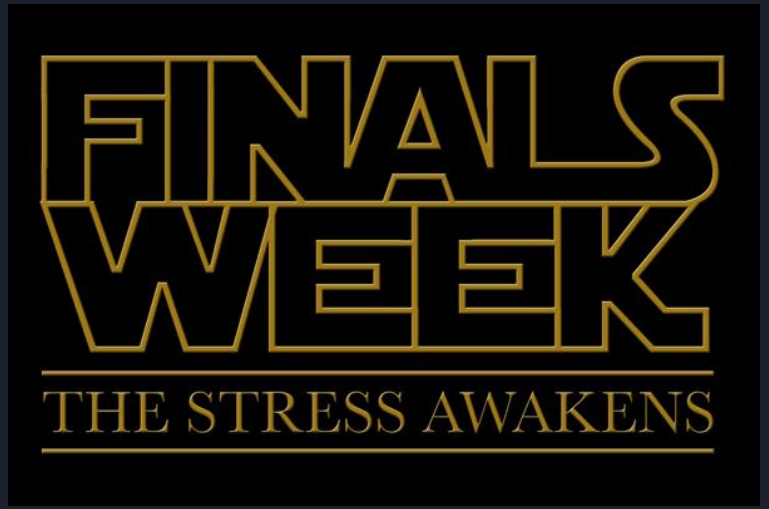
CSE 190 Discussion 8

Final Project: Social VR

Agenda

- Final Project Review
- VR Experience
- Extra Credit
- Presentations and Demo
- RPC Network Setup
- Project Examples



Final Project Recap

Final Project Recap

- Final Project is Due Tuesday of Finals Week
  - June 11th at 3:00pm
- Some of the features you need to include:
  - Dual user VR application
  - Two users need to work together on something
  - Create at least one model on your own
  - Per-pixel shading

Final Project Recap

- In addition to the application also need to create a website/blog with at least two posts and create a video
- Report/Blog Posts Due:
  - #1 - TODAY by 11:59pm
  - #2 - Monday of Finals Week (June 10th by 11:59pm)
- Video Due:
  - Monday of Finals Week (June 10th by 11:59pm)

Report #1

- DUE TODAY!
  - Submit your site/blog information through google form:
  - https://forms.gle/WXTWyyDJbRgisjSu5
- Needs to contain (at a minimum)
  - The name of your project (You need to come up with one)
  - The names of your team members
  - A short description of the project
  - One or more screenshots of your application in its current state

Report #2

- The second post needs to contain (at a minimum)
  - Progress you made
  - Updates on any changes made to the team or team name
  - Post another screenshot
- Can use whatever site you wish
  - Just make it the same for both posts
- Feel free to add more entries beyond the required two

Video

- Each team needs to record a video (up to 3 min long)
- This will be shown during the first hour grading during the final
- Need to use youtube
  - We will be creating a playlist for you to add your videos to
- Videos are due by June 11th at 11:59pm

VR Experience

VR Experience

- Usability determines a big part of the experience
- Make controls fairly intuitive
  - Should be simple enough that anyone with decent amount of VR experience can easily figure it out
- How original/unique is your application?
- Resources of guidelines toward designing a good VR experience

Extra Credit

Extra Credit

- There is a list of hackathon-style awards for teams with outstanding apps
- They also serve as a good guideline for the features we encourage everyone to take care of in your design
- The winners be announced on Piazza the day after grading

Presentation & Demo

Presentations

- Agenda for Tuesday, June 11th:
  - 3pm - 4pm: Screening of videos made by each team (CSE 1242)
  - 4pm - 5pm: Group A science-fair style demos in the VR Lab
  - 5pm - 6pm: Group B science-fair style demos in the VR Lab
- Graders will all be trying out your application during demos
  - Be sure to practice demoing
  - Grades will not be decided on the spot
- Other students/guests may come to the demo session
- Try out people's projects from the other group as well!

Good Presentation Tips

1. Make it short and sweet
2. Have a clear idea/problem/target to solve/do
3. Don’t make them watch you type (or any other misleading actions)
4. Practice in the venue before doing the actual presentation
5. Have a backup machine/connection plan
6. Never troubleshoot in real time

Give a good demo of your application

- A good/bad demo experience can sometimes boost/dampen the user's impression when trying out your application
- Note that your grade on the "subjective" aspects can depend on your demo
- Some other students/faculty who come to our final demos might try out your application as well
- Some slides made by the VR Club might be helpful for you to help prepare for a good pitch during the demo

RPC Network Setup

RPC Network Setup

- RPC Example on the Project page (in Tips section)
  - Has been updated as of 5/30
  - Shows sending a glm vec3 and quat through RPC
- Note: May need to re-compile the sample base

RPC Network Architecture

- Recommend running project with separate apps:
  - 1 server app:
    - Game logic lives here
    - Use multi threading here to keep the game logic separate from network requests
  - 2 client apps:
    - One for each user

RPC Network Setup - Multi-threading

- For the server, you will likely want to use multi-threading
- One thread is **Request Handling:**
  - Handles the RPC related requests
  - Run async because it might be unsure WHEN the client will send you a request
- Another thread is **Game Update Loop**
  - Have a fixed while loop that get executed every fixed amount of time (e.g. 30 milliseconds)
  - Run synchronous and it is crucial for the physics simulation which heavily depends on delta time.

RPC Network Setup - Multi-threading

```
void startServer() {
    rpc::server srv(PORT);
    srv.bind("move", ...); // Handlers
    // ... and other handlers
}

void updateLoop() {
    auto dt = std::chrono::milliseconds(30);
    while (!terminated) {
    // ... do data update
    // sleep at the end
    std::this_thread::sleep_for(dt);
    }
}
```

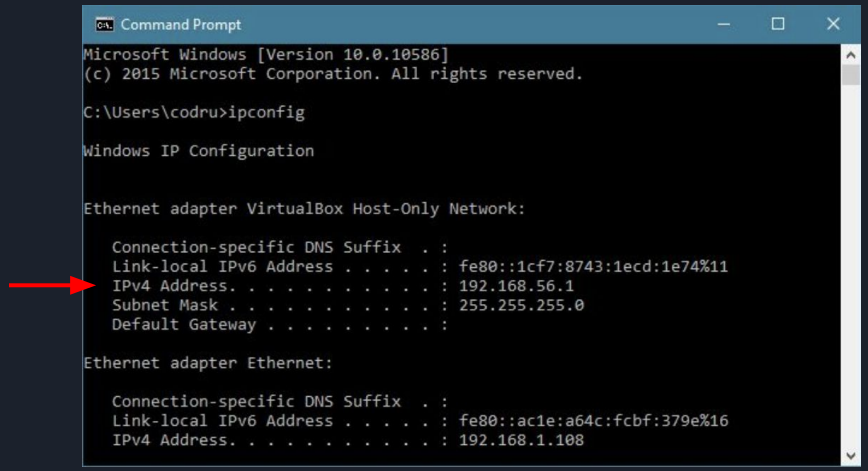
```
int main() {
    std::thread reqHandleThread(startServer);
    std::thread updateLoopThread(updateLoop);

    // Two threads are running simultaneously

    // When ending the program
    // synchronize threads:
    requestHandling.join();
    updateLoop.join();
}
```

Network Setup

- Note:
  - 127.0.0.1 is the localhost, use it to test on the same computer
  - Ports numbers < 1024 are reserved

RPC Network Setup

- To find your local IP:
  - Open up command prompt
  - Run ipconfig
  - Look for your IPv4 address



RPC Network Setup

- TCP vs UDP
  - In our case, local network with high bandwidth and low latency, TCP is good enough.
- Tick Rate:
  - Ideally you can get it up to 90 ticks per second
  - Might be helpful for debugging to start at a slower rate if you send too much data over the network

Network Architecture - World State

- Ideally, you will have a scene graph that would be updated over the network with deltas.
- But if you design it so the client doesn’t care about the structure of the scene graph, you can get away with sending over an array of world space matrices with model ids.

Project Examples

Project Examples

- Projects made by students from
  - Spring 2017
  - Spring 2018
- Should serve as inspiration
  - It does not mean all the projects received full credit

QUESTIONS?