

CST-320 Technical Report - HCI Project Documentation

Period (11/22/21-12/12/21)

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Project Topic: 8

Current task(s) (refer to the tasks listed in LoudCloud and/or instructor directions; detailed bullet list):

- Objective: Students will prepare a formal presentation of their HCI experience, including a demo.
- From this list, here is current task deliverables for this CLC assignment:
 - Complete the technical report and describe the final documentation for the Space Trooper project.
 - Describe the project objective, design, assets, scenes, interaction, and more.
 - Film and present a project demo in a loom video.

Activities performed this week (bullet points with explanations):

- In-class team activities: Demo Presentation
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- Completed a README file for the Space Trooper Project.
 - Included as a text file within the Space Trooper project submission and as a README file on GitHub.
 - GitHub Link: <https://github.com/drewesch/CST-320/blob/main/README.md>
- Completed the Documentation (see below)

Overall progress (describe new knowledge acquired, successes, ideas generated, etc.):

Space Trooper Project Documentation

- Objective: To imagine what it would be like for an astronaut to live and complete tasks in outer space for long periods of time.

Space Trooper Overview

- Unity Install Version: Unity 2021.1.20f1.
 - Required version to run the project: Any Unity 2021 Install
- Project Packages
 - XR Interaction Toolkit (version 1.0.0-pre.6)
 - XR Plugin Management (version 4.1.0+)
 - Oculus XR Plugin (version 1.10.0+)
 - Version Control (version 1.13.5+)
 - TextMesh Pro (version 3.0.6+)
 - Post Processing (version 3.1.1)
- Types of Project Assets:
 - 3D Objects
 - Scripts

- Sprites
- Materials
- Particle Effects
- Lighting
- Sounds
 - Music
 - Sound Effects
- Animations
 - Projectiles
 - Lerp
- UI
 - Floating Text
 - Menus
 - Text
 - Buttons
 - Images
 - Panels
 - Scoreboards (Points, Timers, etc.)
- Project Design Layout
 - General Assets
 - Space Skybox (Ryan)
 - Allows the user to experience the concept of moving and orbiting in space.
 - Music Files (Ryan, Andrew)
 - Ambient Space Music
 - Acts as the background music in all scenes.
 - Epic Space Game Music
 - Unique music files for the Fire Extinguisher Obstacle Course scene and Space Invaders scene.
 - Loading Screens (Andrew)
 - Loading new scenes first leads to a custom-designed loading screen
 - Includes the space skybox, a loading screen sprite, and an astronaut icon
 - The astronaut icon bounces around the loading screen sprite while the loading bar progresses.
 - Navigation Menu (Andrew)
 - Acts as an interactable game menu that pauses the current game and loads a panel with multiple buttons.
 - Interacts with the OVR Pointer object.
 - Three Navigation Menu Options:
 1. Return to Game: Closes the menu and unpauses the game
 2. Go to Space Station: Returns to Space Station scene.
 3. Quit Application: Exits the application and loads to the Oculus Start menu.
 - Intro Scene (Andrew)
 - When users load the application, it leads them to a scene with a simple environment and 3D Rocket Ship
 - The rocket ship object launches off the ground after a few seconds
 - Includes a smoke and explosion particle effect upon rocket lift-off.
 - Epic rocket launch sound leads the rocket into the atmosphere, and changes view once it reaches space

- Switches the scene to a rocket ship orbiting an HD Realistic Earth and Moon in Space
 - Orbit simulation is based on real orbit Physics motion.
 - After orbiting for a short amount of time, it shifts the orbit view towards the title screen and starts loading the Space Station scene.
- Space Station (Andrew and Diego)
 - After the intro scene finishes, it leads to a realistic space station designed like a hallway
 - It acts as the hub to other Space Trooper game scenes.
 - Users navigate to new scenes using futuristic doors
 - Doors slide open and activate a blue lighting effect based on a door motion sensor.
 - Each door has text floating above it that describes which scene the door leads to.
 - Includes Hexagonal Windows that give a view of the Earth and Moon in space and ceiling lights objects with hallway light effect.
 - Users move around the space station using the Oculus Touch controllers:
 - Left Joycon: Move player
 - Right Joycon: Rotate player
 - Start Menu Button: Navigation
- Space Kitchen (Diego)
 - Introduces the player to a simple kitchen scene with a stove, frying pan, pancake, and a plate.
 - The stove has a flame particle effect that interacts with the frying pan.
 - The frying pan floats in space and is the only object that can cook the pancake.
 - The pancake interacts with the frying pan by lerping to multiple “cook states” over time.
 - Also includes a loopable sizzling sound
 - Users move in the Space Invaders scene using the Oculus Touch controllers:
 - Left Joycon: Move player
 - Right Joycon: Rotate player
 - Right Trigger Button: Grab an Object
 - Grabbable Objects: Pancake and Frying Pan
 - Start Menu Button: Navigation
- Fire Extinguisher Obstacle Course (Andrew)
 - The Fire Extinguisher Obstacle course is a randomly-generating, zero-gravity simulation that utilizes realistic fire extinguisher movement in multiple waves.
 - Utilizes zero-gravity VR movement, hoop objects, and a portal cube (as a game objective) in a repeatable system.
 - Movement is only possible by using the fire extinguisher. It pushes the player backwards based on the direction of the fire extinguisher object.
 - Fire Extinguisher Object
 - Fire Extinguisher Emission Effect
 - Unique control script that sends the player backwards in zero-gravity based on the rotation of the fire extinguisher.
 - Users must utilize the fire extinguisher to pass through a series of hoops.
 - Once all the hoops are passed through, a portal cube with a portal effect appears.
 - Grabbing the portal cube allows users to proceed to the next wave when all hoops have been passed through.
 - Users move around the obstacle course using the Oculus Touch controllers:
 - “A” Button: Activate Fire Extinguisher

- Right Trigger Button: Grab an Object
 - The only grabbable object in the scene is the Portal Cube.
 - Start Menu Button: Navigation
- Space Invaders (Ryan)
 - Space Invaders is a randomly-generating simulation that allows players to defend a spaceship against waves of incoming enemy spaceships.
 - It features a unique UI system to display the wave number, number of enemies remaining, and the hearts remaining.
 - User have 4 hearts (shown by the Custom Health UI) before the simulation ends and the scene resets
 - The scene features a couple of unique sound effects for the following interactions:
 - Shooting the cannon
 - Losing health
 - Destroying an enemy spaceship
 - Moving the player spaceship lerps the player to one of three “lane” positions.
 - Shooting the cannon towards incoming ships generates a unique particle effect that destroys enemy spaceships when it interacts with them.
 - Users move in the Space Invaders scene using the Oculus Touch controllers:
 - “X” Button: Shoot the Cannon
 - “B” Button: Move Spaceship Left
 - “A” Button: Move Spaceship Right
 - Start Menu Button: Navigation

Issues that need to be resolved (bullet list):

- N/A
- The project is complete!

Next steps (how will you mitigate the issues listed above; bullet list):

- Submit the final project to Isac Artzi.

Other comments:

- GitHub Link: <https://github.com/drewesch/CST-320>
 - Our Unity Scripts are located under /Scripts/Topic-8
- Demo Video Link: <https://www.loom.com/share/989a0b55662a4fed9ec819b9341064b1>

Project Sources

Object Sources (all from Unity Asset Store):

- Oculus Integration Assets:
<https://assetstore.unity.com/packages/tools/integration/oculus-integration-82022>
- Unity Standard Assets:
<https://assetstore.unity.com/packages/essentials/asset-packs/standard-assets-for-unity-2018-4-32351>

- Rocket Launch Asset (AurynSky):
<https://assetstore.unity.com/packages/3d/props/weapons/rockets-missiles-bombs-cartoon-low-poly-pack-73141>
- City Bar Shops and Offices Demo:
<https://assetstore.unity.com/packages/3d/environments/city-bars-shops-and-offices-demo-195333>
- Futuristic Security Door:
<https://assetstore.unity.com/packages/3d/props/interior/futuristic-security-door-182385>
- Earth:
<https://assetstore.unity.com/packages/3d/environments/sci-fi/planet-earth-free-23399>
- Free Spaceship Assets:
<https://assetstore.unity.com/packages/3d/free-space-ships-37562>

Music/SFX Sources (all from Creative Commons):

- Space Ambiance Music: <http://jamen.do/t/298870>
- Epic Space Music: <http://jamen.do/t/1889411>
- Epic Space Music 2: <http://jamen.do/t/1867609>
- Space Cannon Sound: <https://youtu.be/XElgqFIW2T8>

Coding Sources (Tutorials):

- Lerp
<https://gamedevbeginner.com/the-right-way-to-lerp-in-unity-with-examples/>
- Oculus Pointer
<https://www.youtube.com/watch?v=8fT478uopco>