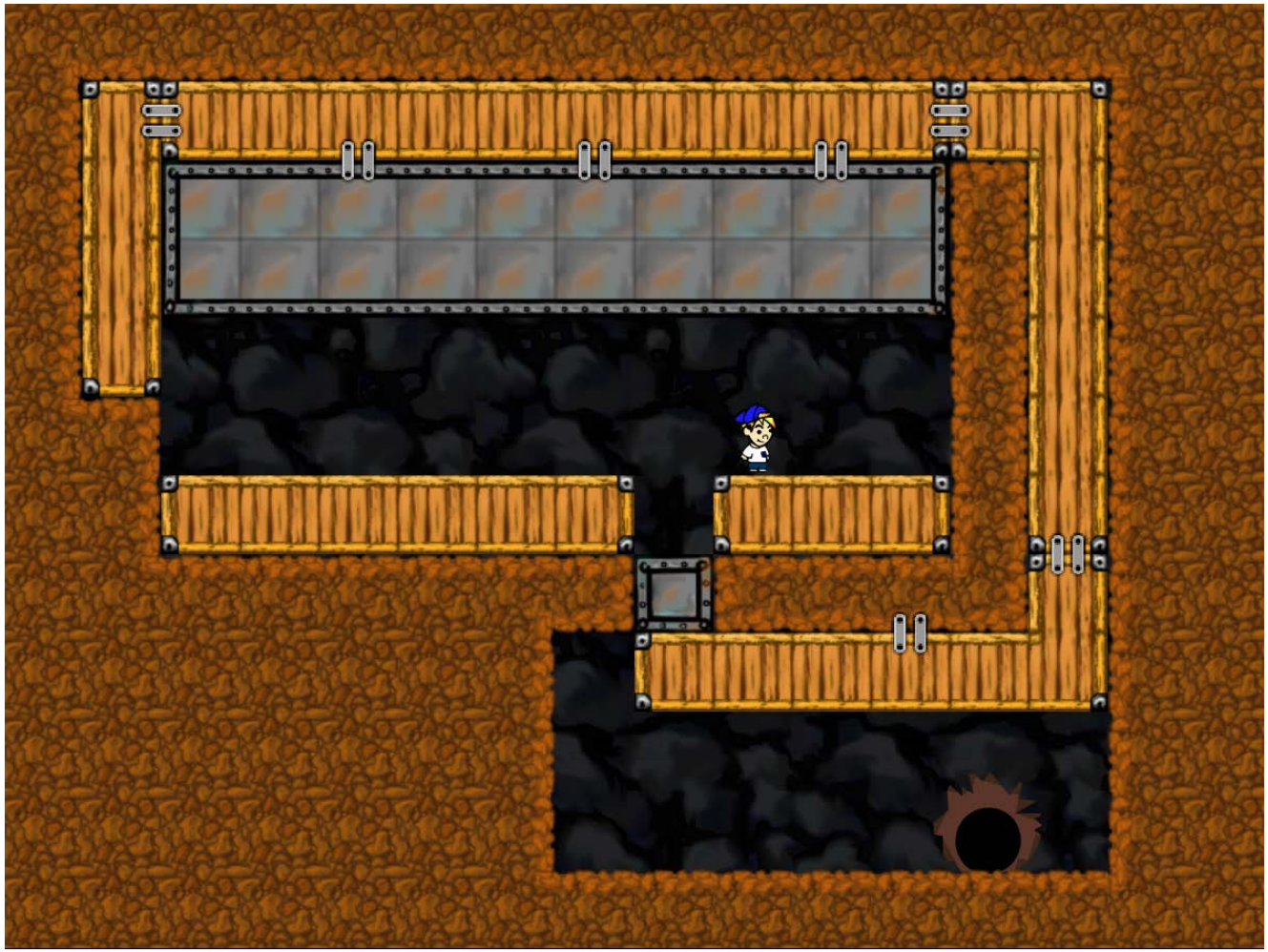
CS/INFO 4154:
Analytics-driven Game Design

Class 2:

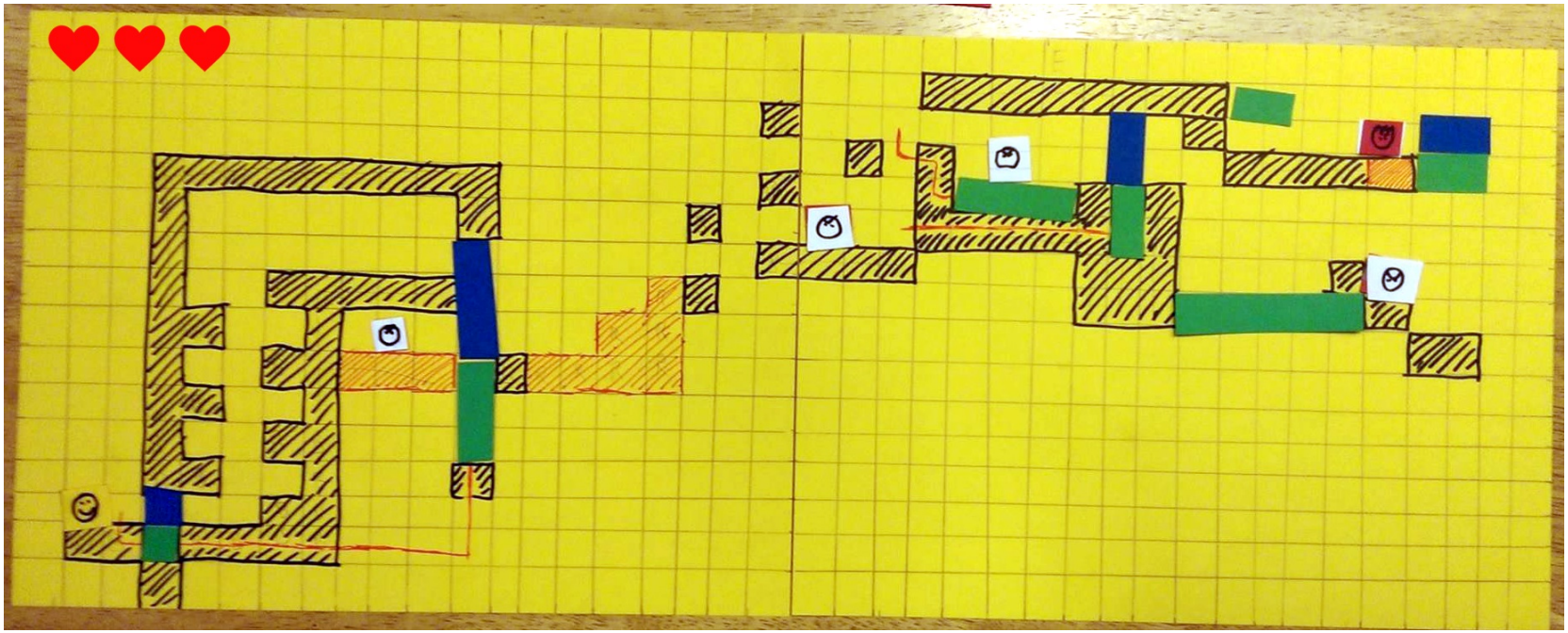
Mechanics and Brainstorming

Eventually…



Pyrokid, 2014

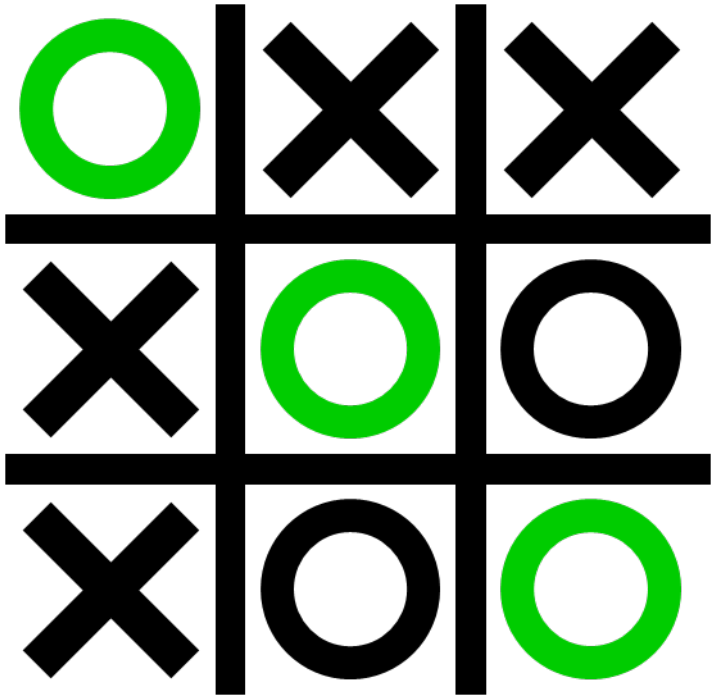
Goal of Paper Prototyping



- Evaluate whether the idea has *potential*
- Implement the *core* of the idea
- Do the *minimum* possible to test it

Pyrokid, 2014

What is a game?



Tracy Fullerton

a *closed, formal system*

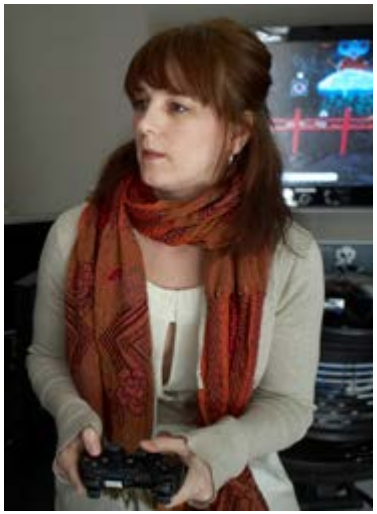
that engages players in *structured conflict*

and resolves its *uncertainty*

in an *unequal outcome*

(*Game Design Workshop*)

Karen Salen and Eric Zimmerman



a *system*
in which *players*
engage in *artificial conflict*,
defined by *rules*,
that results in a *quantifiable outcome*

(*Rules of Play*)

Sid Meier

a series of
interesting decisions

(GDC 2012)

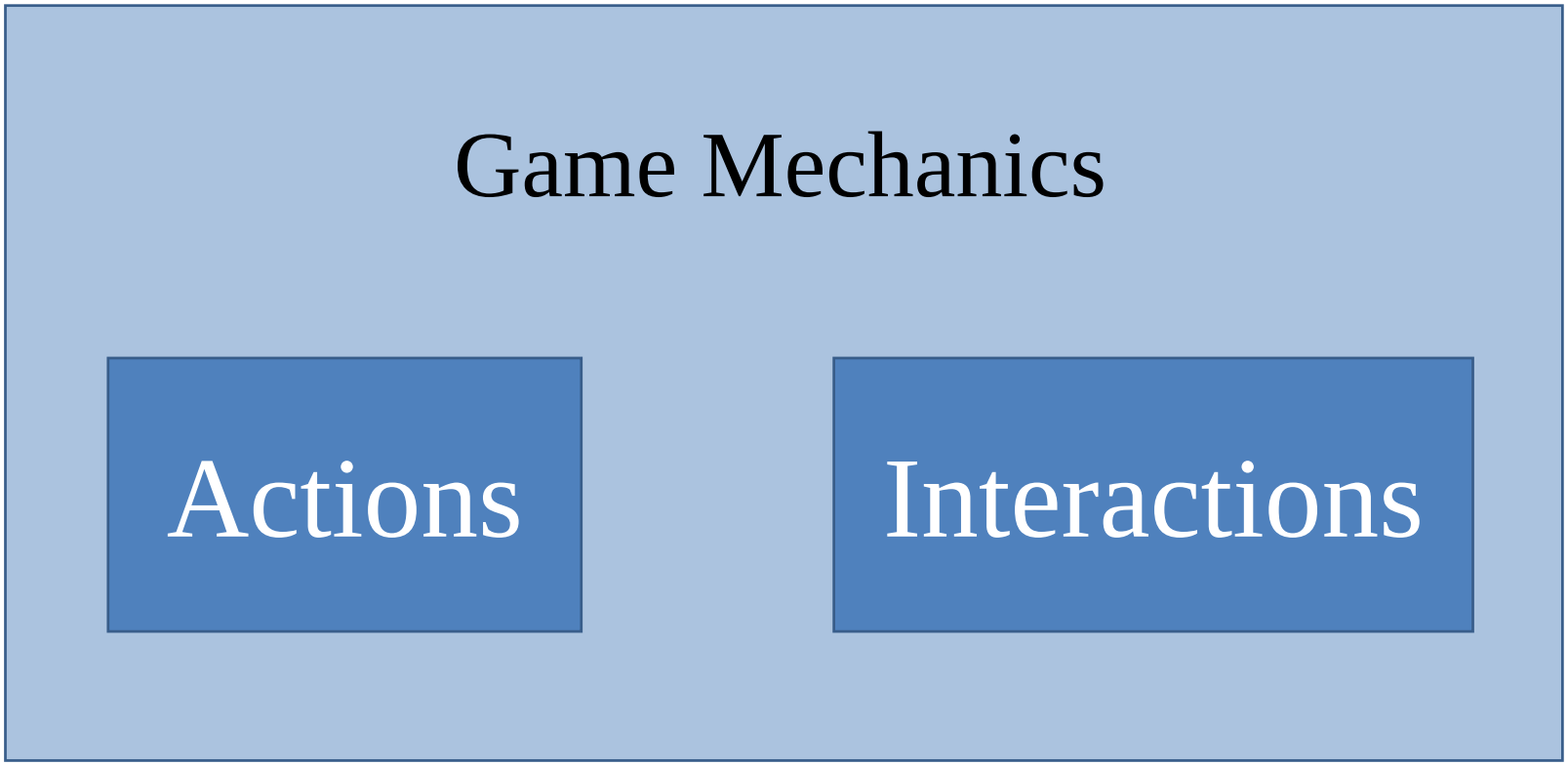
Common Threads

- Rules
- Conflict
- Decisions

Common Threads

- Rules
- Conflict
- Decisions

Rules



Actions

- **Verbs** that describe what the player can **do**
  - Walk
  - Run
  - Jump
  - Shoot
- Might not involve an avatar
  - Build
  - Swap
  - Rotate

What are the actions?

What are the actions?

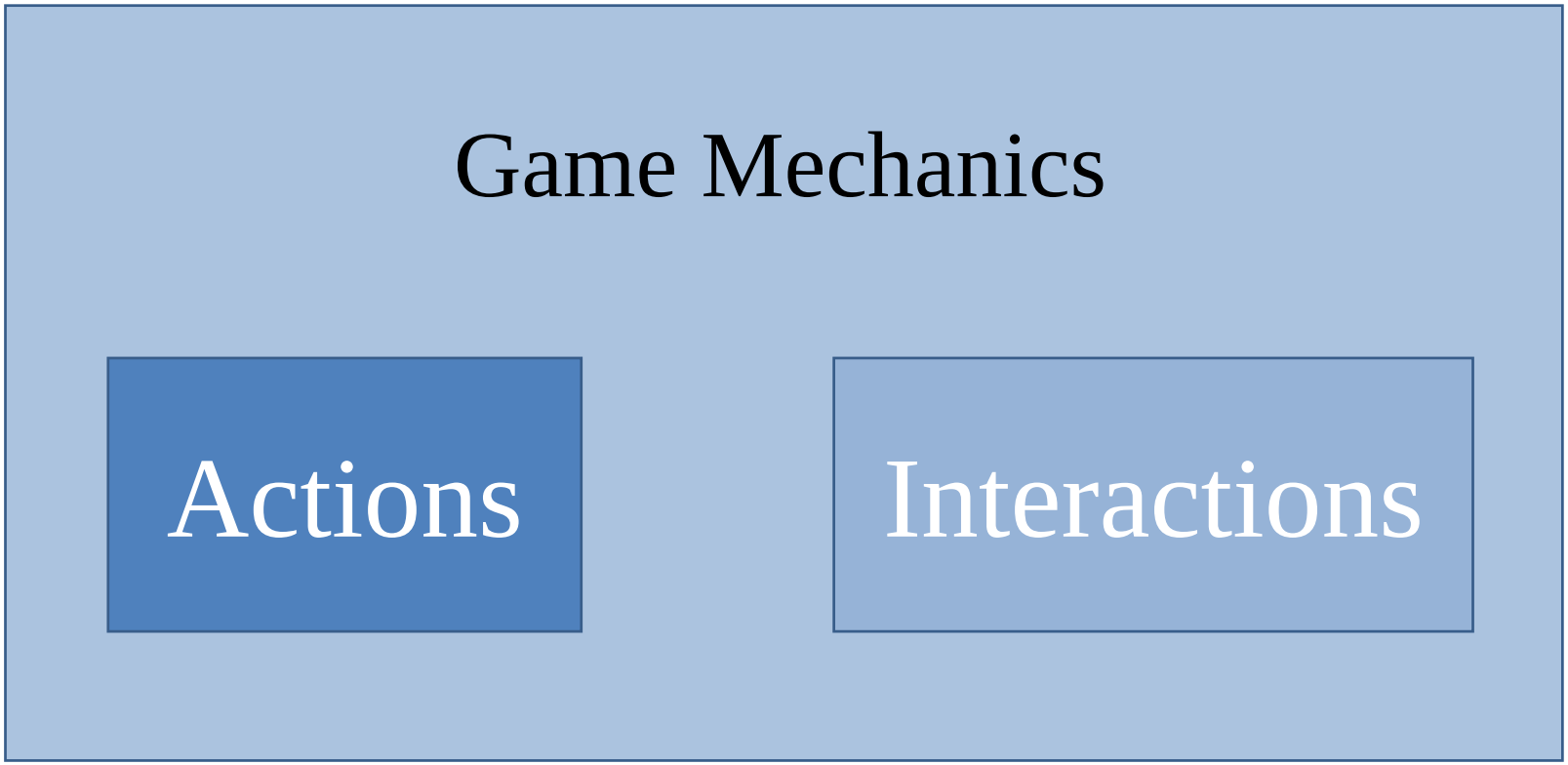
Actions tend to map to a ***single*** input

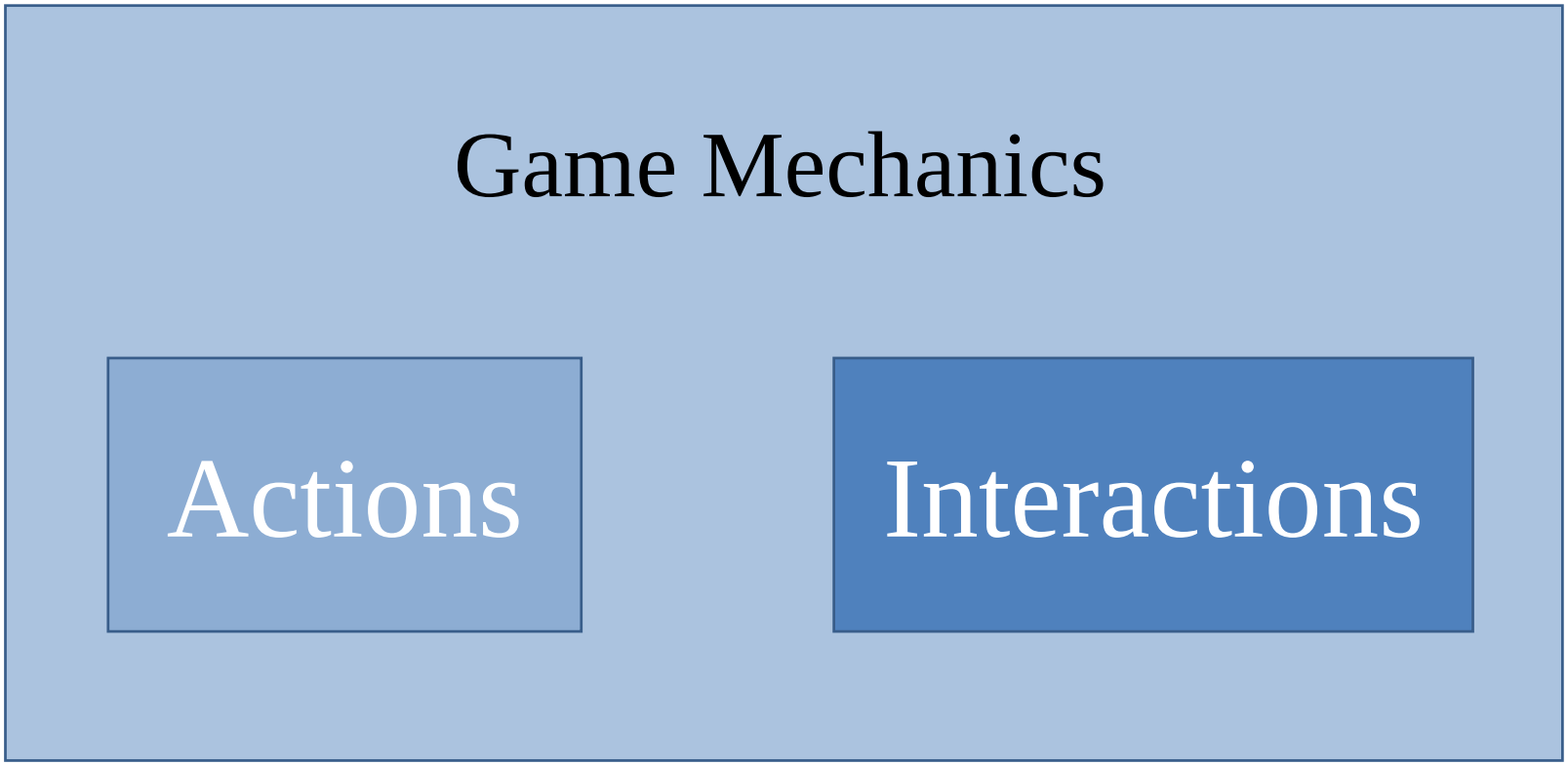
- button press
- key press
- click on something
- drag something

Actions *combine*

run + **jump** = **jump further**

shoot + **slide** = **strafing attack**


Game Mechanics
Actions
Interactions

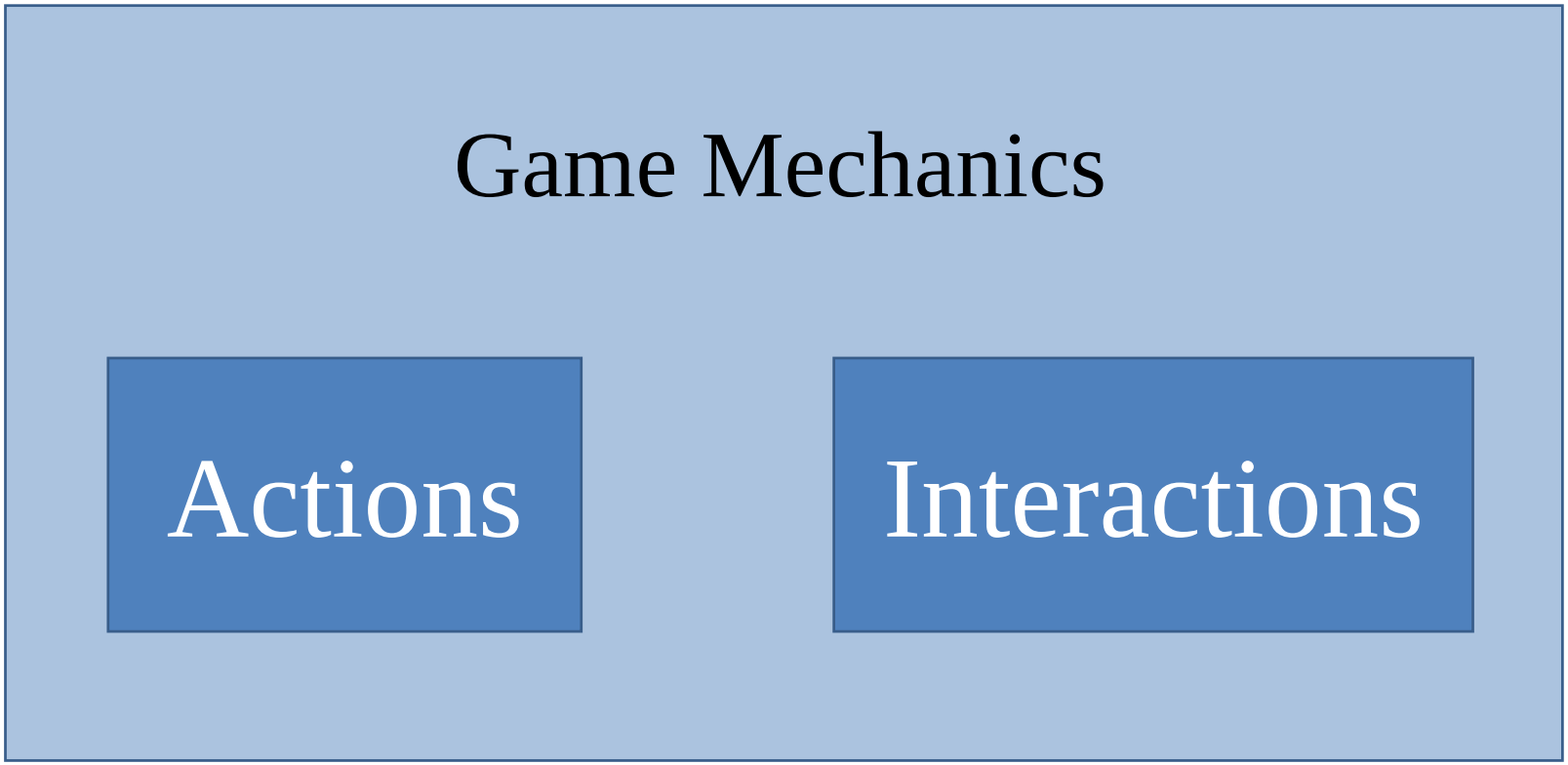

Game Mechanics
Actions
Interactions

Interactions

- Things that happen ***because*** of an action
- Player does not have direct control

What are the interactions?

What are the interactions?


Game Mechanics
Actions
Interactions

Common Threads

- Rules
- Conflict
- Decisions

Growth in complexity

Plants vs. Zombies

Sense of achievement

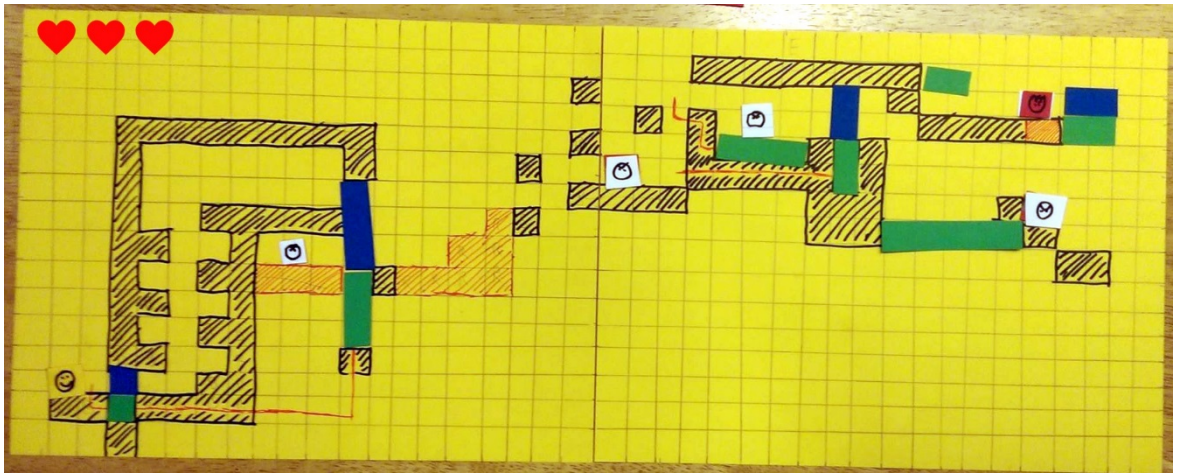
Common Threads

- Rules
- Conflict
- Decisions

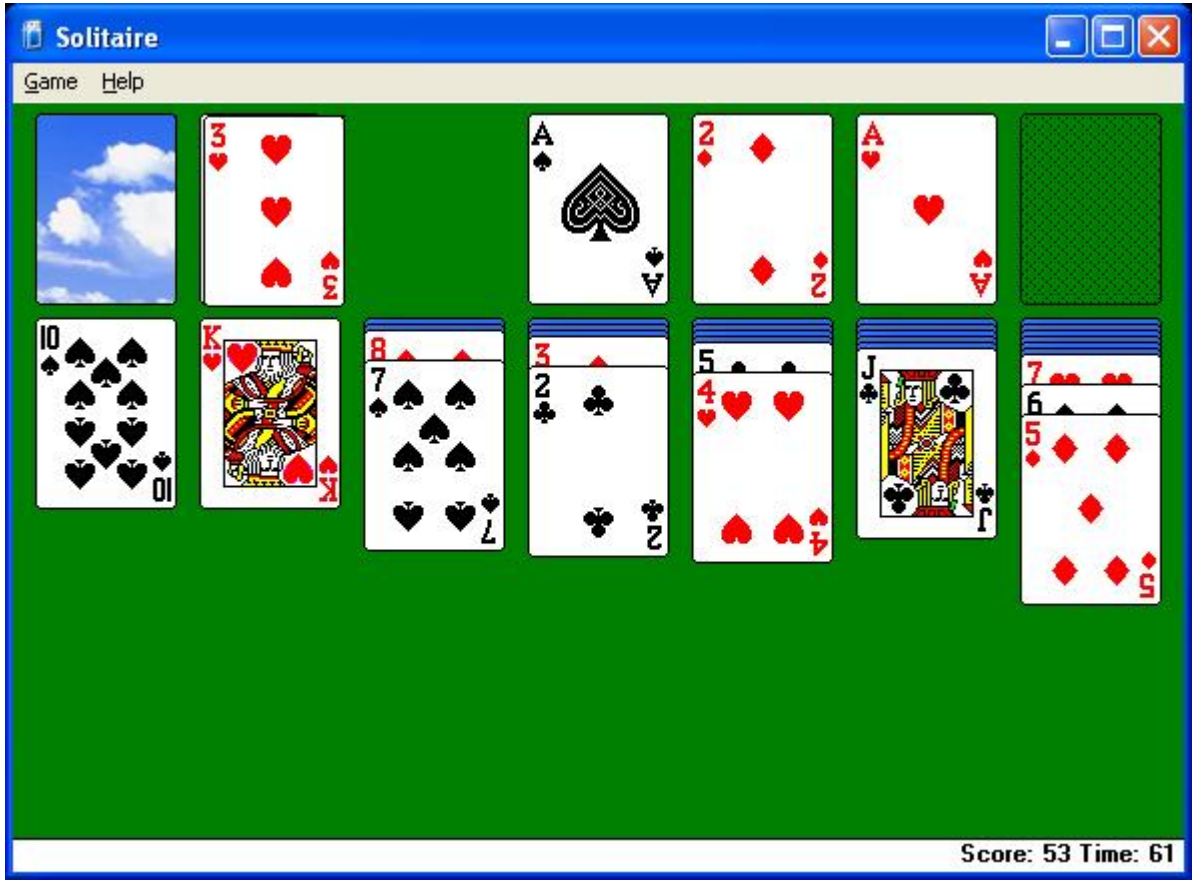
What are the decisions?

Objective: Simulate

- Rules
- Conflict
- Decisions



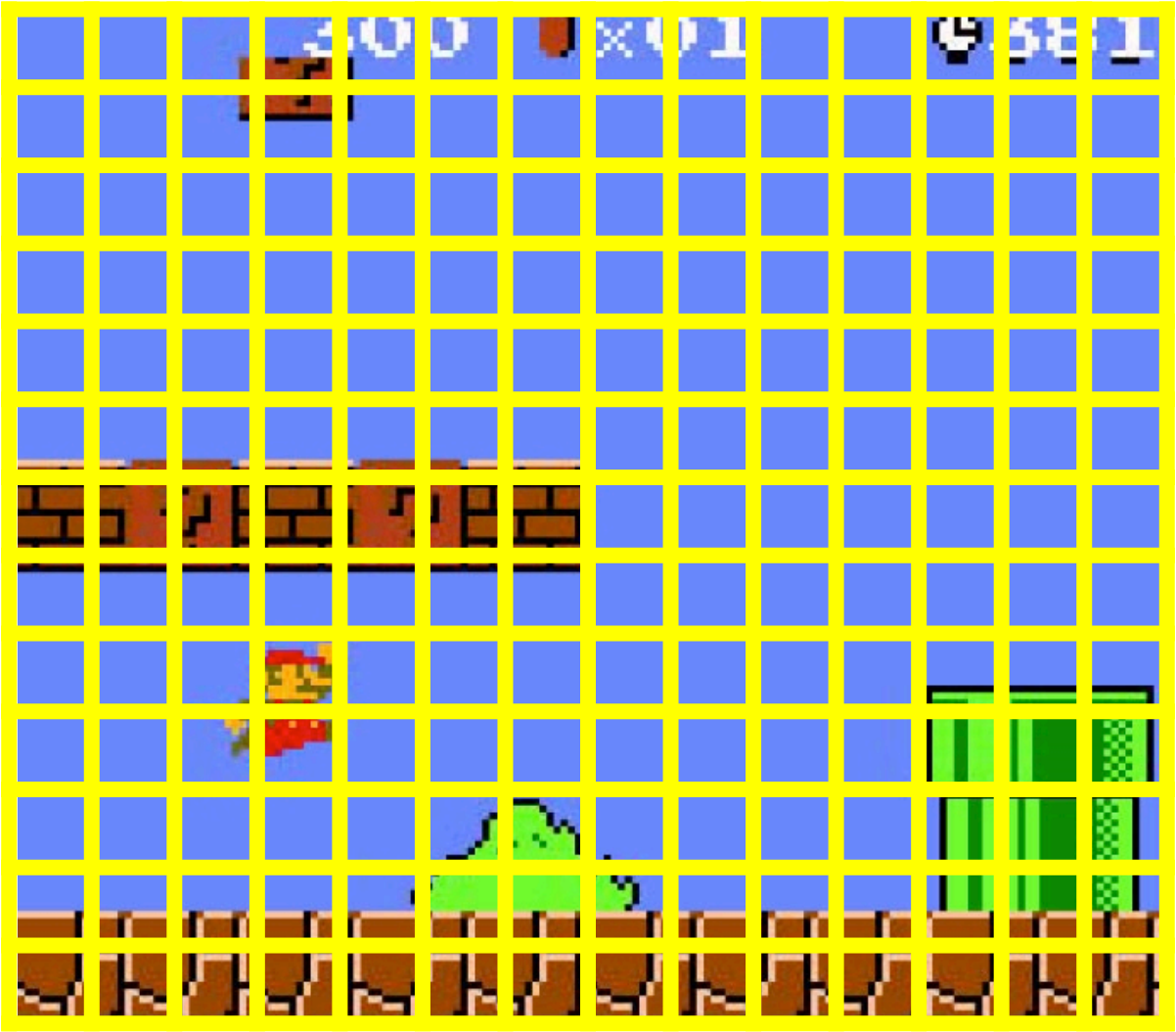
Sometimes easy to prototype



Sometimes not…

Discretizing Space

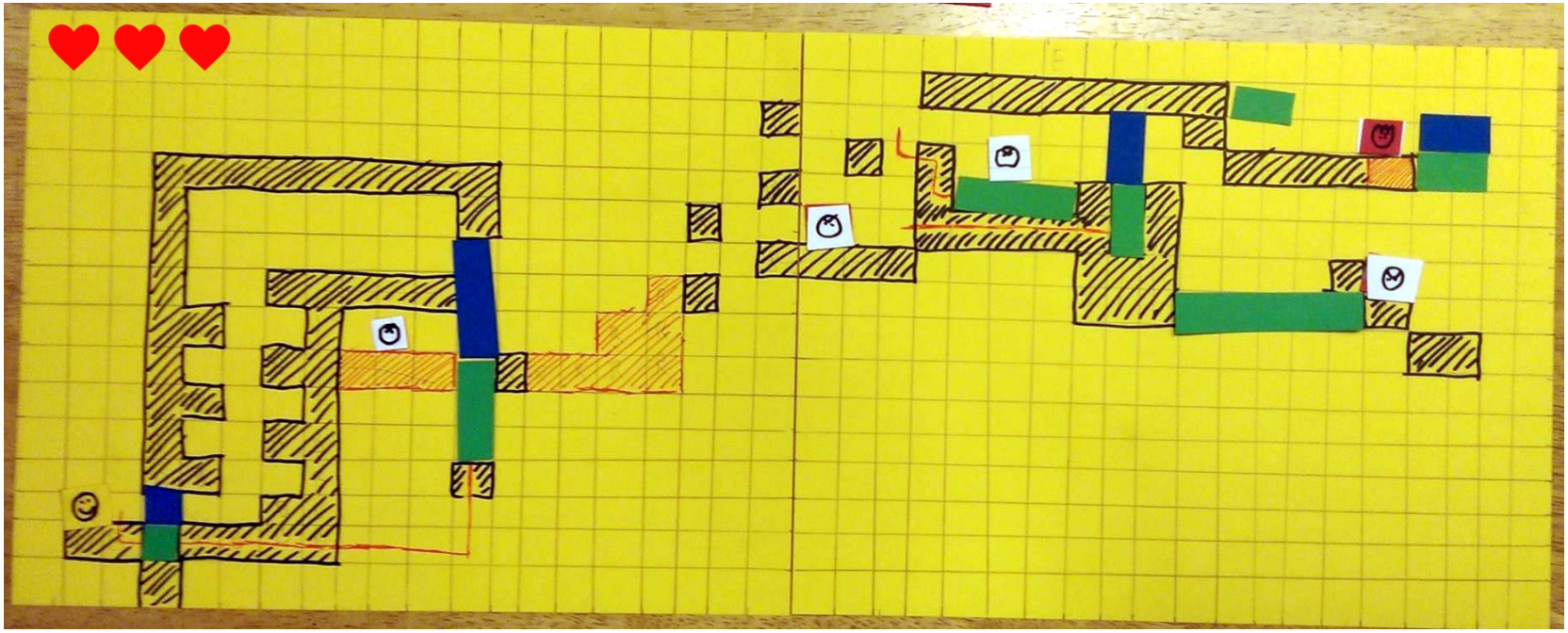
Discretizing Space



Discretizing Time

Turns!

Why is brainstorming *important*?



Review: making pots

no fame

1 hour

no fame

10 hours

lots of fame

100 hours

Which is better use of time?

make many pots

spend all your time
making one awesome pot

What are the tradeoffs?

Fewer designs	More designs
Spend more time per design	Explore more
Avoid duplication of effort	First idea maybe not the best
Reach consensus faster	Play off each other’s ideas

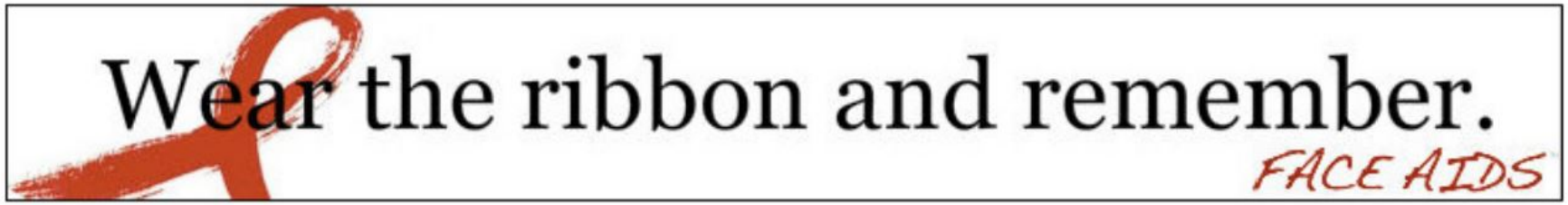
The hypothesis

Source: David Bayles, Ted Orland (2001)
Art & Fear: Observations on the Perils (and Rewards) of Artmaking

Reality

Source: David Bayles, Ted Orland (2001)
Art & Fear: Observations on the Perils (and Rewards) of Artmaking

Larger-scale experiment



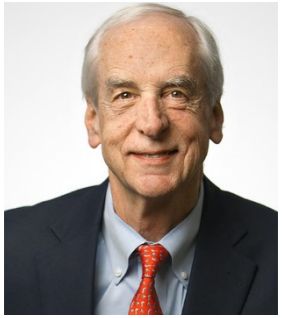
"Parallel prototyping leads to better design results, more divergence, and increased self-efficacy"

Steven P Dow, Alana Glassco, Jonathan Kass, Melissa Schwarz, Daniel L Schwartz, Scott R Klemmer

CHI 2011

Scenario 1

Design



Design

Dow et al. CHI 2011

Scenario 1: Share One

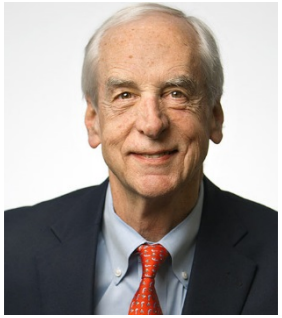
Dow et al. CHI 2011

Scenario 2

Design 1

Best Design

Design 3



Design 1

Best Design

Design 3

Dow et al. CHI 2011

Scenario 2: Share Best

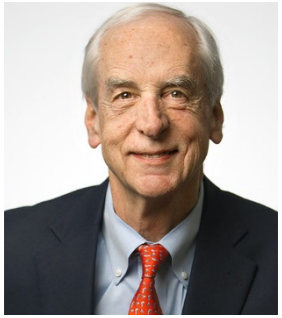
Dow et al. CHI 2011

Scenario 3

Design 1

Design 2

Design 3



Design 1

Design 2

Design 3

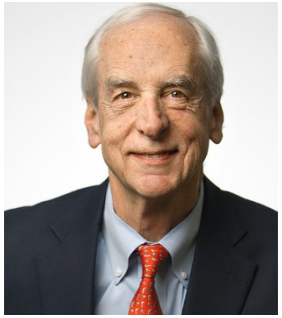
Dow et al. CHI 2011

Scenario 3

Design 1

Design 2

Design 3



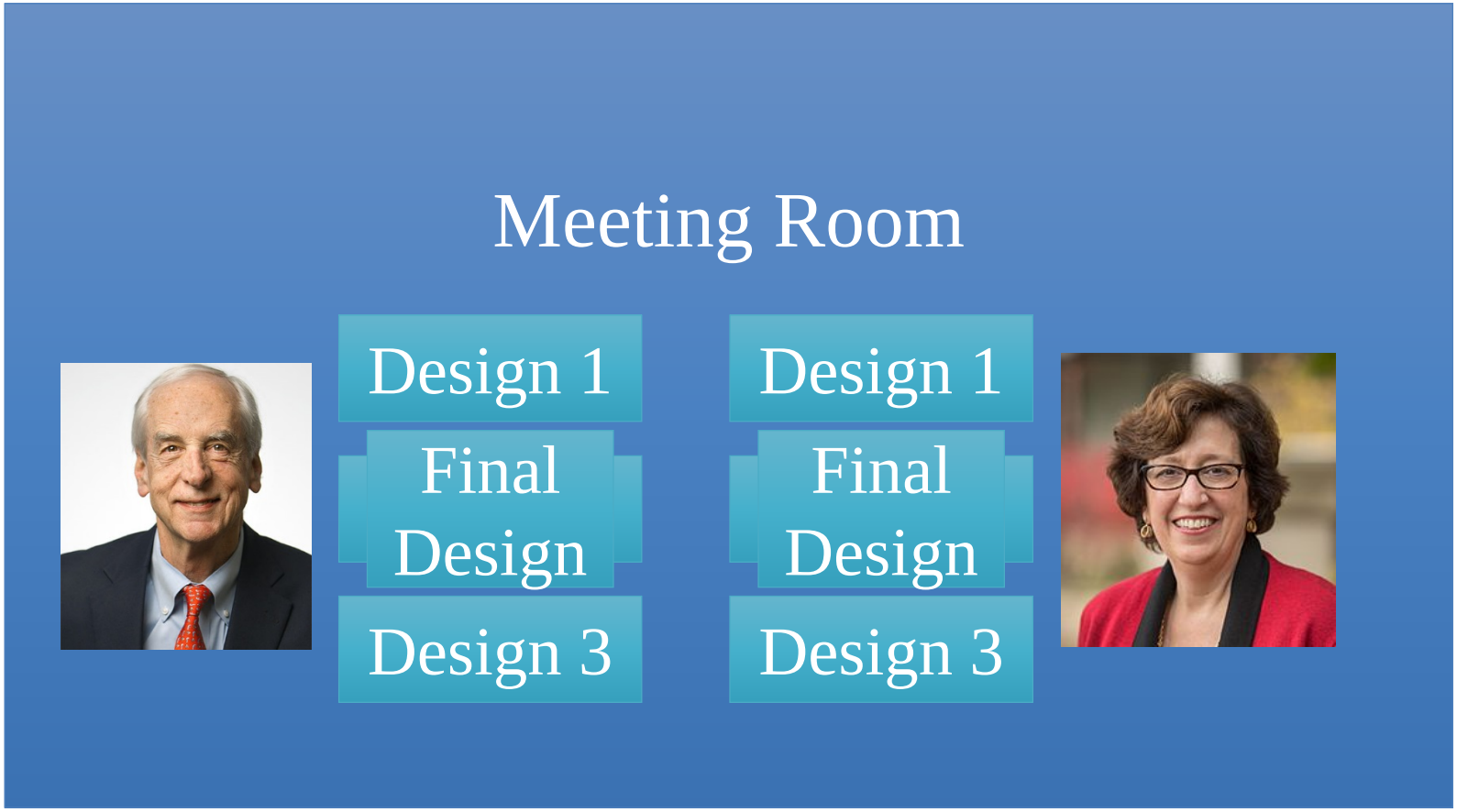
Design 1

Design 2

Design 3

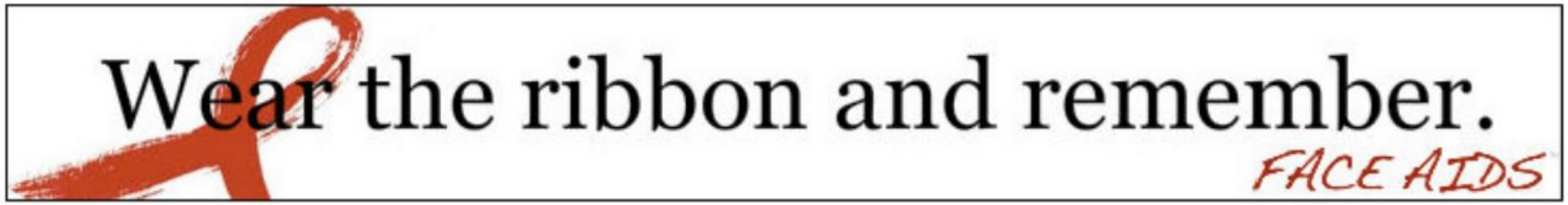
Dow et al. CHI 2011

Scenario 3: Share Multiple



Dow et al. CHI 2011

Large-scale evaluation



Dow et al. CHI 2011

Which did the best?

Share One

Share Best

Share Multiple

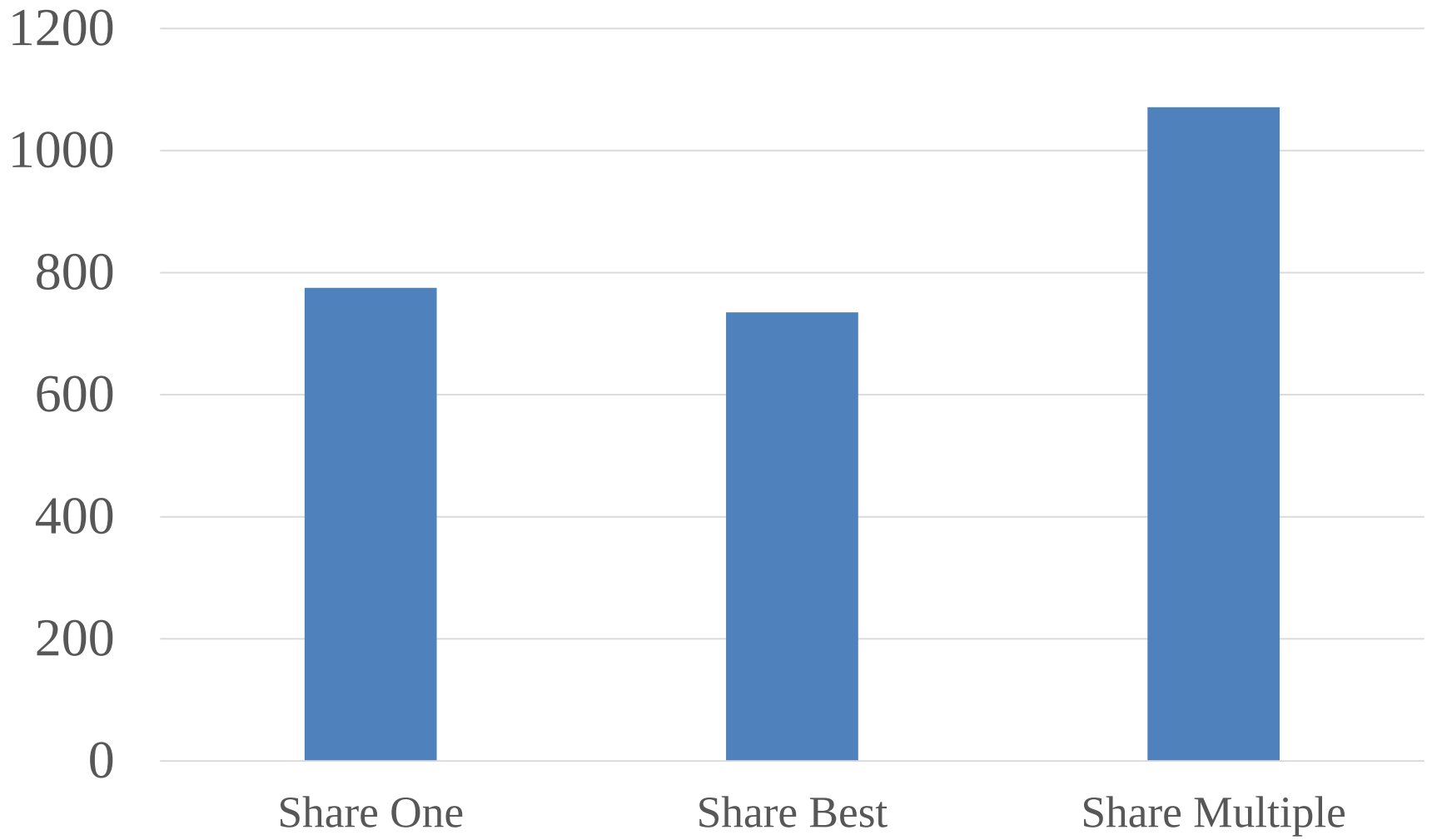
Dow et al. CHI 2011

Effect of sharing multiple designs

+5% +15% +25% +35% +45%

Dow et al. CHI 2011

Clicks per million impressions

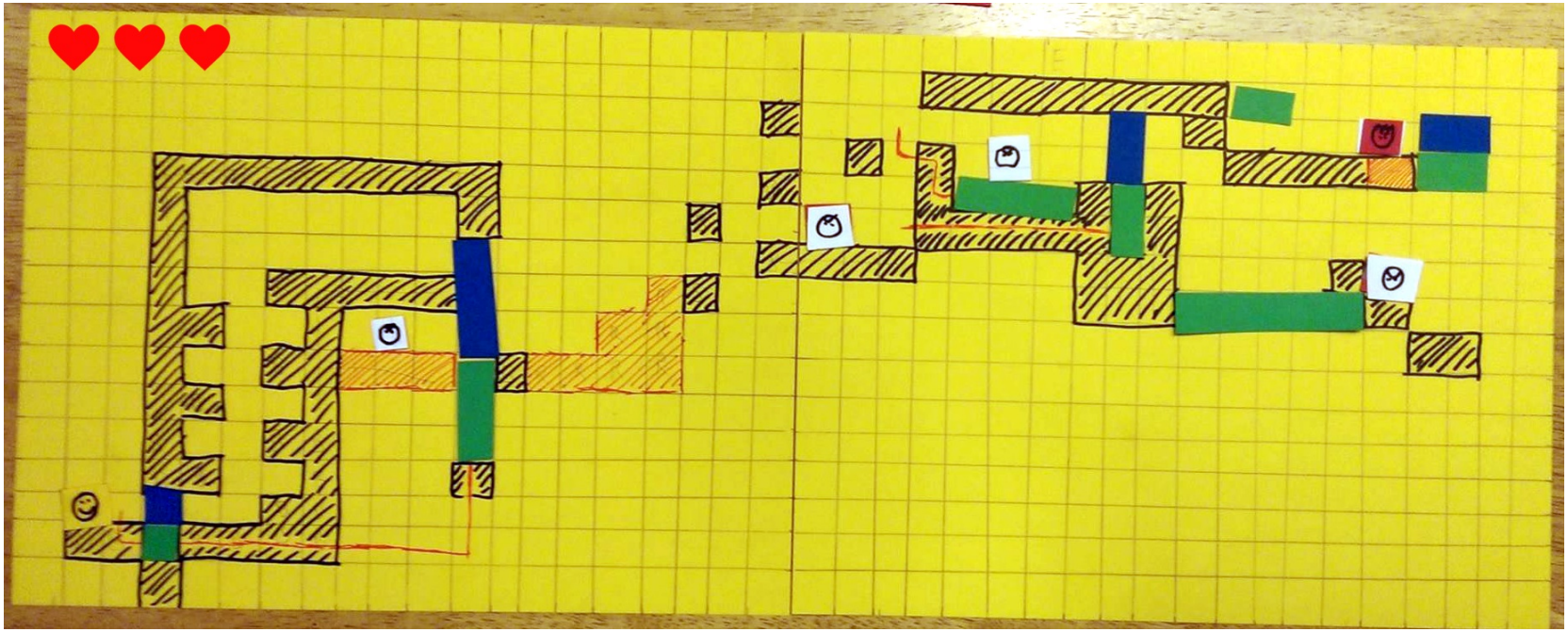


Dow et al. CHI 2011

1 tip of good design:

Improve your
design by 25%
by simply
using this one
weird tip

Why is *testing* prototypes important?

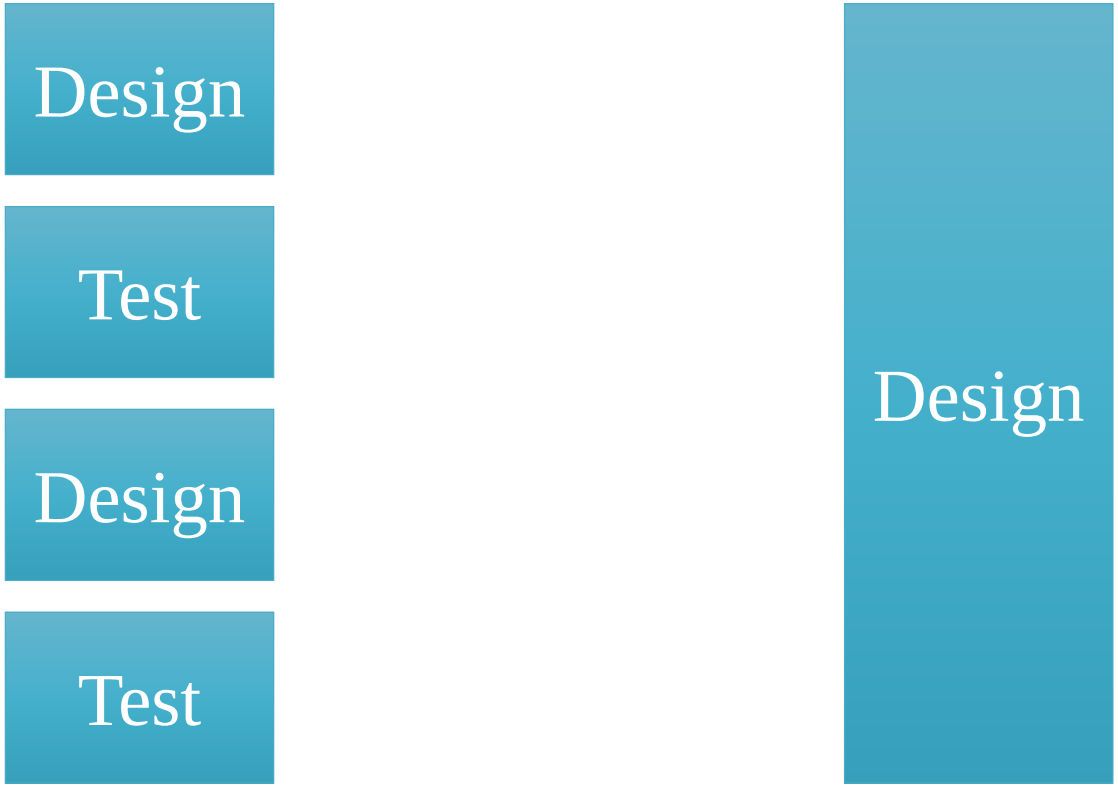


- **Question**: should you spend time *making* or *testing*?

Egg drop

Dow et al. CHI 2011

Experimental Conditions



Iterative group

Non-iterative group

Some of the products

Dow et al. CHI 2011

Effect of iteration

worse same better

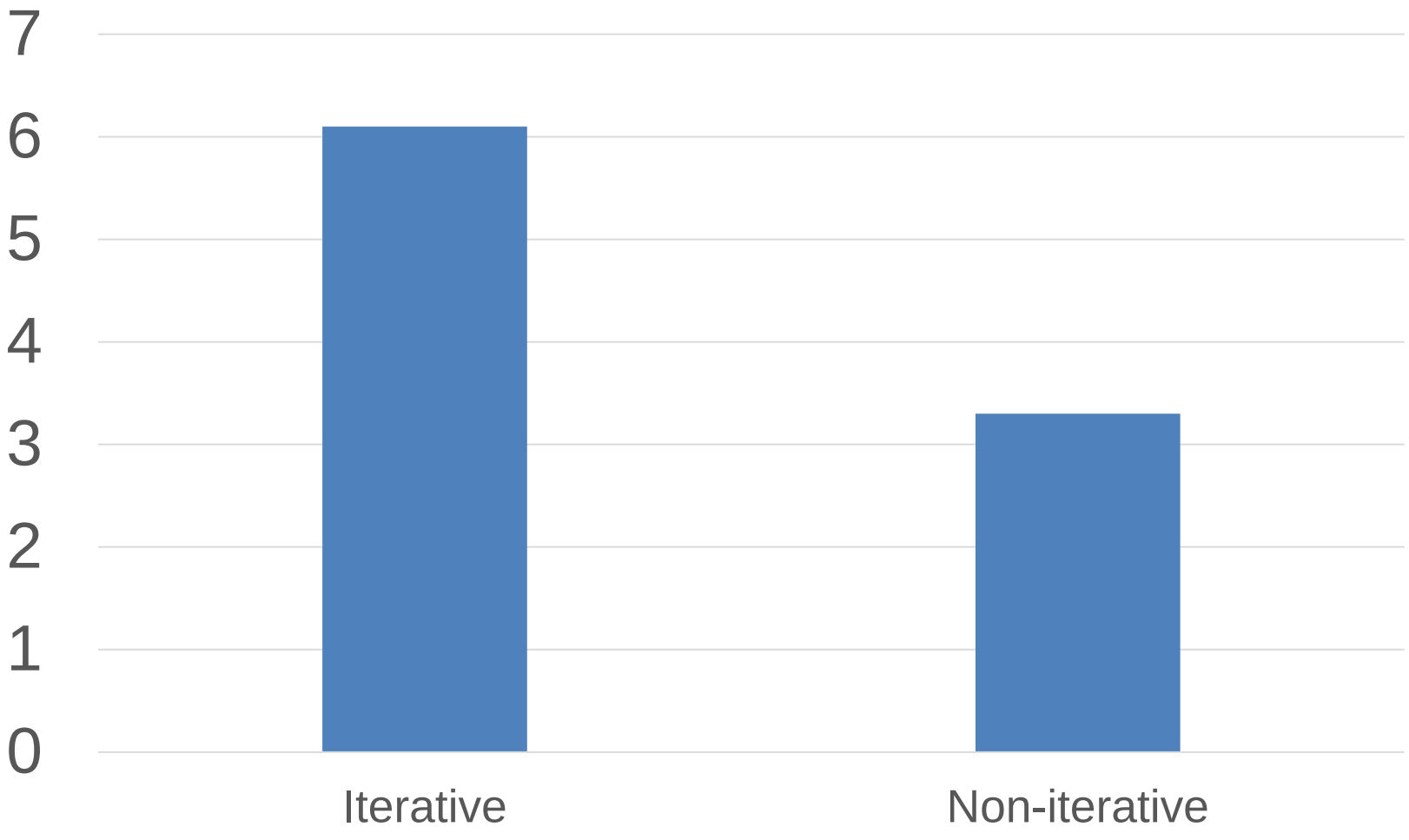
Dow et al. CHI 2011

Effect of iteration

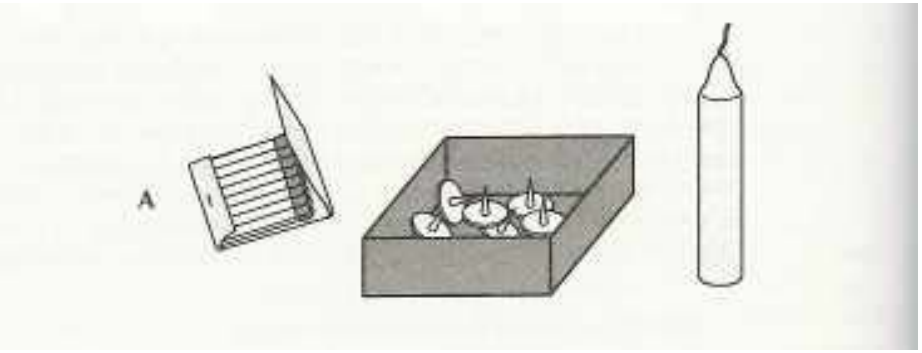
+25% +50% +75% +100% +125%

Dow et al. CHI 2011

Maximum height

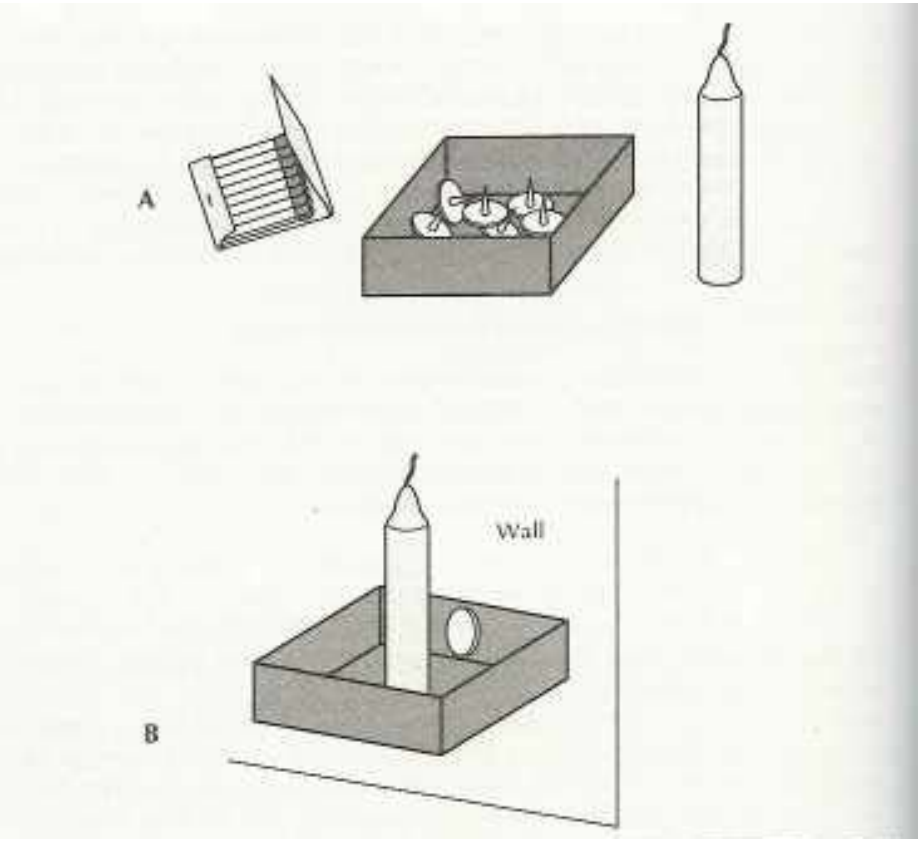


Functional fixedness



The Candle Problem (Karl Duncker)

Functional fixedness



The Candle Problem (Karl Duncker)

Key Lesson of this Class #1

Generating, ***sharing***, and ***testing*** ***multiple*** ideas leads to ***better outcomes***

Ideas are valuable ***even if not used***

Take next week seriously!

Brainstorming Technique

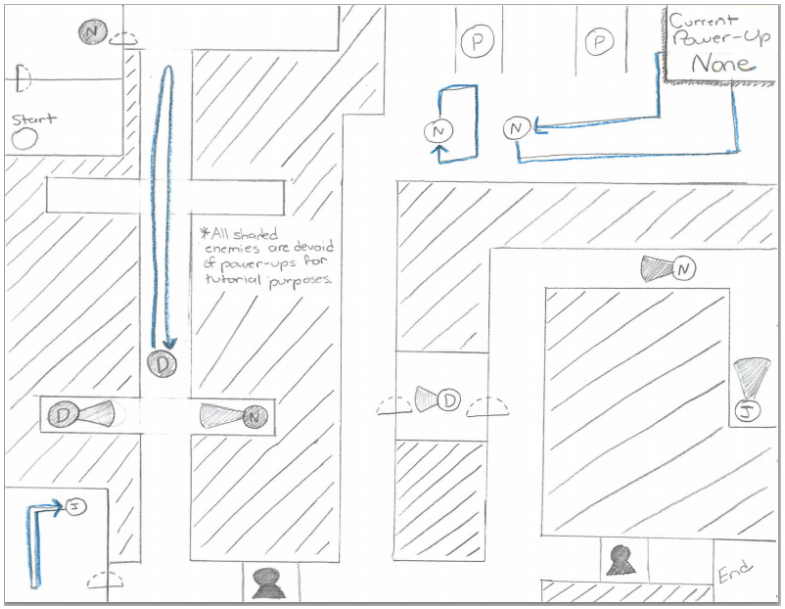
- Focus
- **Limit the amount of time**
- Appoint a scribe who will write down ideas
- **Positive** phase
  - Only write down new ideas! **Don’t criticize any suggestion.**
- **Negative** phase
  - Discuss each idea and reject as a group
- Repeat if necessary
  - But take a break!
  - If done correctly, you will be exhausted.

Mon	Wed	Fri
		8/25 Mechanics and Prototyping
8/28 In-class Brainstorming	8/30 Paper Prototyping 1	9/1 Paper Prototyping 2

Attendance will be taken

Assignments 2 & 3: Paper Prototypes

- NOT GRADED!
- Will have Monday's class to work on this
- Prototype #1
  - due Wed 8/30 (11:00am)
  - (submit a picture)
- Prototype #2
  - due Fri 8/1 (11:00am)
  - (submit a picture)

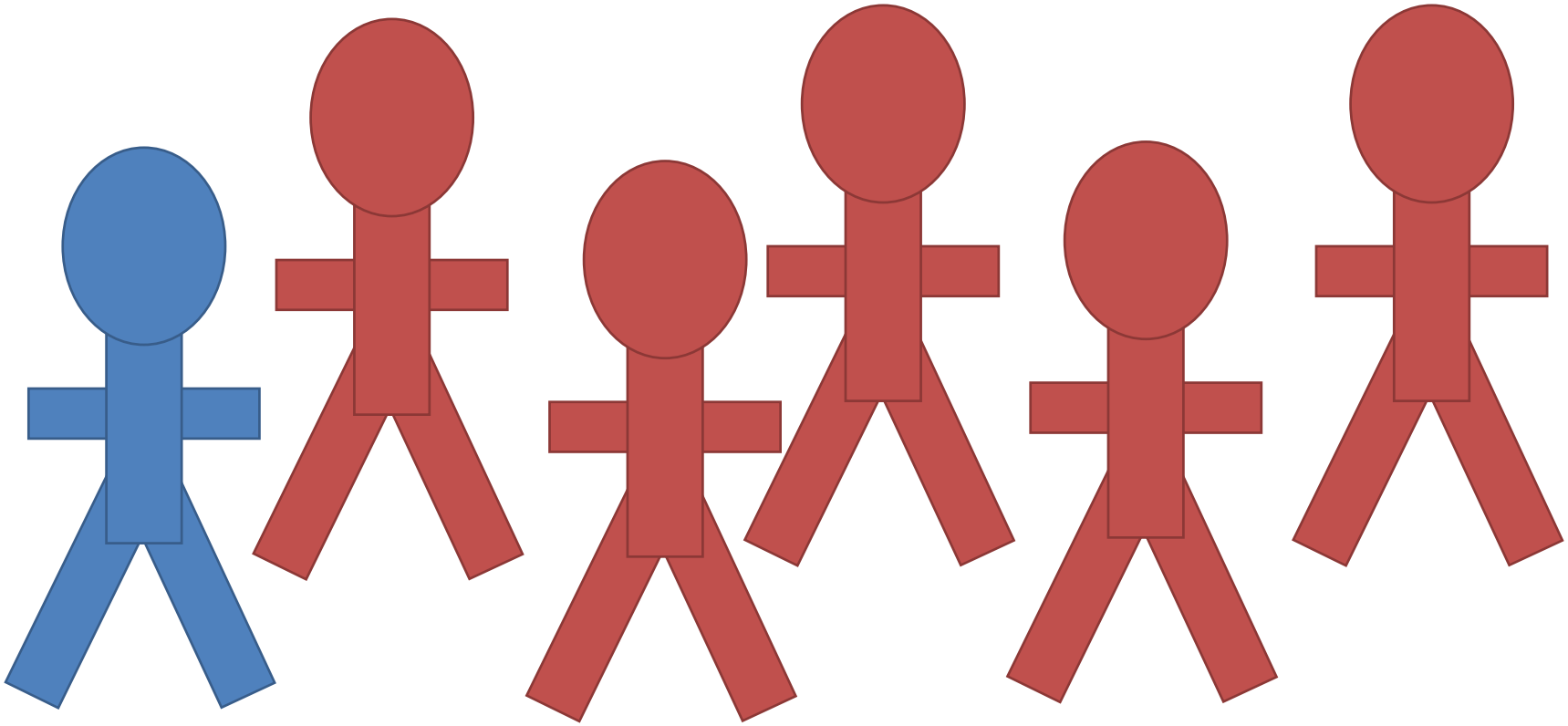


Zombify, 2014

Game: Video Game Charades

- Topic #1: emotions
- Topic #2: video game problems

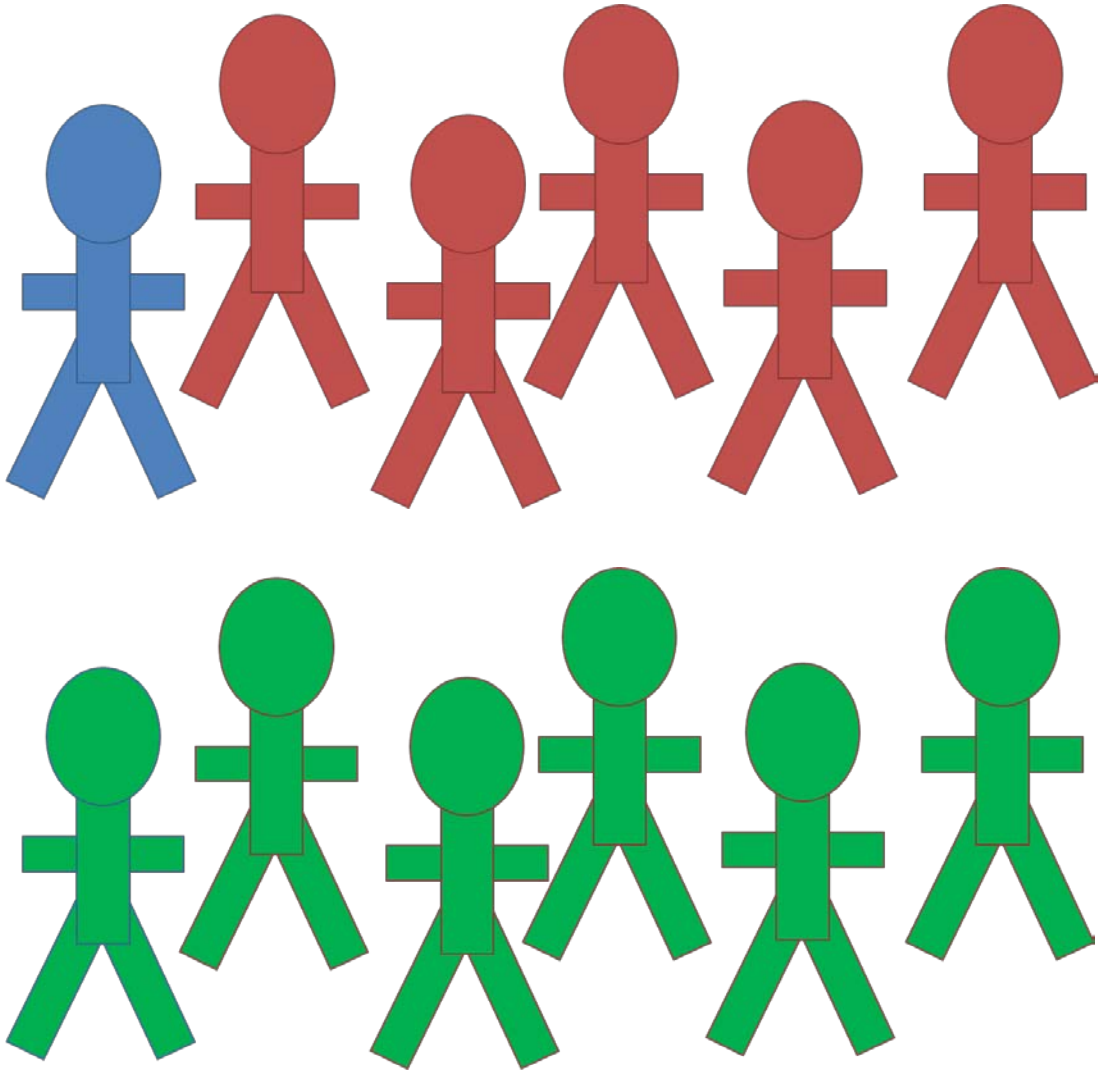
Game: Video Game Charades



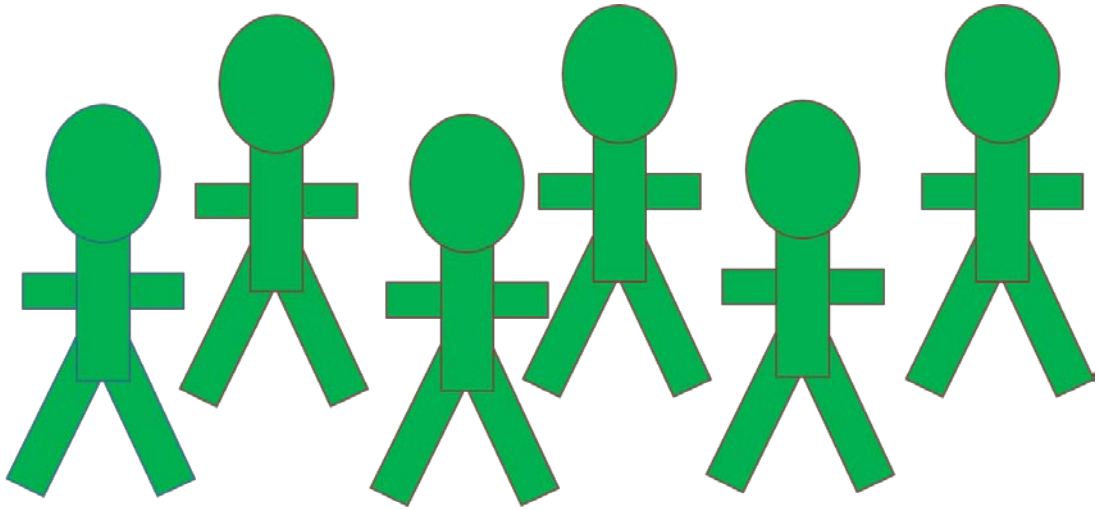
Actor

Topic 1: emotions

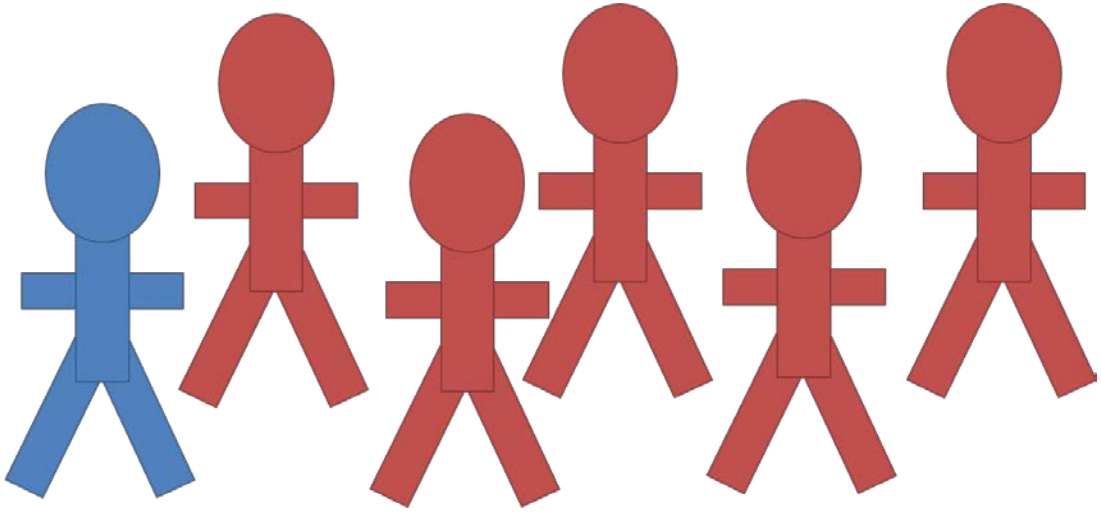
A



Topic 1: emotions

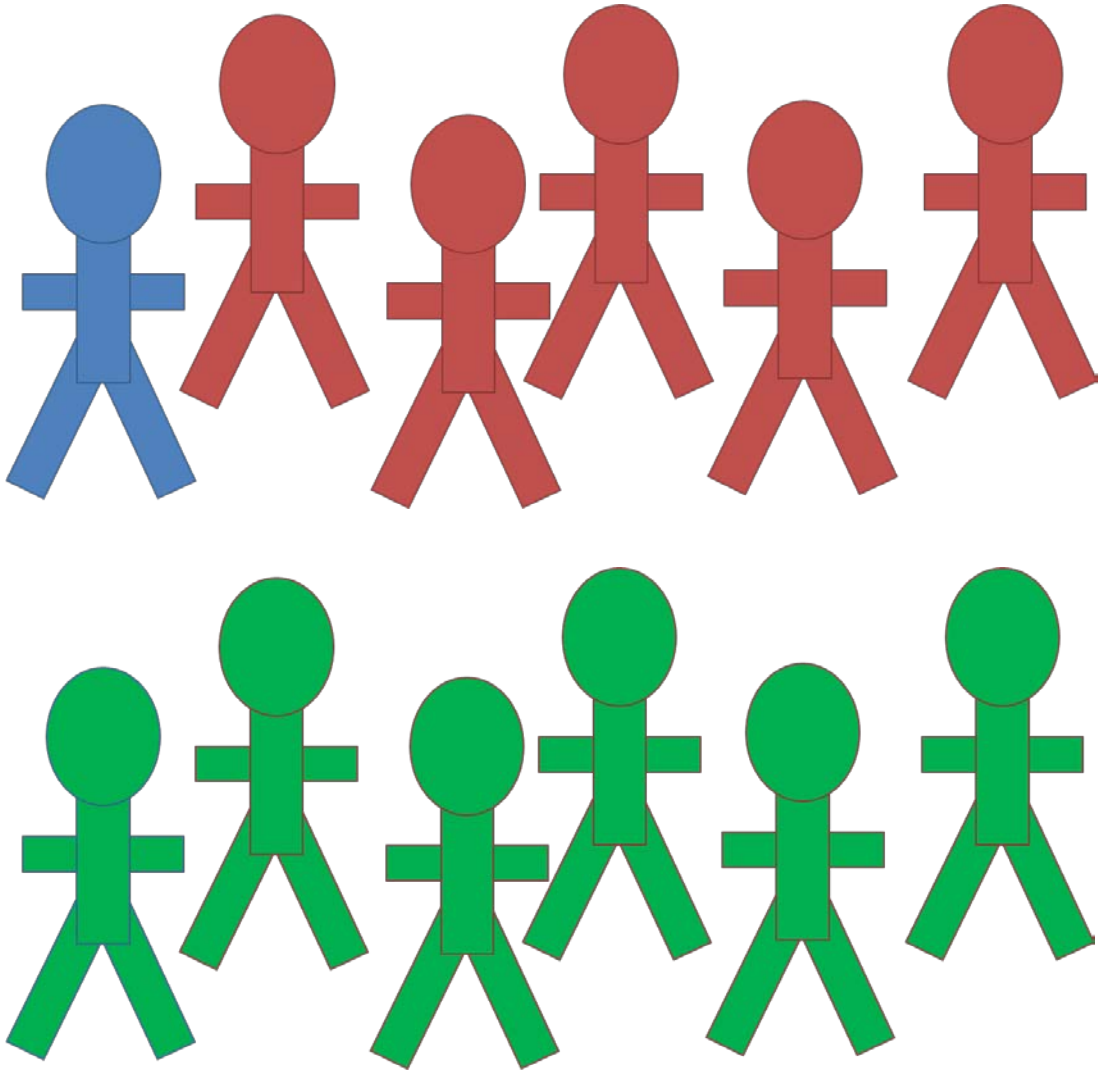


B



Topic 2: video game problems

A



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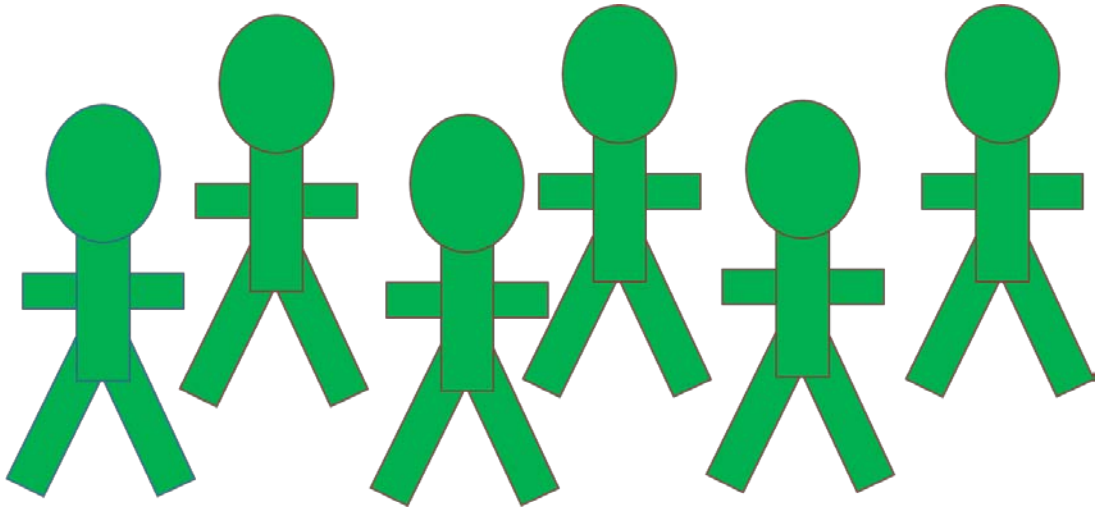

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