CMPM 120

Branching on Data

Objectives

By the end of today you should be able to...

1. Control program flow with data
2. Understand
3. Scale your games to match the window they are in

https://twitter.com/TheSugarVenom/status/1161699674316779520

Sarah Arellano (SugarVenom)
@TheSugarVenom

Games writing is like:

I write a scene in which a character takes something out of her purse.

Two days later I discover that I caused a shockwave through like six departments.

11:02 AM · Aug 14, 2019 · Twitter Web App

1.2K Retweets **6K** Likes

Sarah Arellano (SugarVenom) @TheSugarVenom · 23h
Replying to @TheSugarVenom
Project Management: The purse is not on the asset list!

Concept Art: Should it be a basic purse or a couture purse? Is anything else in the purse?

Animation: Does the purse need to move? Do we need a custom animation for her reaching in and removing an item?

3 80 1K

Sarah Arellano (SugarVenom) @TheSugarVenom · 23h
Design/Props: Does it need to exist in the gameplay environment or only in cinematics?

Narrative: Wouldn't a woman who carries a purse always have it on her?

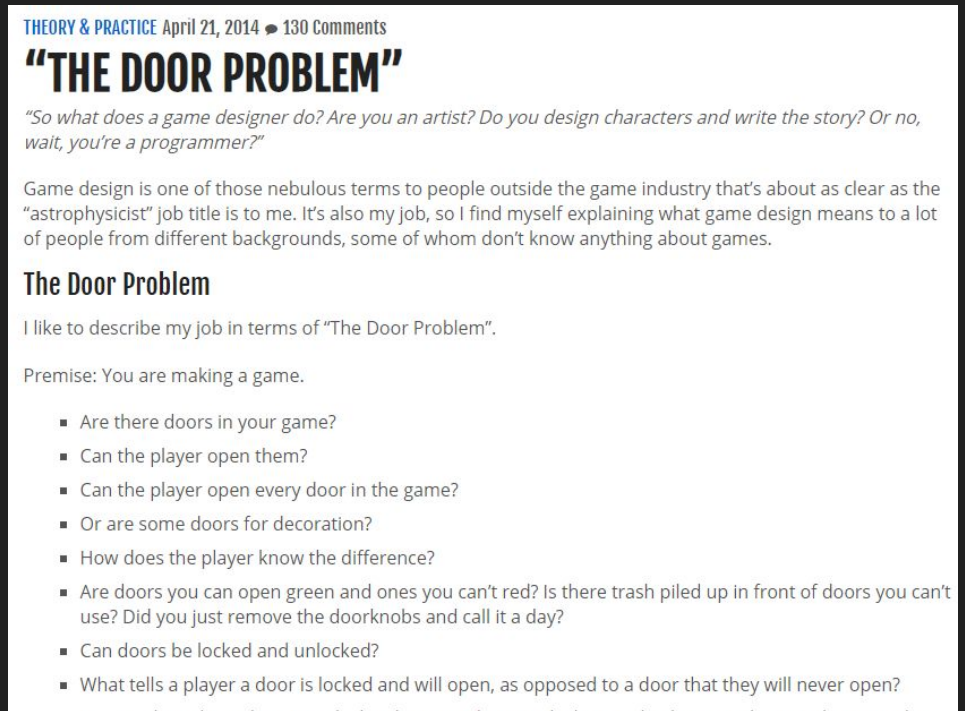
8 59 890

Sarah Arellano (SugarVenom) @TheSugarVenom · 23h
In short, by mid-development on a project, you must consider with care all verbs, lest you make animators cry, and eliminate all nouns, lest you set back production for two full days.

7 69 1.1K

The door problem

http://www.lizengland.com/blog/2014/04/the-door-problem/



THEORY & PRACTICE April 21, 2014 • 130 Comments

"THE DOOR PROBLEM"

"So what does a game designer do? Are you an artist? Do you design characters and write the story? Or no, wait, you're a programmer?"

Game design is one of those nebulous terms to people outside the game industry that's about as clear as the "astrophysicist" job title is to me. It's also my job, so I find myself explaining what game design means to a lot of people from different backgrounds, some of whom don't know anything about games.

The Door Problem

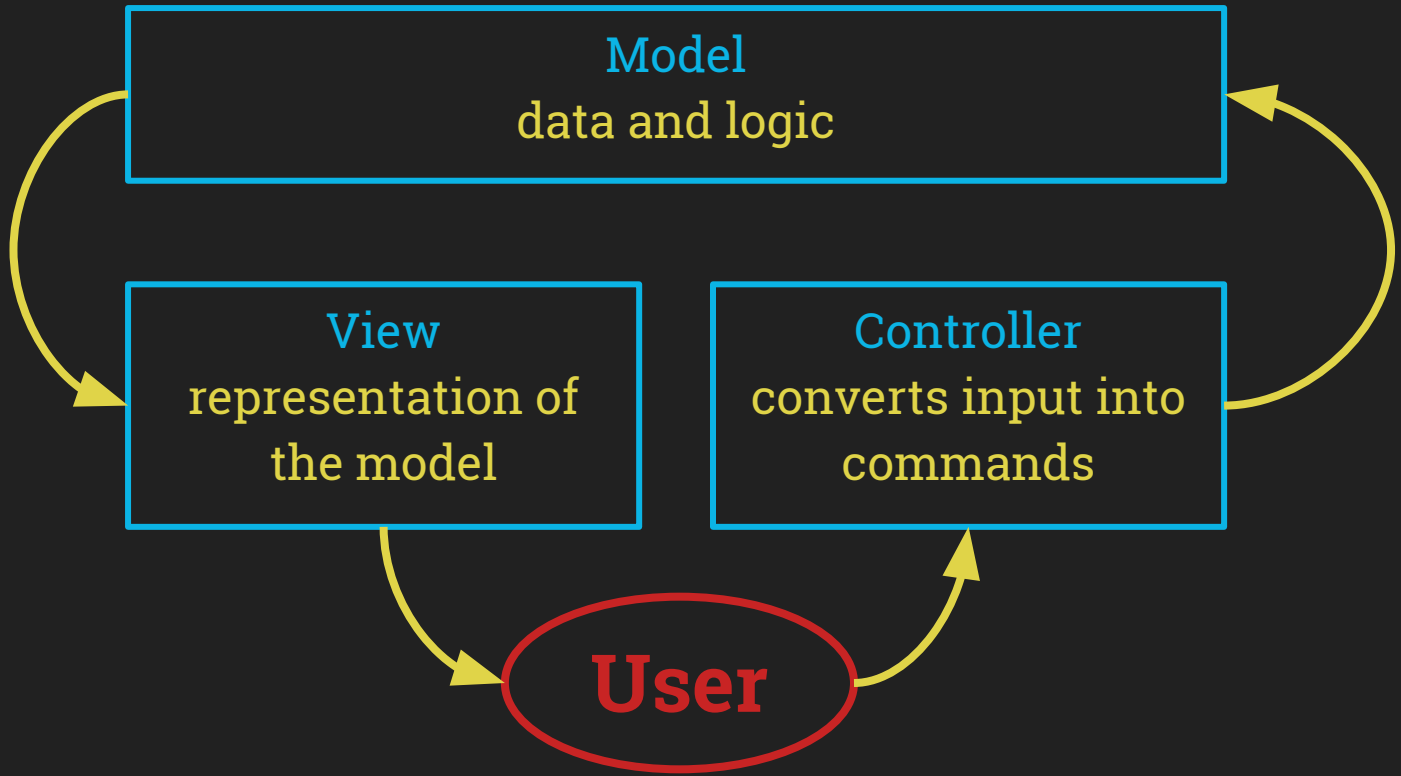
I like to describe my job in terms of "The Door Problem".

Premise: You are making a game.

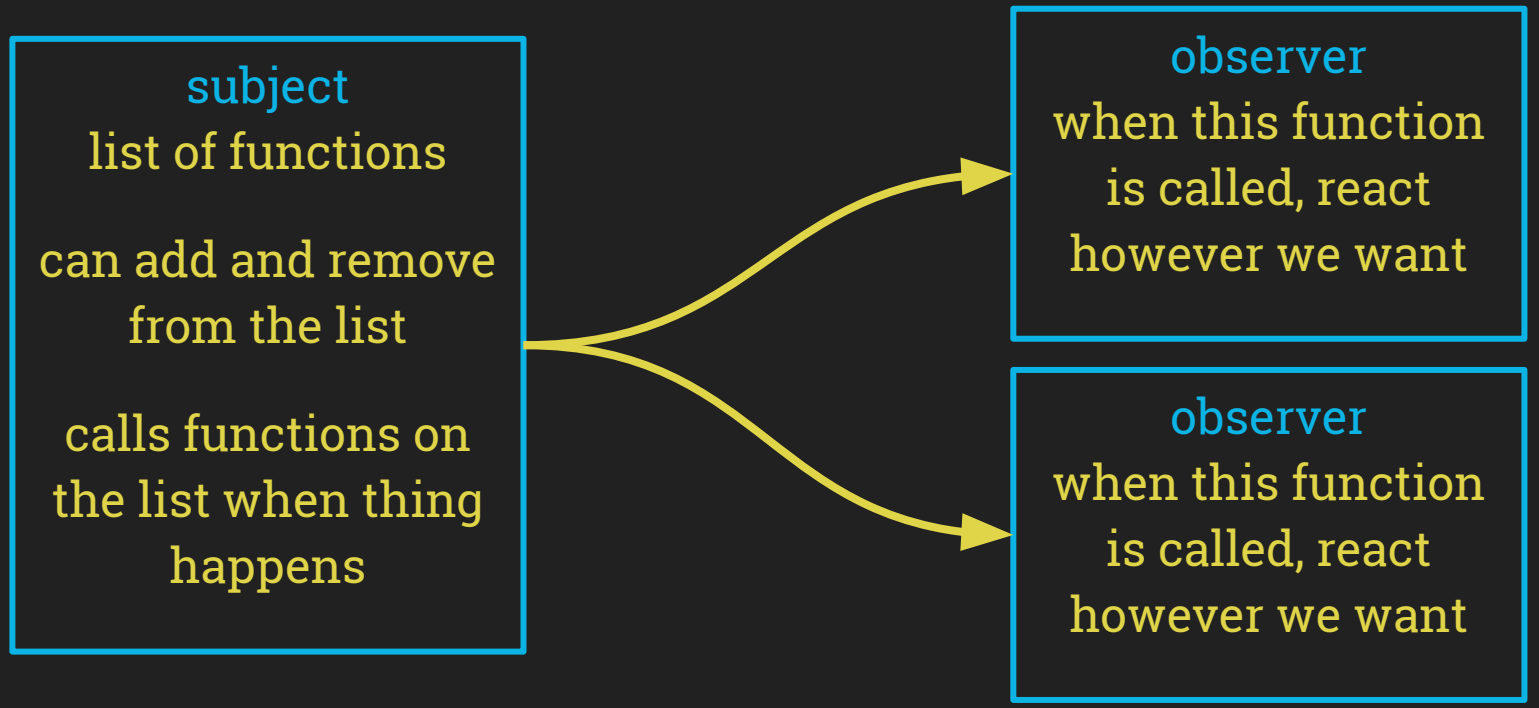
- Are there doors in your game?
- Can the player open them?
- Can the player open every door in the game?
- Or are some doors for decoration?
- How does the player know the difference?
- Are doors you can open green and ones you can't red? Is there trash piled up in front of doors you can't use? Did you just remove the doorknobs and call it a day?
- Can doors be locked and unlocked?
- What tells a player a door is locked and will open, as opposed to a door that they will never open?

Structuring Your Program

Model View Controller

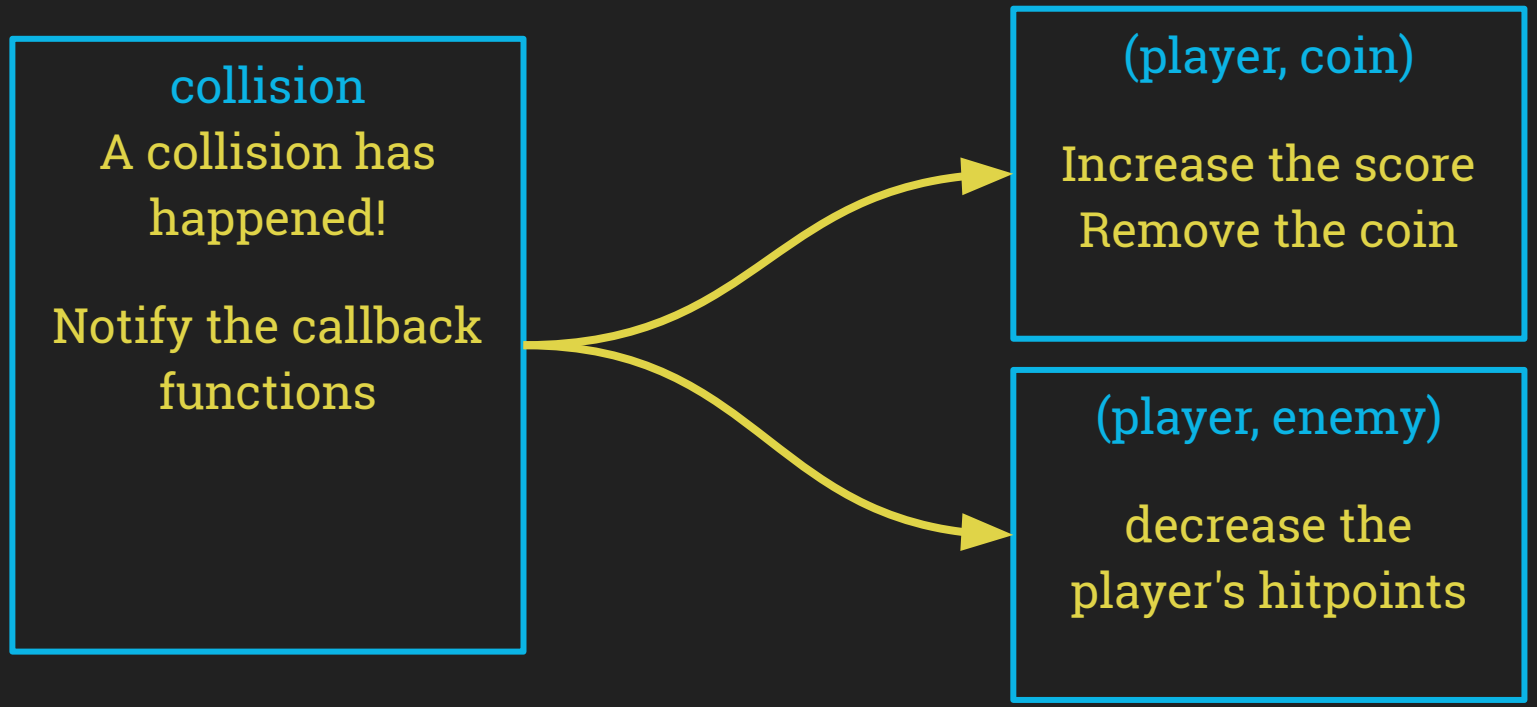


Observer



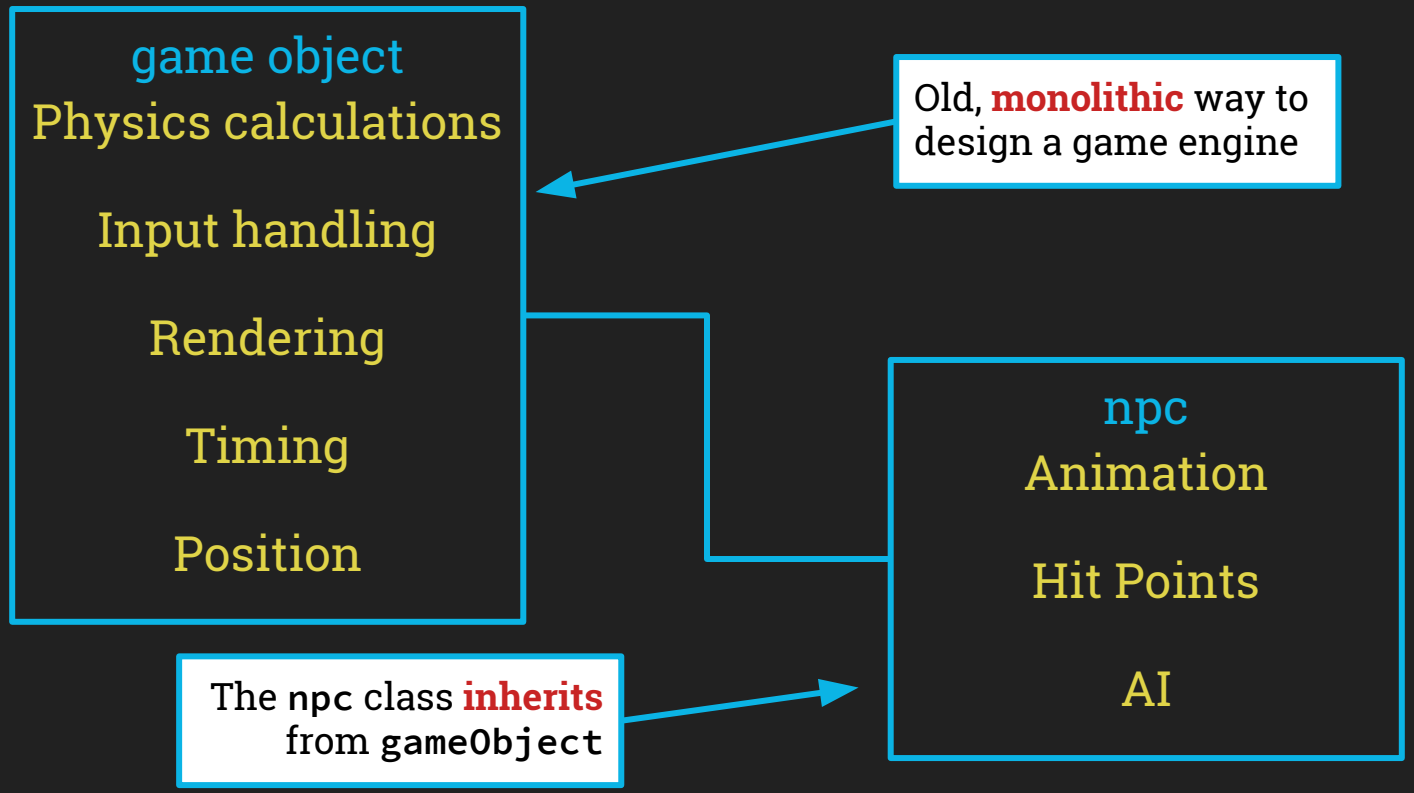
https://gameprogrammingpatterns.com/observer.html

Observer - you've seen this with collisions!



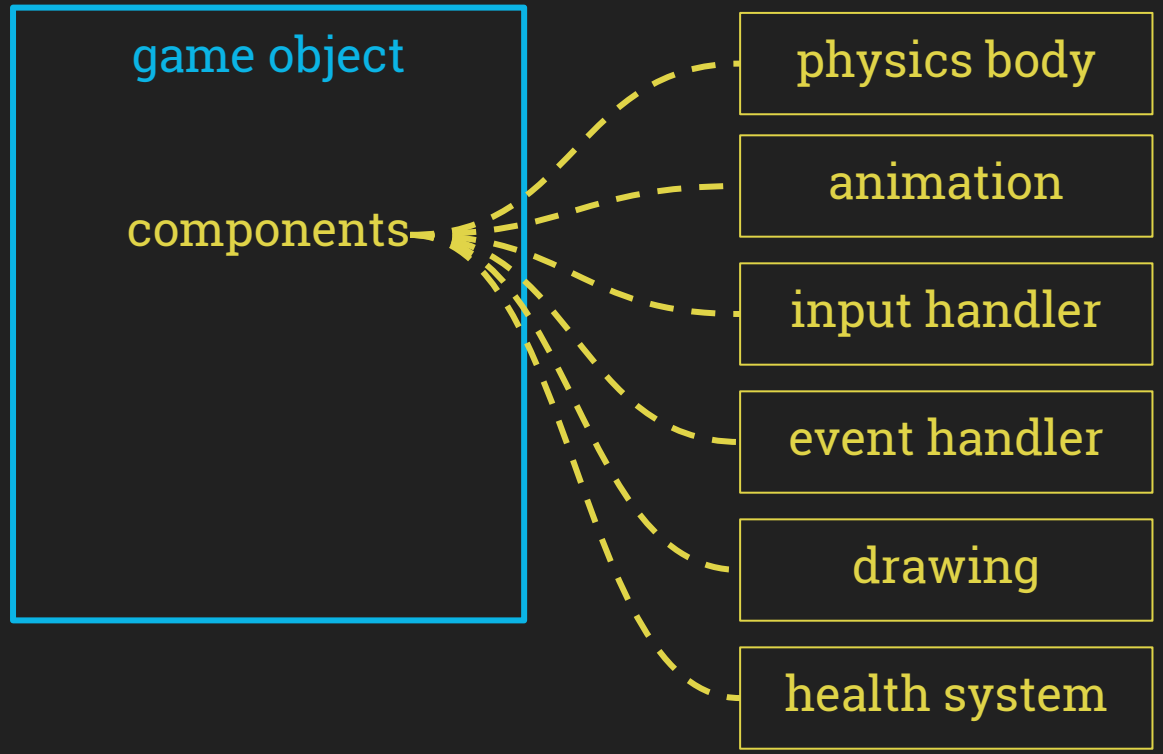
https://gameprogrammingpatterns.com/observer.html

Inherited Classes



Entity Component System

modular approach, composing objects out of smaller parts



gameObject **contains** components, each of which handles a small, isolated part

Branching Narrative

Problem Solving

Define the actual problem

Think about it

Plan a solution, including alternate plans

Carry out the plan

Look Back: verify you solved the original problem.

Defining the problem

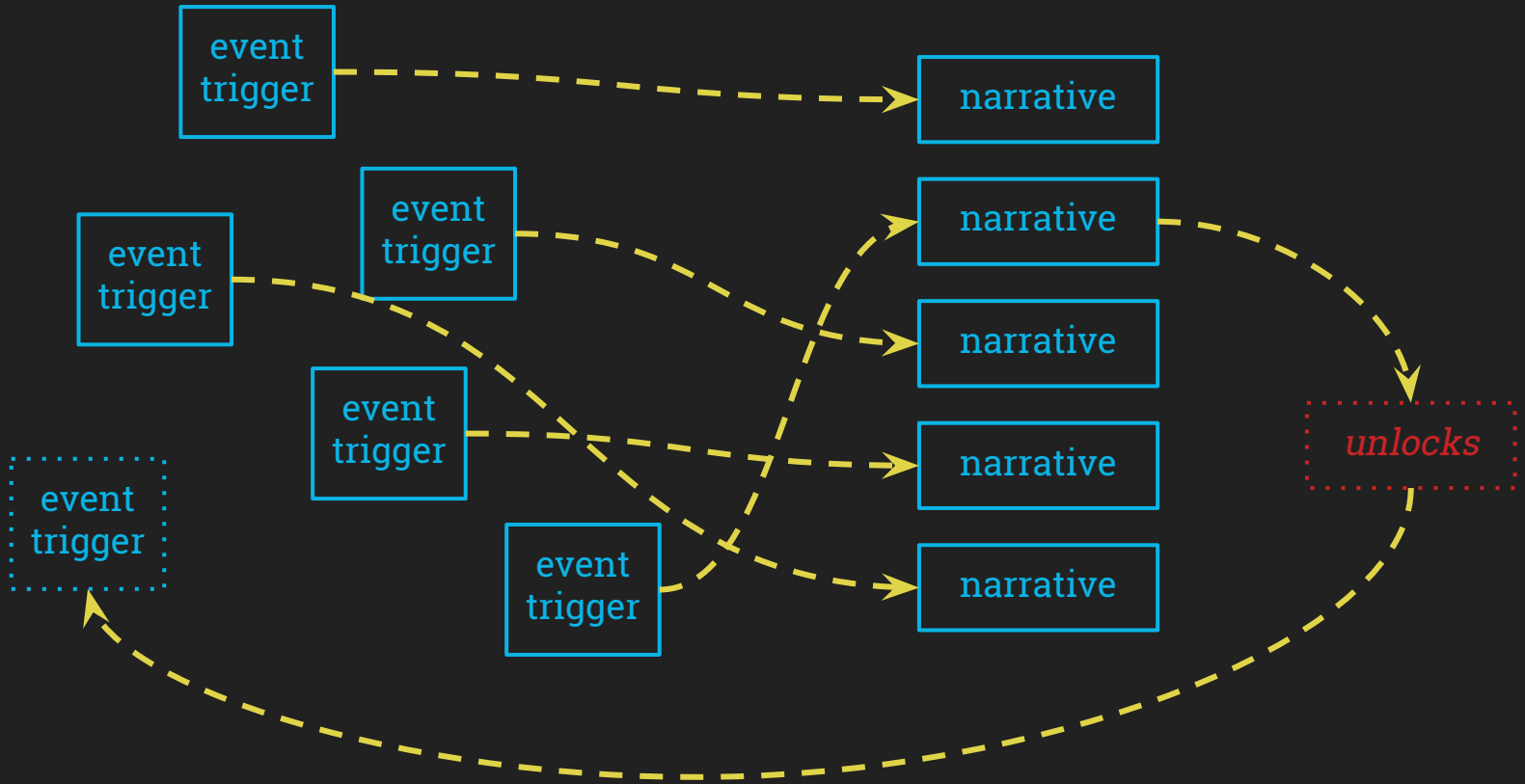
We want our game to have a branching narrative. What do we mean by that?

...most computer games are the combination of two different ways of presenting the player with a challenge, one which I will term **emergence** (simple rules combining, leading to variation) and one of **progression** (serially introduced challenges).

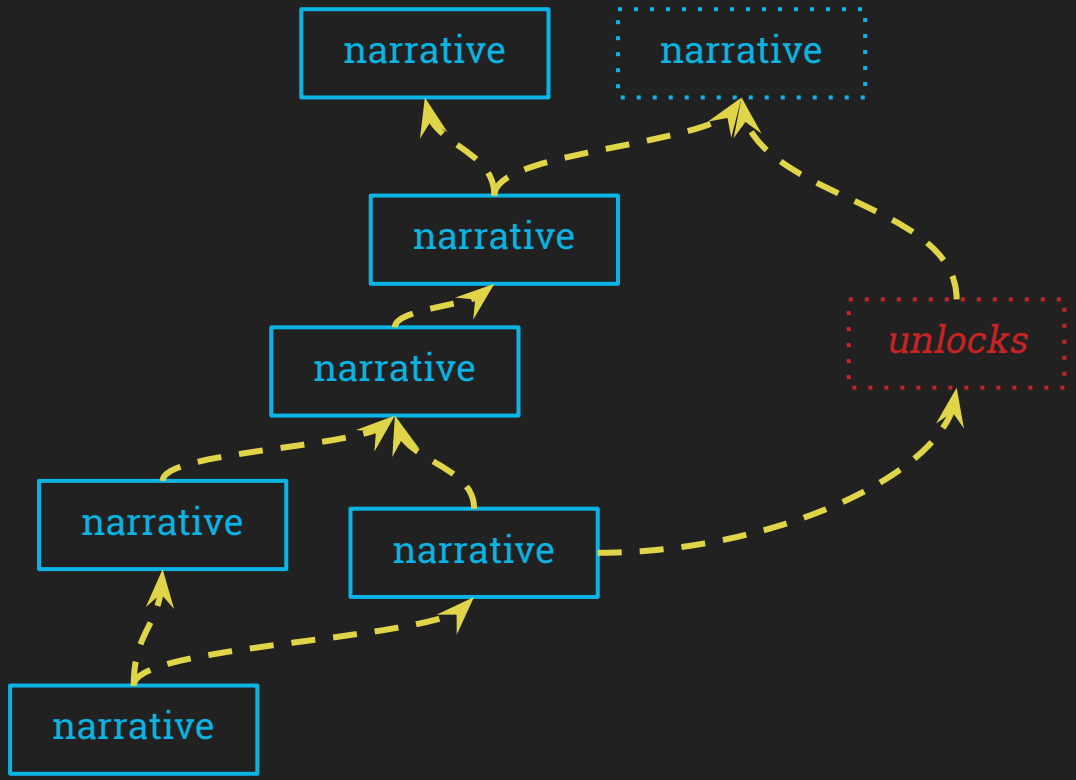
Jesper Juul

"The Open and the Closed: Games of Emergence and Games of Progression"
https://www.jesperjuul.net/text/openandtheclosed.html

Structure: triggers embedded in emergent world



Structure: progression tree



What is the difference?

The Stanley Parable (2013)

A room of dark metal. Fluorescent lights embedded in the ceiling.

The **activity room** is in the north wall. The **lavatory** entrance, west, next to the **trash disposal** and the **nutrient dispensers**. The **sanity room** is in the east wall.

Her **photograph** is pinned to the side of your bunk. A red LCD reads 367 a few inches over.

howling dogs (2012)

What is the difference?

Skyrim (2011)

A room of dark metal. Fluorescent lights embedded in the ceiling.

The **activity room** is in the north wall. The **lavatory** entrance, west, next to the **trash disposal** and the **nutrient dispensers**. The **sanity room** is in the east wall.

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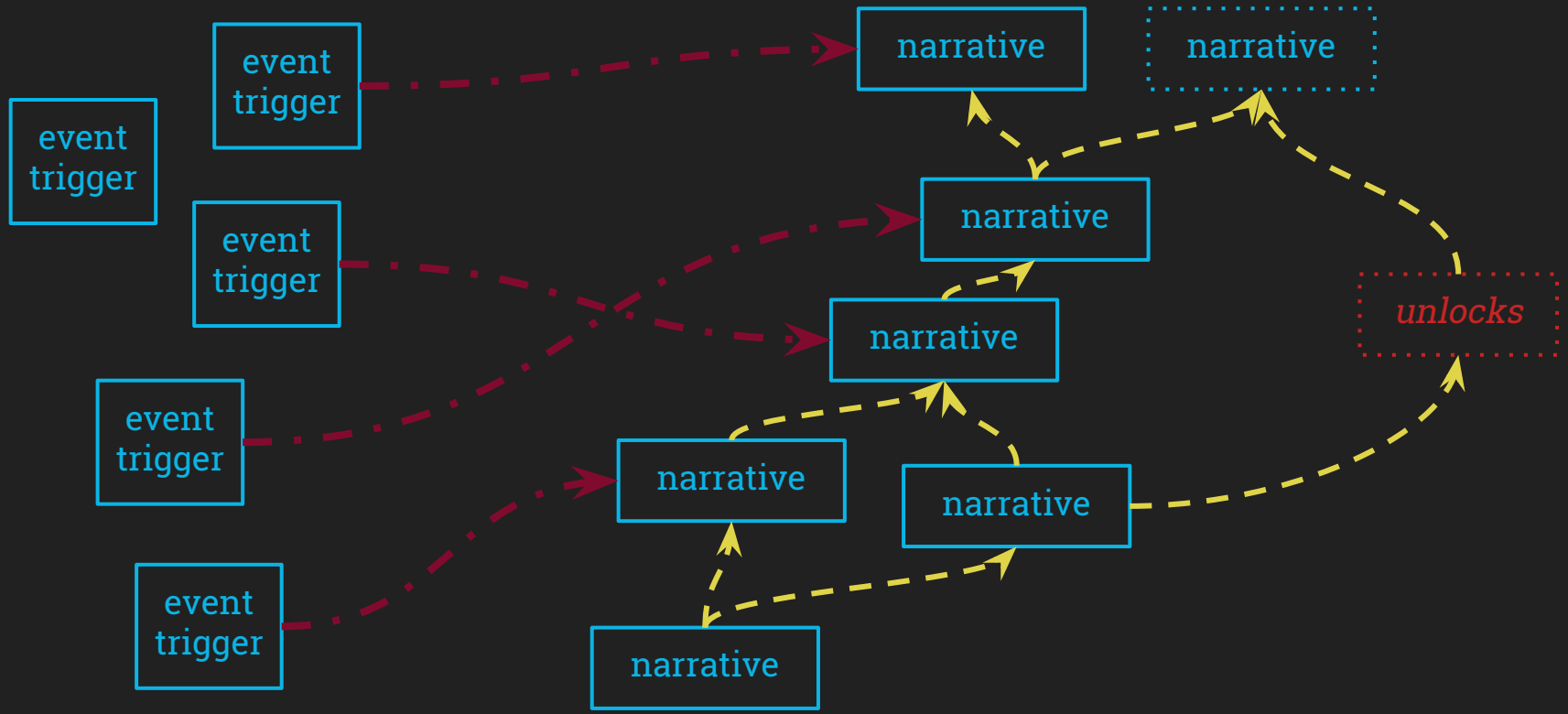
howling dogs (2012)

Structure: events walking progression tree



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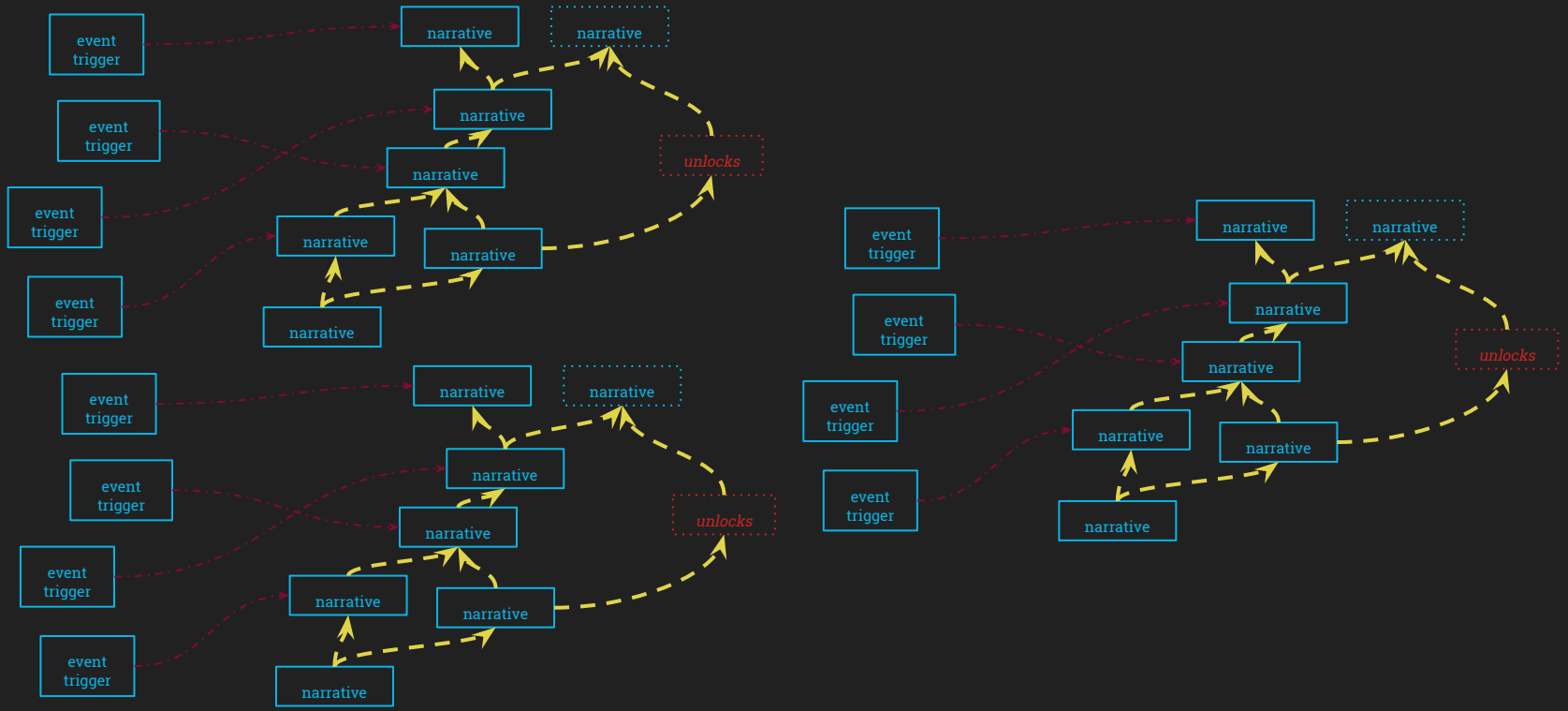

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Our Use Case

- What we need out of our data
  - Nodes
  - Links
- (CS 101: Vertices and Edges)
- One way to organize the data:
  - Nodes: Dialogue Objects
  - Links: Prereqs
- Alternative:
  - Nodes: Agents
  - Links: Dialogue Objects between agents

```
"5": {
  "speaker": "slimeD",
  "target": "player",
  "prereqs": ["8"],
  "loop": false,
  "utterance": "...Sorry about that."
},
"6": {
  "speaker": "slimeE",
  "target": "player",
  "prereqs": ["!4"],
  "loop": false,
  "utterance": "The green slime is spouting some nonsense.
},
```

Other Narrative Tools

Yarn: https://github.com/InfiniteAmmoInc/Yarn

Javascript port of Yarn: https://github.com/jhayley/bondage.js/

Ink (from Inkle): https://www.inklestudios.com/ink/

Javascript port of Ink: https://github.com/y-lohse/inkjs

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https://github.com/ikarth/ink_and_phaser

Scaling

Brief lecture about how to scale your entire game goes here (see other slides).

Problem Solving

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More Debugging Tips

Useful random debugging advice

1. When you find a problem, change something so that same problem can't happen again
    a. assert()
    b. Keep a debugging notebook
2. Make debug tools
    a. Quicker feedback is better
    b. Display values live if possible
3. Only make one change at a time and then test it
4. Just because you paused the game doesn't mean it's paused
    a. And stopping one update doesn't mean you stopped all of them
5. console.log() is slow
    a. Faster to print an array as a string than to individually print the contents

Useful random debugging advice

Walk through your code step by step, explaining to yourself what is supposed to happen

Useful random debugging advice

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AABB characters and slopes

An example of a real-world physics-and-debugging problem in a game with 2D physics like yours

https://twitter.com/eevee/status/1133248372624613376