

# Take a Virtual Hike

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# Project Vision

- Problem: The COVID-19 pandemic is mentally and emotionally stressful, and has limited opportunities for activities such as vacationing and connecting with nature
- Solution: to create an explorable, full-scale 3D virtual nature environment
  - Purpose of relaxation and stress relief in the stressful time of COVID-19
  - To indulge the user in a realistic nature environment
- Our application will require a web browser to run on an OS
- Our app is made for anyone whose life could use a bit of stress relief and relaxation
  - Whether those stresses are from COVID-19 or not
  - These people's lives will be improved just by playing our game
  - Will improve the life of anyone that plays, no matter what

# Conceptual Visual

- Procedurally generate an infinite 3D nature environment
  - Includes trees, grass, bushes, hills, mountains, etc.
  - All aspects will be placed randomly throughout the environment on startup
- Every aspect of our environment will be generated at a realistic 1:1 scale
  - Unlike games like Minecraft and No Man's Sky
- Our targeted clientele is anyone who needs or wants a break from the real world



# Requirements

## Functional

- The User shall be able to load into a virtual Environment upon startup
- The User shall be able to move around and explore the world freely
- The environment must include collision detection
- The User will have the ability to choose between a fly-through and walk-through mode
- The environment must be 1:1 scale with reality
- The Game must implement a soundscape for the environment (secondary requirement)

# Requirements (cont.)

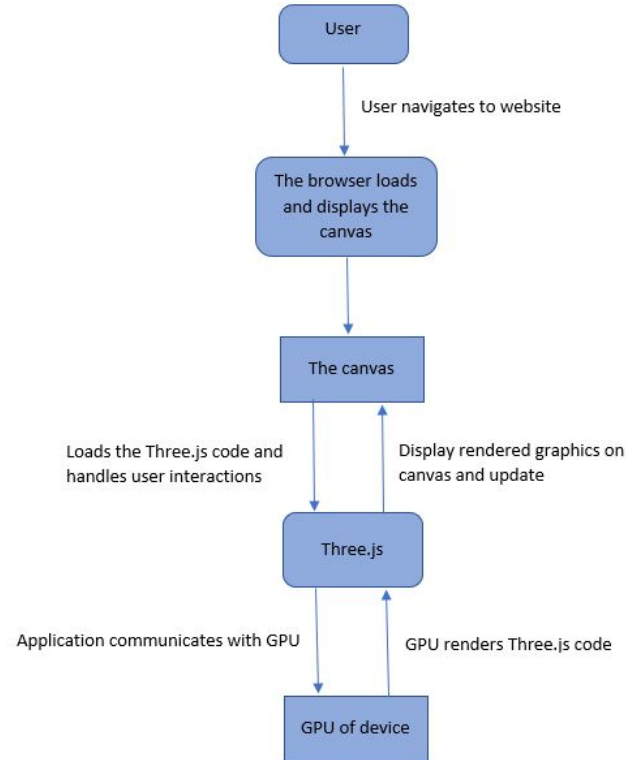
## Non-functional

- The rendering of the environment must be aesthetically pleasing
- The movement/usability while exploring environment must be simple and effective
- The application must run on a reasonably priced and attainable computer.
- The application must contain elements of procedural generation

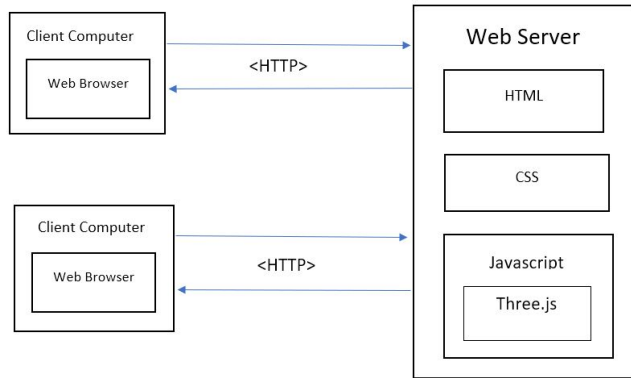
## Technical and/or other constraints

- The application must be compatible with all web browsers

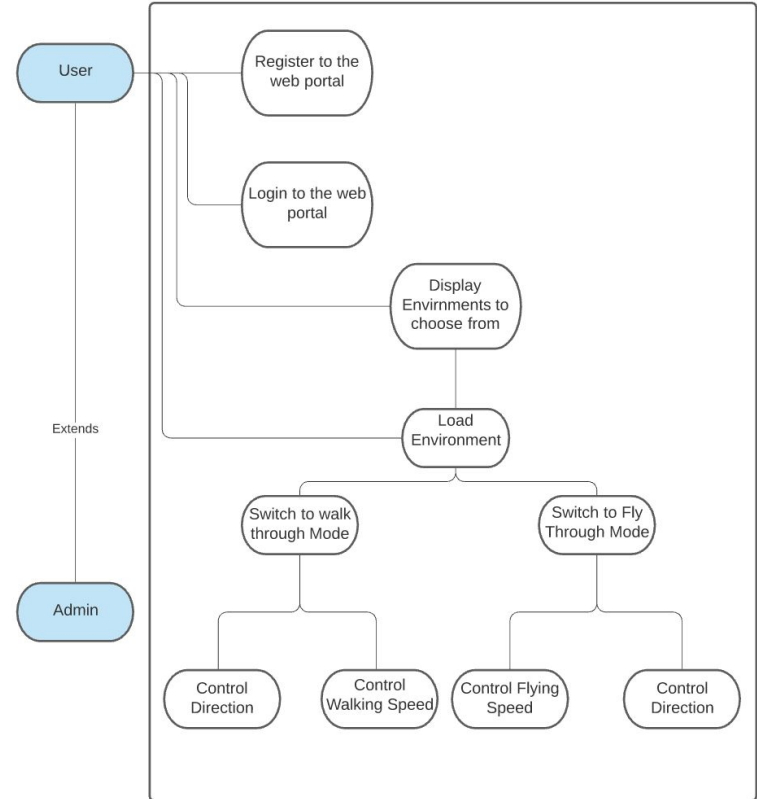
# Conceptual Design Diagram



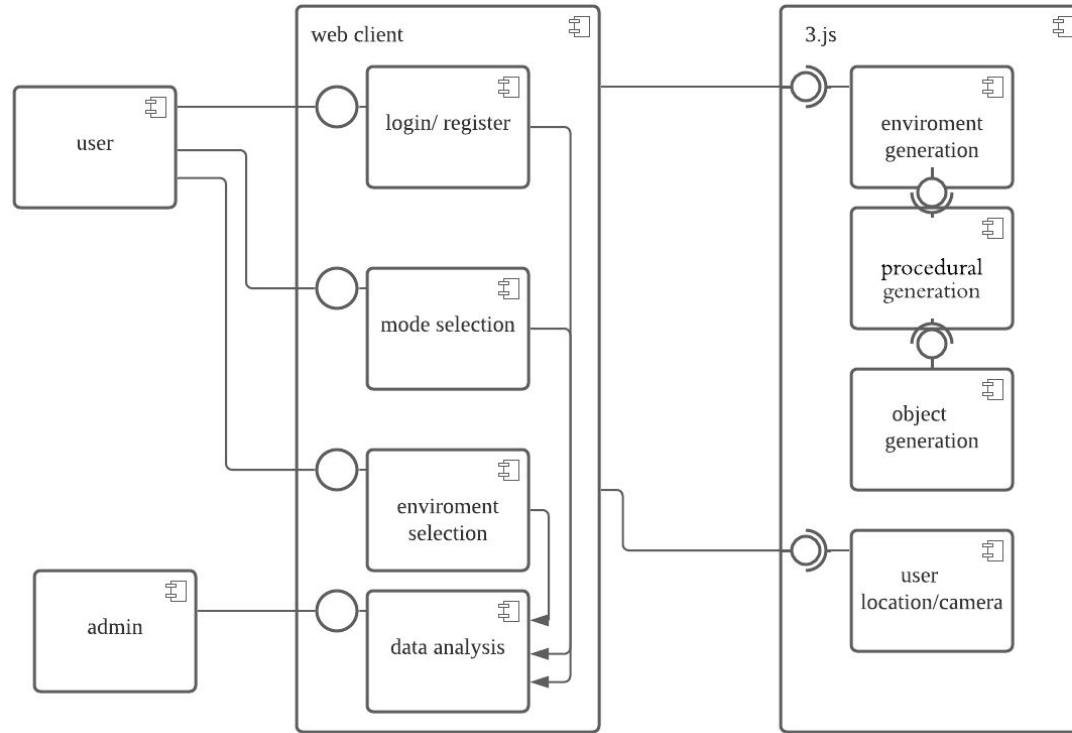
# System Design



- User connects to application using HTTP connection
- User will be asked to register/login
- User will choose and load the environment
- User will interact with the environment using walk through or fly through mode
- Admin will oversee user privileges



## Take a Virtual Hike

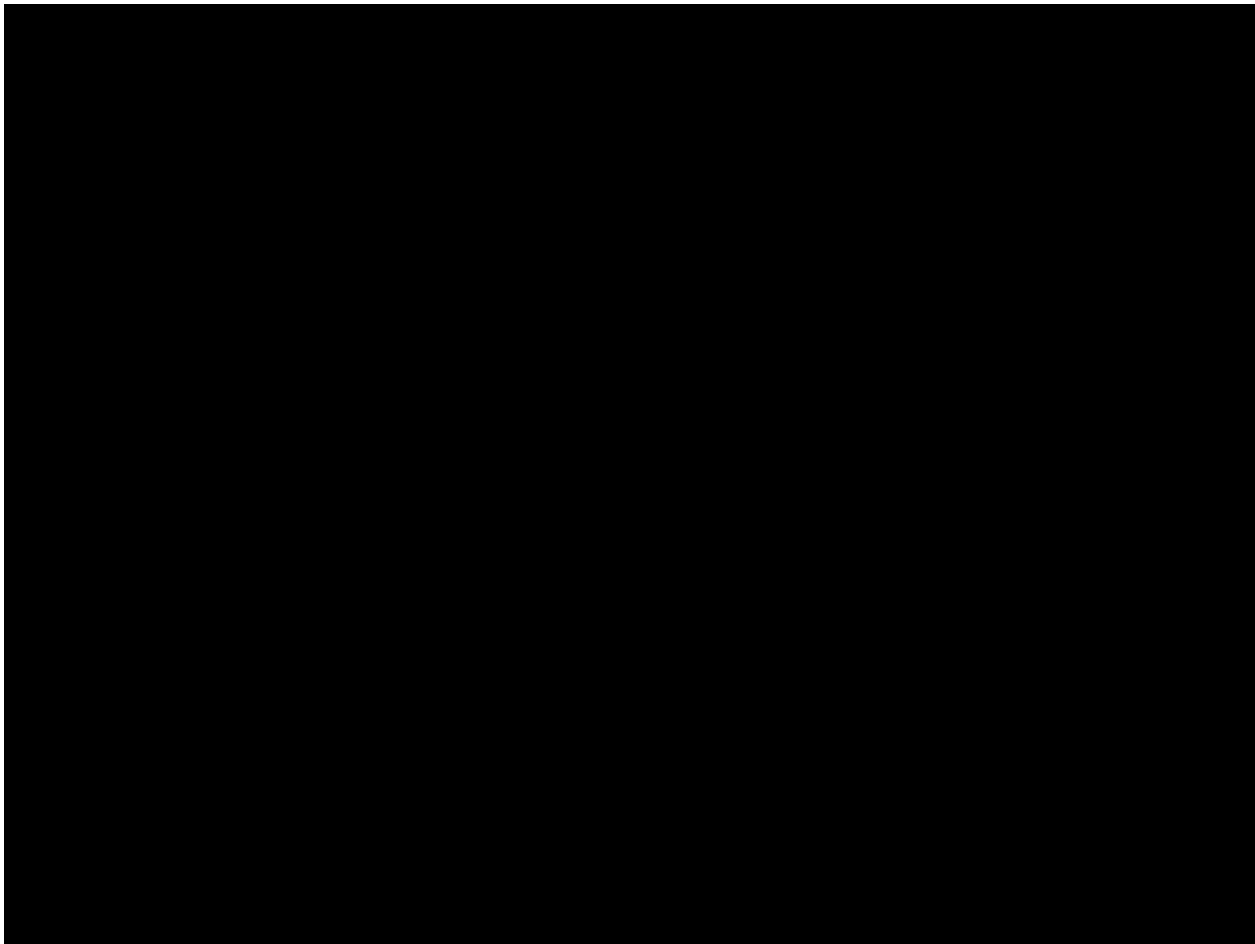




# Procedural Generation

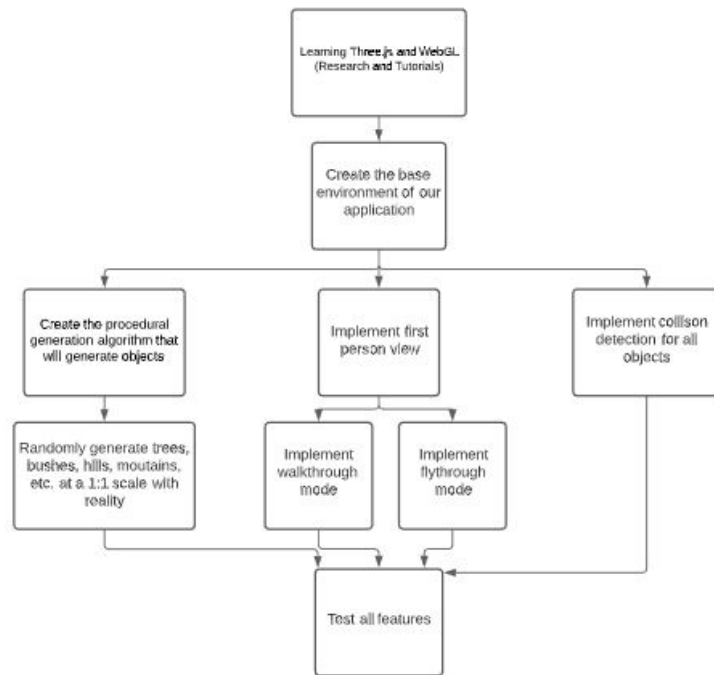
- Procedural generation allows for an endless continuous world and reduced memory requirement.
- Procedurally generated meshes, terrain, and texture
- Perlin noise for texture and terrain generation with different dimension

Demo application using  
Perlin noise



# Project Plan - Tasks

- Learn Three.js, WebGL and Procedural Generation
- Implement procedural generation algorithm to generate objects randomly
- Implement user controls
- Implement collision detection
- Test the application
- Create a soundscape for the world - Optional



# Project Plan - Risks & Mitigation

- Risks
  - Steep learning curve
  - Complexity in writing a procedural generation algorithm
  - The application renders the 3d environment with a consistent frame rate
- Mitigations
  - Use Watch and Monitor strategy for monitoring the project for risks and consequences and identifying any changes or shortcomings that can affect the impact of the risk

# Project Plan - Schedule

[illegible]

# Test Plan - Unit Testing

- Testing will be performed in isolation
- Components
  - First person movement controls
  - Procedural generation algorithm
  - Collision detection
  - Consistent framerate

# Test Plan - Integration Testing

- Bring all components and testing them together
- Testing the web server interface and the application server interface
- Expect to run into problems when integrating components

# Test Plan - Acceptance Testing

For a test to be accepted it must meet the following requirement:

- All previous test should run with no errors
- The key project requirement should be fully functional on all platforms
- The test should ensure that the product run multiple platform
- The test should ensure that the product is working in the way it has to



# Conclusion

- We were able to meet all of our deadlines
- The structure we set up at the beginning of the semester was helpful in making us more productive
- We are in a good place to meet our clients expectations next semester

# Next Semester

Next Semester, we plan to get a lot more hands on. This semester has been mostly about set up. We plan to achieve the following next semester:

- Have a working demo of the project
- Have a structured work flow of adding new features to the project
- Have a structured way of testing and improving the project code on GitLab
- Set up continuous integration for the project on GitLab
- Use an agile like framework for structuring our workflow



Thank you for listening!