Game Engines
CMPM 164, F2019

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Website: creativecoding.soe.ucsc.edu/courses/cmpm164
Slack: https://ucscccmpm164.slack.com
Class information

Class website:
https://creativecoding.soe.ucsc.edu/courses/cmpm164

Slack is the main form of class communication:
https://ucsccmpm164.slack.com

Our TA is Montana Fowler
They will lead the lab sections starting Friday
Lab Sessions

Lab:
Ming Ong Computer Center, Windows Lab – Merrill 103

Tuesdays 11am-12noon
Wednesdays 3pm-4pm
Thursdays 1pm-2pm

Lab website:
https://its.ucsc.edu/computer-labs/descriptions/mingong.html
Discussion

- What did you watch?
- What conference was it from?
- What did you learn that you didn’t know before?
- What terms or topics were you not familiar with or were confusing?
- Is there something you saw that you would like to learn how to implement?
Game Engines

- Why are there different game engines?
- Why use an existing one rather than creating your own?
- What is difficult about creating an engine?
- What design decisions do you have to make?
Game Engines

**Coordination** between various hardware components and software processes:

- Communicating state
- Sharing resources
- Passing data
- Organizing and ordering information
- Prioritizing actions
- Responding to inputs
- Synchronizing outputs
Game Engines

Which components/processes need to coordinate with each other?
How do they communicate to each other?
Is that the best way for them to communicate?
Is it the only way these components can be choreographed and linked together?
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Different temporal granularities:

- 60fps for graphics output
- 120fps for physics simulations
- 44,100hz for audio processing
- AI bots that only make decisions once they have reached a particular objective
- Characters that move only in response to user input, etc.

If all goes well, we have a seamless illusion of time
Game Engines

The Game Loop

- In an early arcade game like Pong or Space Invaders?

- In a contemporary multiplayer game like Fortnite?

(in class exercise)
Game Engines

Pong:

```java
while (true) {
    readPlayerDevices();
    movePaddles();
    moveBall();
    collideAndBounceBall();
    if (ballHitsSide(LEFT)) {
        incrementScore(RIGHT); resetBall();
    } else if (ballHitsSide(RIGHT)) {
        incrementScore(LEFT); resetBall();
    }
    render();
}
```
For Wednesday

- Keep going through Unreal learning paths, keep notes on anything that you don’t understand completely.

- Homework 2 will be introduced on Wednesday.