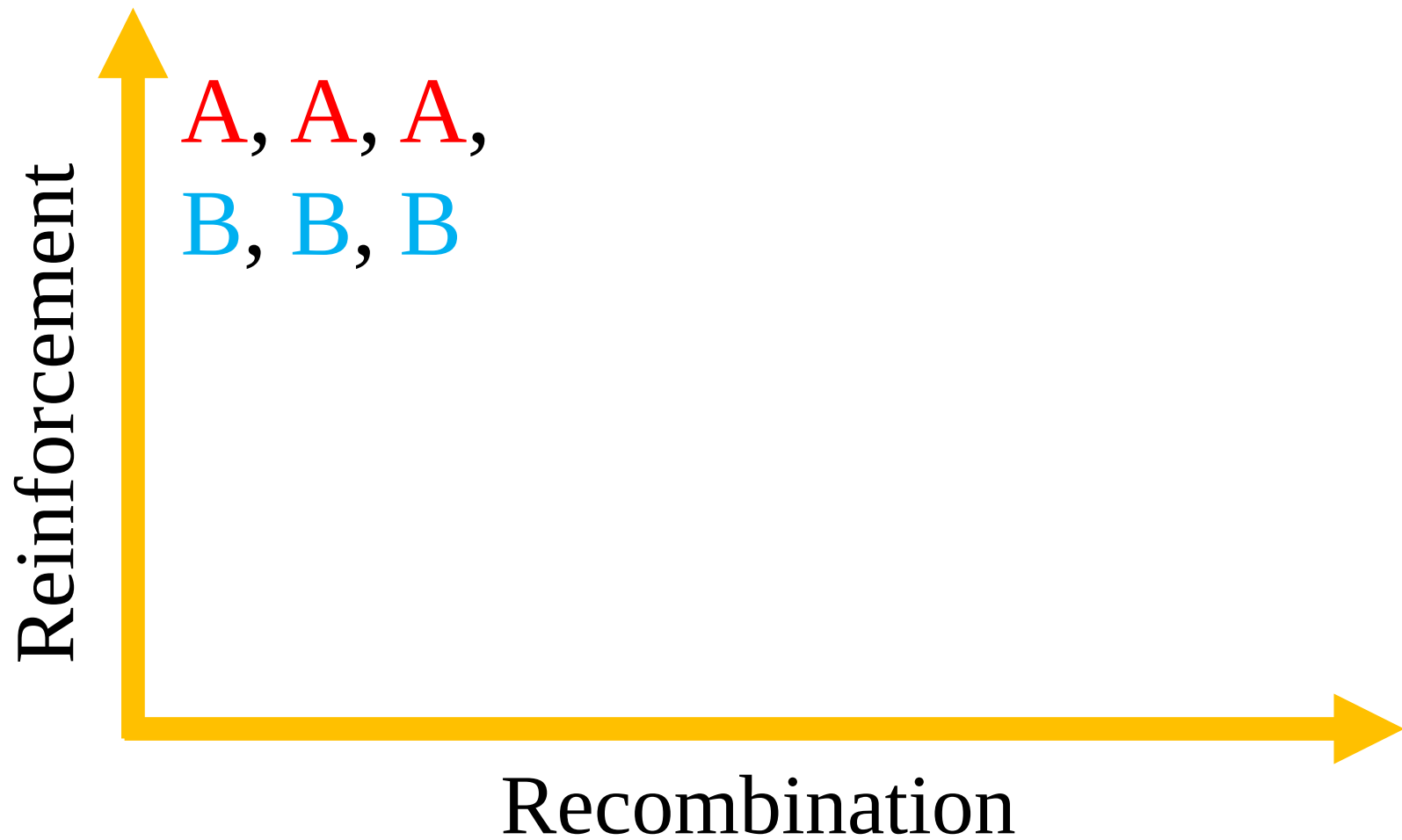
Comparing progressions



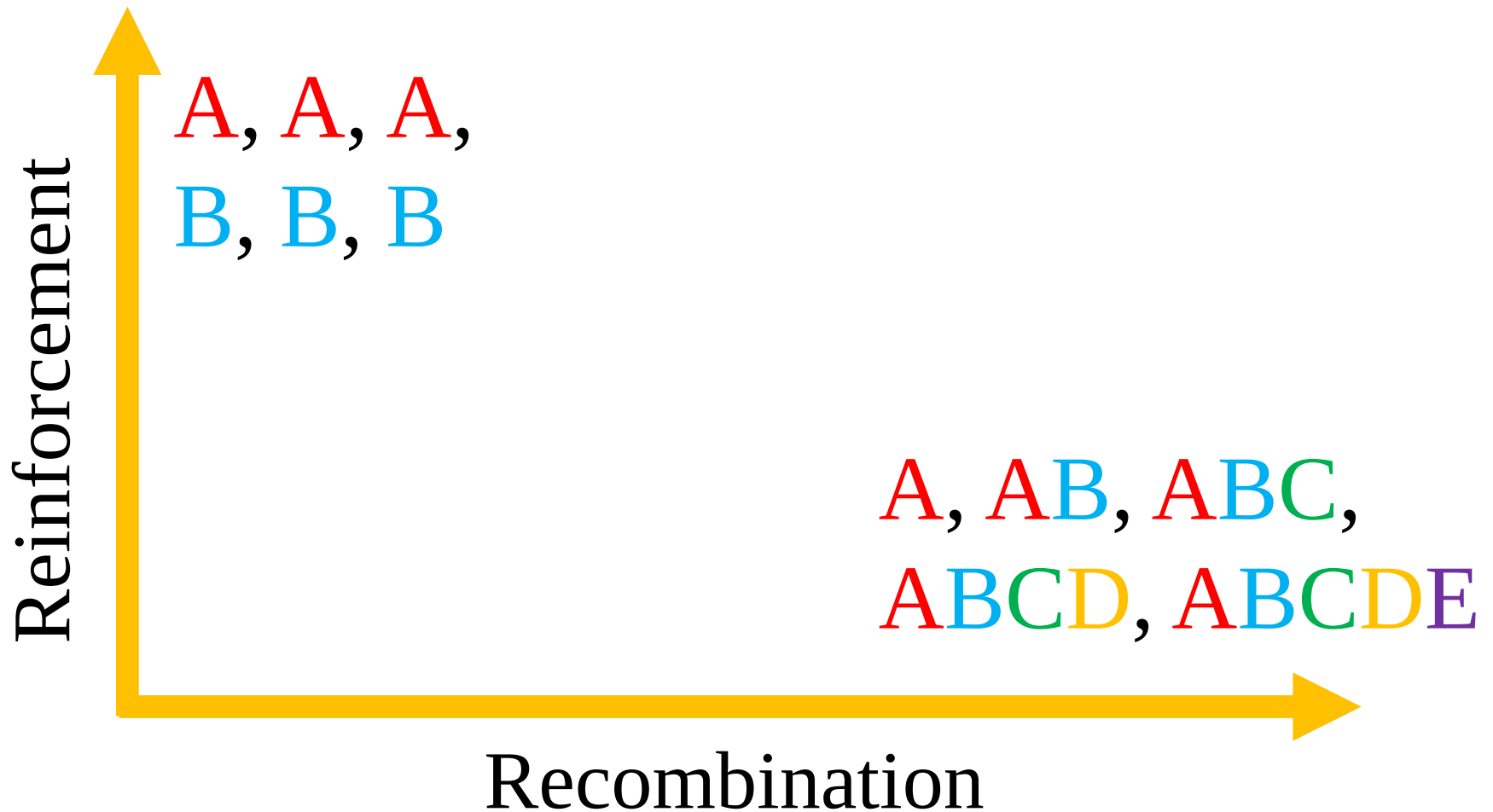
Pair activity: compare progressions



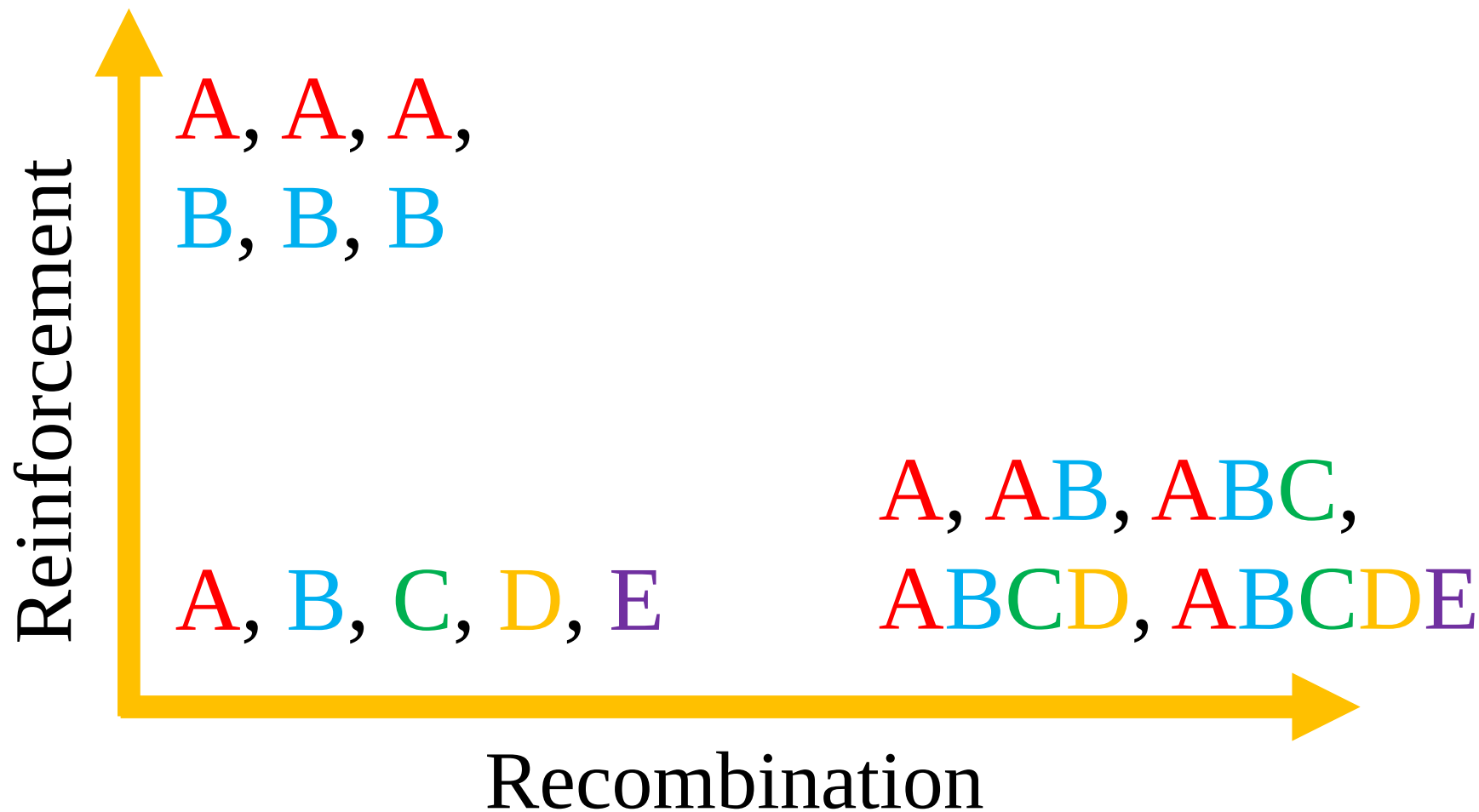
A, A, A, B, B, B



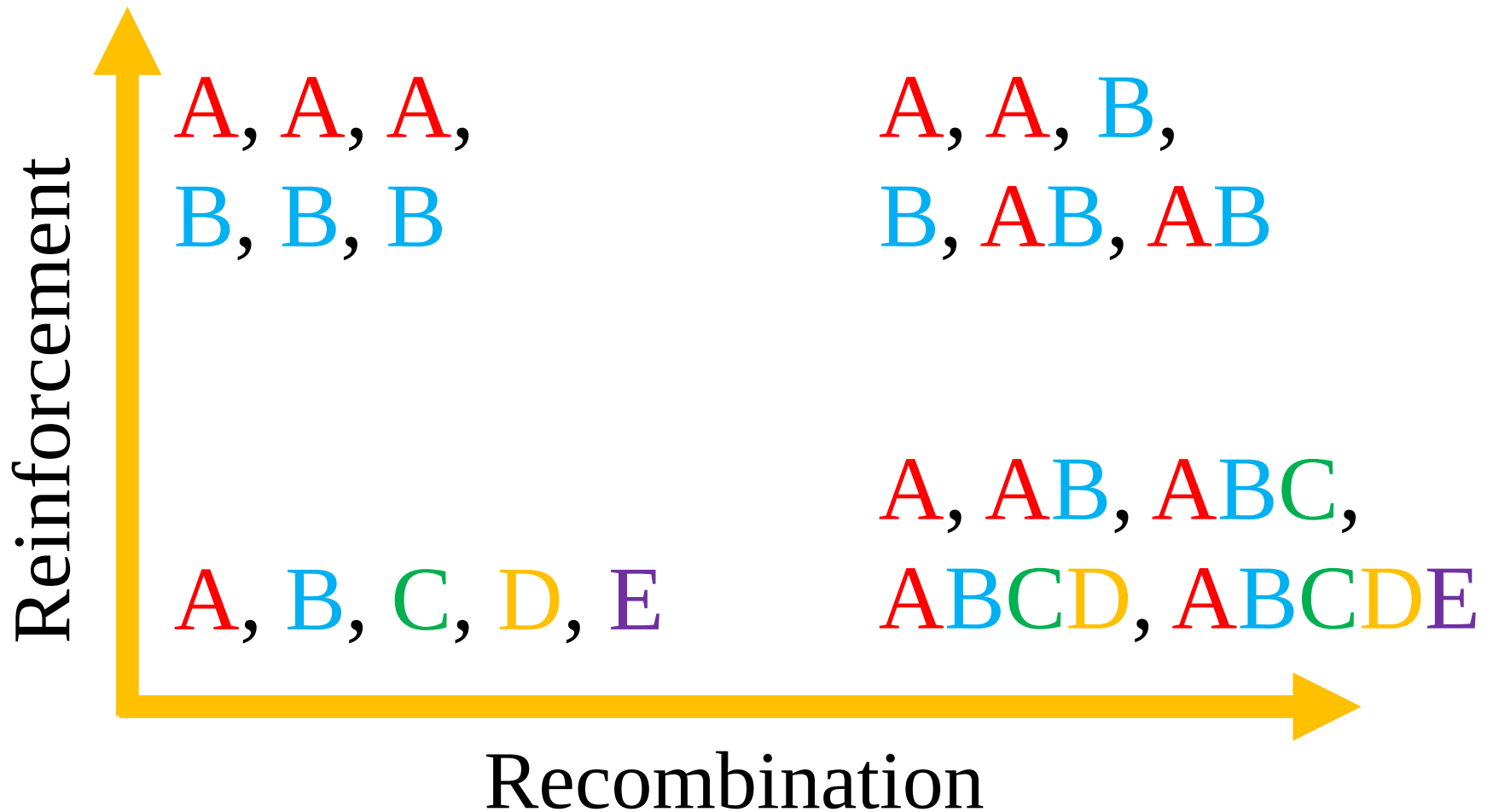
A, AB, ABC, ABCD, ABCDE



A, B, C, D, E



A, A, B, B, AB, AB



Robot Unicorn Attack Progression

Challenges:

A = jump **B** = dash

A A A B A A B

High reinforcement, low recombination

Hello Worlds

Challenges:

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

Hello Worlds!

A

COMBO(C)

REWIND(V)

QUIT

RESTART(R)



TIME: 1

PAR TIME: 45

SPEED TIME: 12

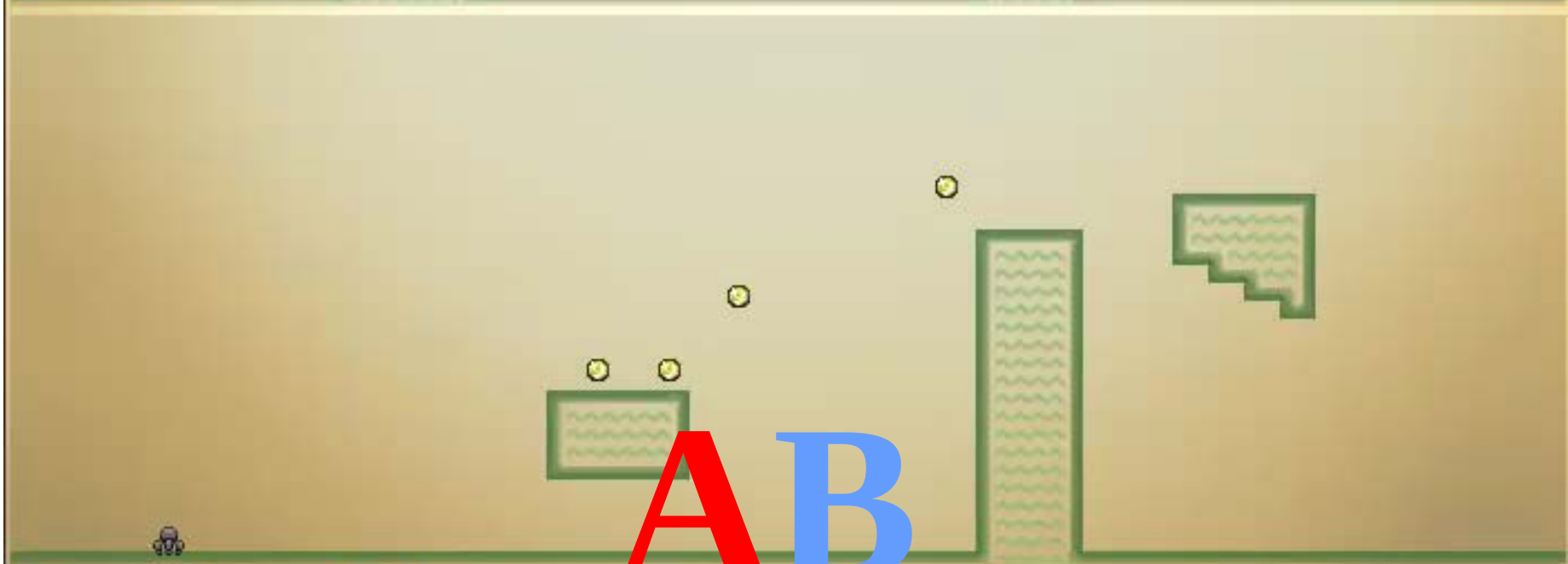
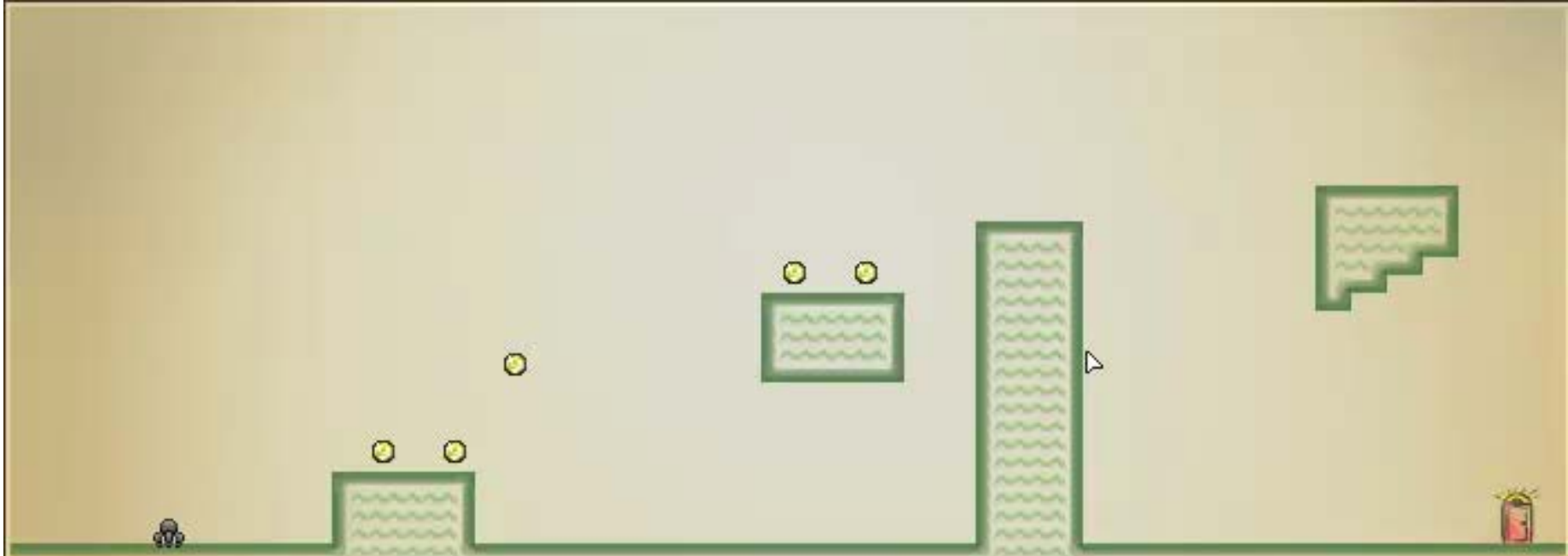


ALPHA

COINS 0/6

STARS 0

POINTS: 0



A B

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

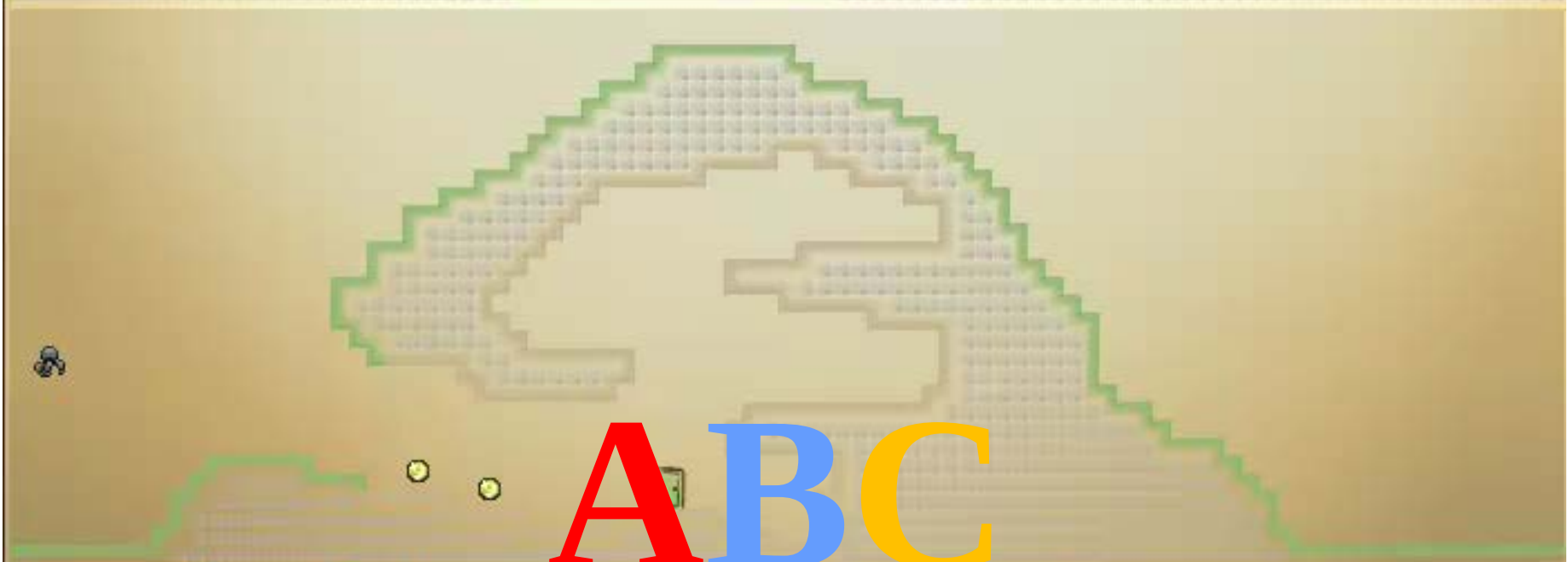
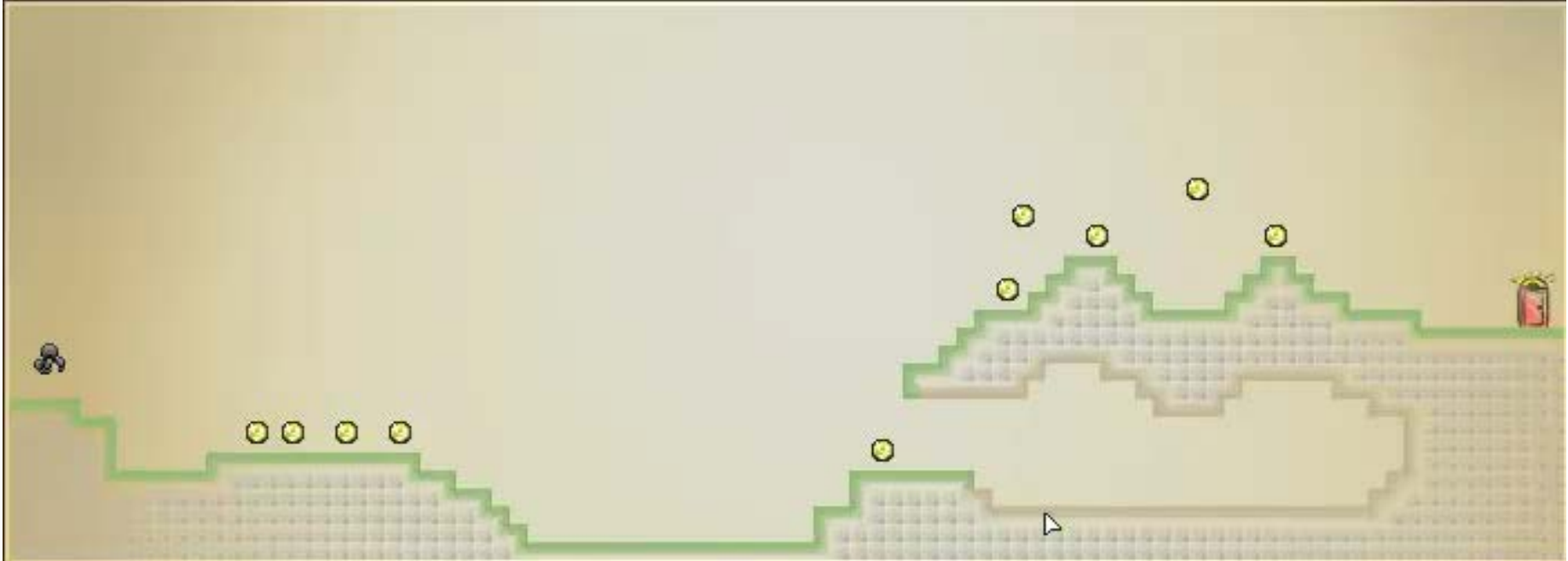
SPEED TIME: 15

GANMA

COINS 0/6

STARS 6

POINTS: 573



A B C

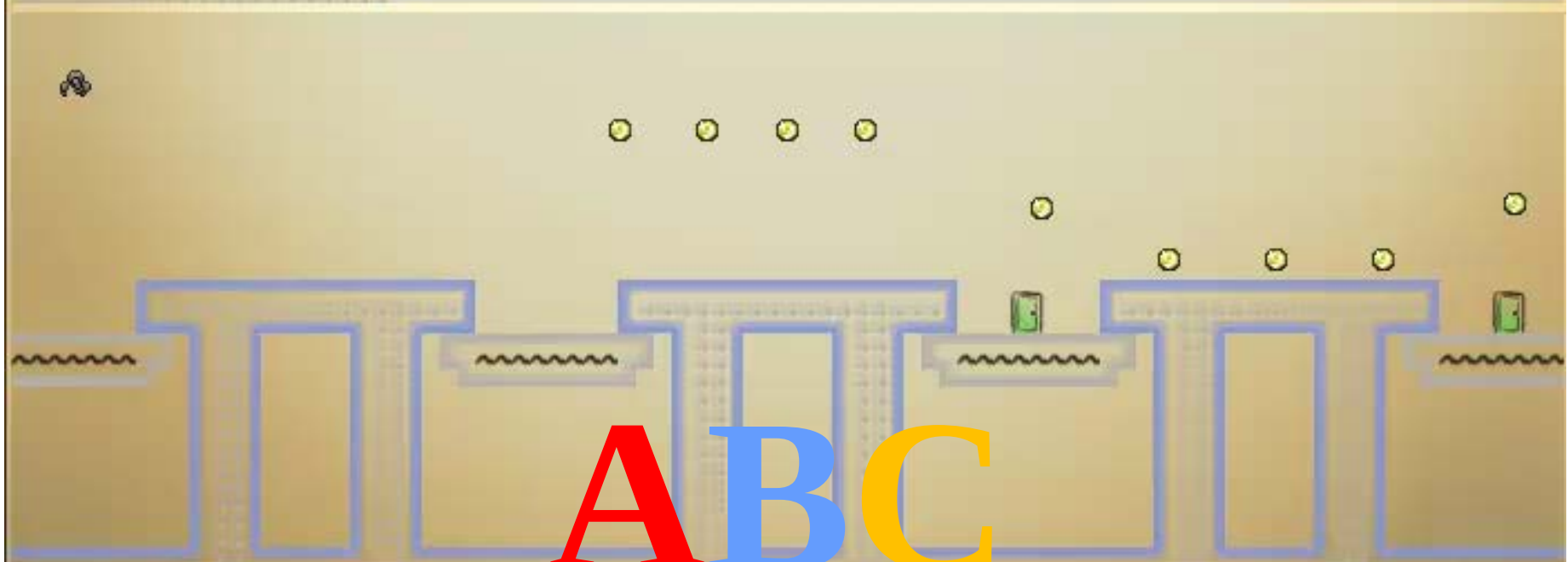
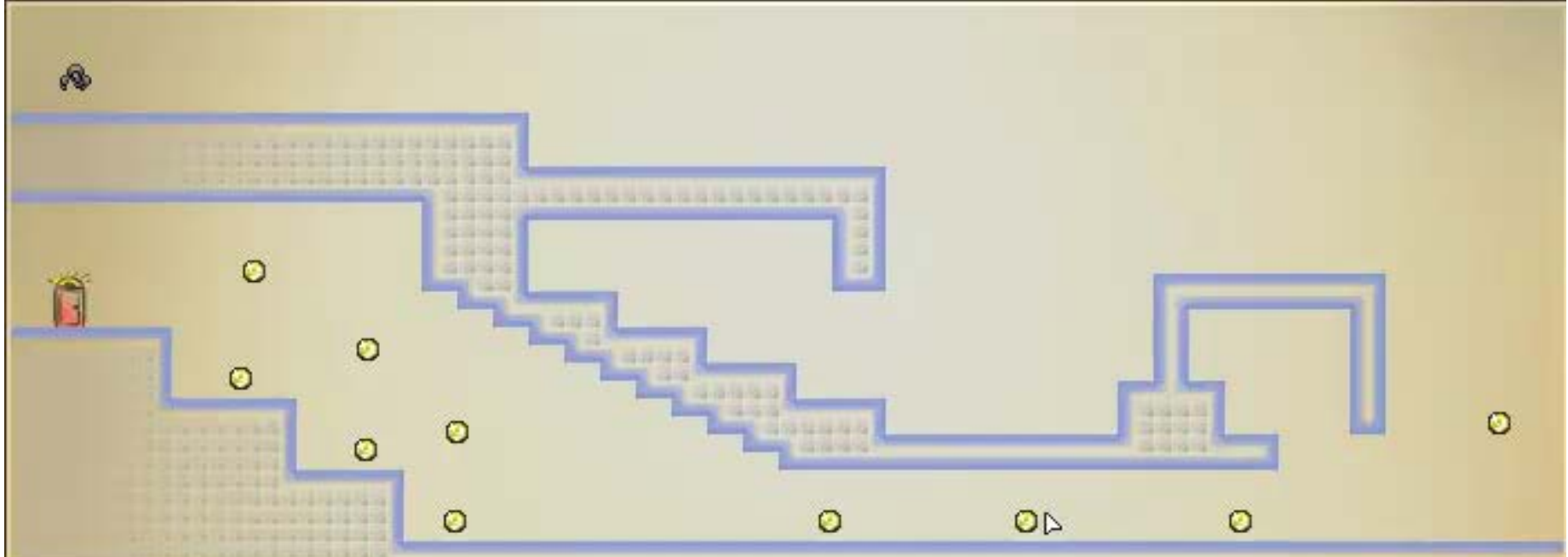
COMBO(C) REWIND(V)
QUIT RESTART(R)



TIME: 0
PAR TIME: 60
SPEED TIME: 26

MOUNTAIN SIDE

COINS 0/12
STARS 9
POINTS: 879



ABC

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

Challenges:

A = move **B** = two worlds **C** = 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>

