Design Document

# Game Concept

I am planning on following the concept of the game Portal by Valve. It will be a first person game where the player will have to use a portal device to create a start portal, and an end portal. The player can move back and forth between these portals at will, but can only have two portals at a time.

The player will use this portal device to solve puzzles that would otherwise be unsolvable without the device. Once the player completes a puzzle, they will be prompted to go through a large portal at the end of the room, which will load the next puzzle/level.

Once the player completes all of the puzzles, they win the game.

# Player Controls

|  |  |  |
| --- | --- | --- |
| **Action** | **Key(s)** | **Description** |
| Movement | W, A, S, D | W: Forward  A: Strafe Left  S: Backwards  D: Strafe Right |
| Create Portal 1 | Left Click | Shoots a portal onto the surface you are looking at. |
| Create Portal 2 | Right Click | Shoots a portal onto the surface you are looking at. |
| Jump | Space Bar | Makes the player jump into the air. |
| Hold Object | E | Look at the object and press E when within range. |
| Close All Portals | R | Closes all portals that are currently open. |

# Target Audience

My target audience will be individuals of any age who think logically and like to solve puzzles.

# Task Breakdown and Time Estimates

1. Create or get a player model (If create: 20 minutes, if get: 5 minutes)
2. Make the player move (20 minutes)
3. Make the player jump (20 minutes)
4. Camera movement (35 minutes)
   1. Clamp camera movement up/down, but not left and right. (30 minutes)
   2. The player model will always face the direction that the camera is looking in (5 minutes)
5. Create or get a portal gun model (If create: 10 minutes, if get: 5 minutes)
6. Create or get a portal gun projectile model(If create: 10 minutes, if get: 5 minutes)
7. Create or get a surface that portals **can** be placed on. (2 minutes)
   1. Tag it “PortalSurface”
8. Create or get a surface that portals **cannot** be placed on. (2 minutes)
   1. Tag it “NonPortalSurface”
9. Make the portal gun shoot the portal gun projectile (20 minutes)
   1. Always moves forward
   2. Left click for blue projectile.
   3. Right click for orange projectile.
10. Create or get two portal prefabs (30 minutes)
    1. Colored differently
    2. Has a camera facing outwards
    3. Tag one “BluePortal” and the other “OrangePortal”
11. Make the portal gun projectile instantiate a portal prefab on a surface on contact (30 minutes)
    1. Keep a reference to both objects once instantiated
    2. Use RaycastHit.normal to determine the direction the portal prefab will face
    3. Ensure portal has enough space to be placed (use the portal surface object extents and do a calculation)
       1. Do a small overlap cube to check what object we are on
       2. If there is not enough space then disallow placement
12. Make a PortalController script (1 minute)
    1. Tag it “PortalController”
13. Portal Controller keeps a reference to both portals at all times (5 minutes)
    1. Will have a public method that will set the reference for the portals
14. Portal Controller will destroy a portal if another one of that type exists (10 minutes)
15. Portal Controller will ensure the cameras that are on the portals will render their view to the other portal’s surface. (30 minutes)
16. Create a mask to ensure the square render surface for the portals does not have its corners showing (20 minutes)
    1. Ensure portals don’t create a “Mirror” effect when they face each other
       1. If they do then layer the render texture object as “PortalRenderer”  
          and disallow the portal’s camera from seeing it.
       2. Ensure there is a “empty” texture behind the render texture to show that the portal is closed
17. When the player walks into a portal, it will move them to the other portal (30 minutes)
    1. Ensure that you don’t accidentally go through the second portal immediately after going through the first one.
    2. Make the velocity direction change depending on the angle of the portal
18. Create a cube that will be used on detectors (5 minutes)
19. Create the detectors that can only be triggered by the cubes (20 minutes)
20. Ensure the player can grab the cubes (1 hour)
    1. When press E on cube, change the cube’s parent to the camera so that it follows you
    2. When you press E a second time, it changes the parent back to what it was before
    3. Ensure there is a minimum distance to pick the object up from.
21. Create a main menu (~1 hour)
    1. Play
       1. Load Puzzle 1
    2. Puzzle Selection
       1. Display all levels as screenshots in a grid (5 minutes)
       2. Click on one to load the level (10 minutes)
    3. Options
       1. Music Slider (20 minutes)
       2. Sfx Slider (20 minutes)
       3. Back button (1 minute)
    4. Controls
       1. Display controls (10 minutes)
       2. Back button (1 minute)
    5. Quit
       1. Exit the game (1 minute)
22. Create a pause menu (Time Scale 0) (~1 hour)
    1. Resume (1 minute)
       1. Close the pause menu
       2. Make Time.TimeScale 1
    2. Options
       1. Music Slider (20 minutes)
       2. Sfx Slider (20 minutes)
       3. Back button (1 minute)
    3. Exit to Menu (1 hour)
       1. If the level was manually selected from the puzzle selection menu , don’t save
       2. If the level was naturally reached then have the puzzle number you’re on saved in player preferences
       3. Load the menu scene
23. Create a win screen. (20 minutes)
    1. Win message
    2. Finish
       1. Save final puzzle number
       2. Load Main Menu
24. Recreate some of the puzzles from Portal with Unity 3D primitives. (3+ hours)

# Tasks to be completed for Prototype

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