

Programming Assignment 1

Treasure Hunt VR

Virtual Reality
Grade Percentage: 5%
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1 Objective

This programming assignment introduces basic concepts of Virtual Reality (VR) development. Through the assignment, the student will learn basic tools to program and test VR projects.

2 Background

2.1 Navigation, Exploration, and Decision-Making

VR has three general, sometimes overlapping, types of tasks: navigation, exploration, and decision-making. Navigation involves the movement from a point A to a point B inside the virtual space. Exploration typically involves observing the surroundings from a given point C without moving. Decision-making involves generating a choice from the information available in the environment.

3 Problem Specification

In this assignment, students will explore and navigate a 3D environment. This 3D environment should be populated, at the minimum, with a floor to walk over and gray boxes representing obstacles in the world. The user will put on the VR headset and visualize this 3D environment from a first-person perspective. Once inside the environment, the user will use the joystick controllers of the headset to move the position of the 3D camera (emulating the action of moving in the environment). The user should not be allowed to walk through the obstacles.

Additionally, you will create a script that will select three random locations in the 3D environment to represent treasures. The user will traverse the 3D environment to search and collect these treasures. At the minimum, these treasure should be represented with 3D red spheres. The treasures should be collected by simply walking through them. Given this, the location of the treasures should be generated so that it is reachable by walking in the VR space. Once collected, the treasures should disappear from the 3D environment. When all treasures are collected, the experience will end.

3.1 Extra Credit

You will earn cumulative extra credit by completing any of the following tasks. If the extra credit earned makes the grade of the assignment go over a 100, it can be transferred to future assignments:

- **Treasure Interaction:** Instead of merely walking through the treasures to collect them, students can use the headset's controllers to click / grab them.
- **User Interface:** Implement a basic 3D User Interface to interact with the application. The User Interface will be used to: (1) show the time the treasure hunt has taken, (2) restart the experience once the treasure hunt is completed, and (3) convey the user that all the treasures have been found.
- **Set Dressing:** Instead of showing a basic 3D environment with gray boxes and spheres representing treasures, dress the environment in a way that tell a cohesive and

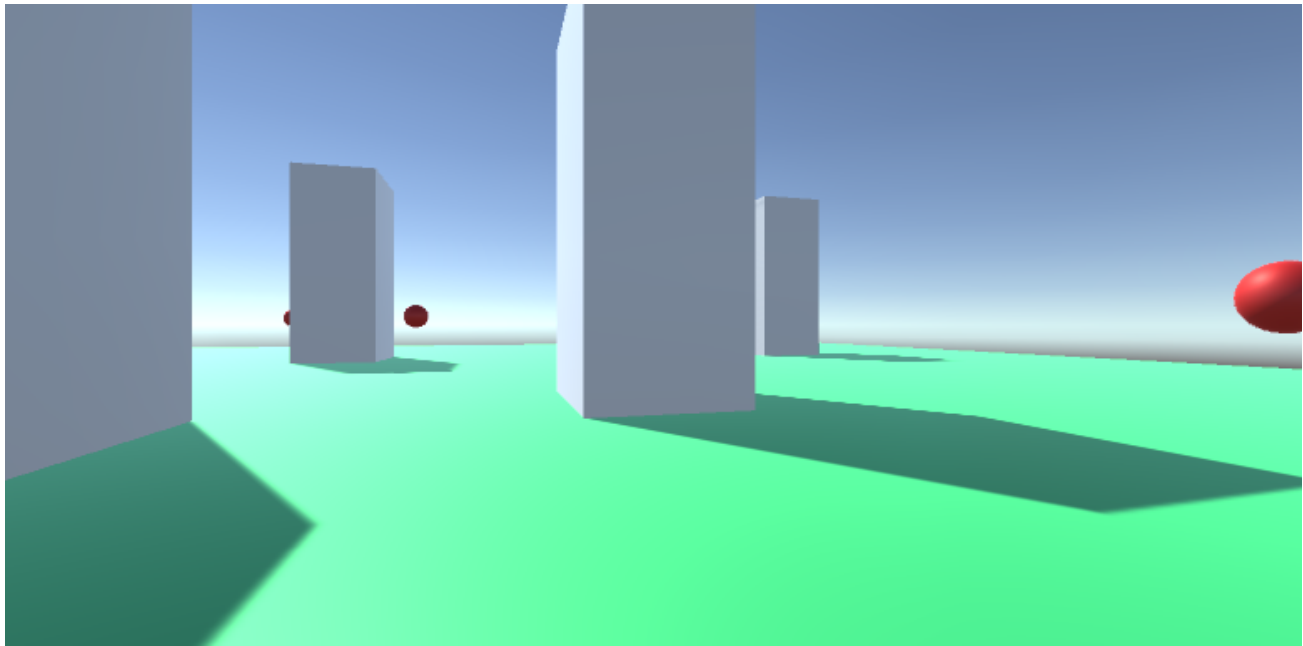


Figure 1: Sample first-person view of user exploring a 3D environment with obstacles and treasures.

interesting story. For instance, you could be in a forest where the obstacles are trees and the treasures are acorns that you are collecting in preparation for the winter.

4 Rubric

The rubric to evaluate the assignment is shown below:

Component	Percentage
Basic environment design	10%
Movement via controller	30%
Cannot walk through obstacles	10%
Treasure generation script	30%
Treasure collecting	20%
Treasure Interactions	15%
User Interface	15%
Set Dressing	20%
TOTAL	150%

5 Logistics

- The assignment will be done in pairs.
- Due date: Thursday February 9, 11:59 pm.

- The assignment must to be uploaded as a .zip file. The content of the .zip should be:
 1. A .txt file with a link of a Dropbox/OneDrive (or equivalent) folder containing all the files created by your game engine. The instructor should be able to export and open the folder into the corresponding game engine in his computer.
 2. A .mp4 video file of a screen recording of your VR headset while the application is in use. The recording should showcase all the functionalities of the developed application.
 3. A 1-page .pdf file describing your application. This can be done using text, diagrams or whatever other means you consider useful or necessary.
- The naming convention for the .zip file should be the first 3 letters of each team member's first name the plus the code PA1. For instance, if Gabriella and Troy team up, their .zip file should be named *GabTroPA1.zip*.