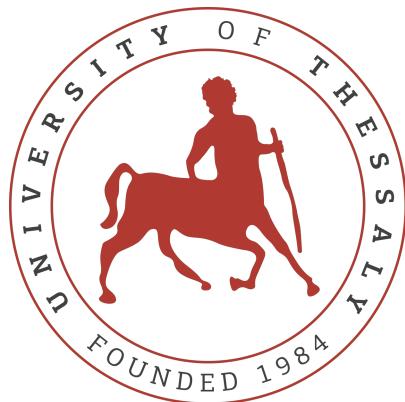


Definitely Not Portal Design Document

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1. General Game Information

1.1. Overview of Game Objectives - High Concept

Escape from a mysterious underground complex, using a portal gun which creates doorways-portals connecting two points in space, to solve complex physical puzzles by maneuvering objects and yourself through them.

1.2. Player's Role

The player is in control of chell. Chell is the main character of the game and has the appearance of a typical action character. The player's role is to guide her through the various puzzles helping her progress and eventually escaping to the surface.

1.3. Interaction Model

The player's basic interaction model is through the avatar-main character that can manipulate objects to press buttons and open closed gates or use the portals to reach in other ways unreachable areas.

1.4. Genre

Portal is a puzzle-platform game, with first person shooter elements making it also an action-adventure game, unlike most puzzle platform games which are side-scrollers. Puzzle platformers are characterized by their use of a platform game structure to drive a game whose challenge is derived primarily from puzzles. They normally feature a gimmick which is used throughout the entire game and as the level design becomes more complicated players are tasked with using that gimmick in different ways. In our case the gimmick is the portal.

1.5. Competition - Collaboration

Portal is a single player game with no competitive elements whatsoever and no collaboration mode. You are on your own and you can take as much time as you want to figure out the puzzles.

1.6. Camera

The player controls the character from a first-person perspective. The camera is free in every axis for the user to rotate using the mouse. Move the mouse left and right to turn left and right respectively. There's a maximum turning speed so that Chell doesn't spin erratically when the mouse is moved quickly. Move the mouse up and down to look up and down respectively. Looking is constrained between straight up and straight down to prevent flipping the camera upside-down.

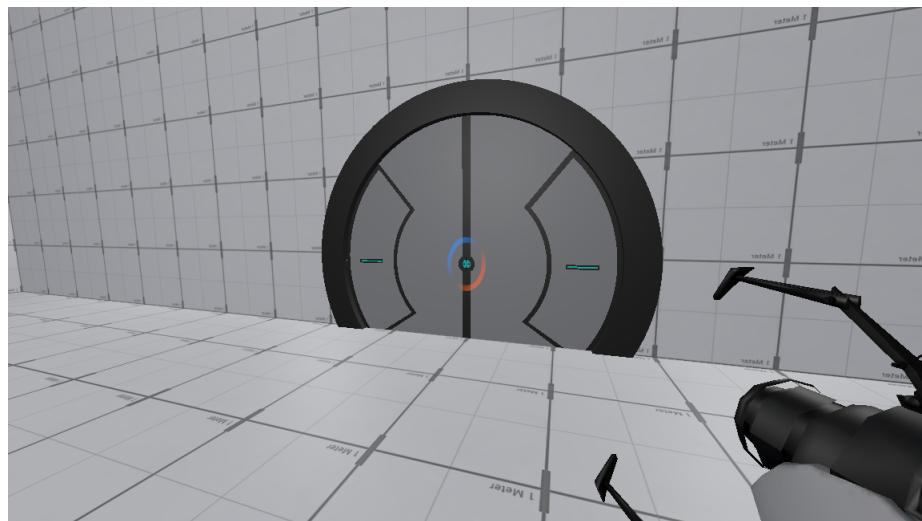


Figure 1: The Camera

1.7. Audience

This game's simplicity will attract kids to young adults. Its selling points will draw in hardcore gamers who appreciate and form cults over quirky gimmick games. Fans of the action puzzle or environment puzzle genres will find the game very accessible. The most prominent and compelling feature-core mechanic of our game is the portal mechanic. The unique portal mechanic challenges the player's thought process, making him think of new ways to navigate through space, and interact with game-objects, to tackle otherwise impossible challenges.

1.8. Hardware

The game is available on the PC platform, the minimum hardware requirements are low making it playable even on lower end machines with integrated graphics. Gamepads are supported but not necessary.

2. Gameplay

2.1. Portal Gun

The player controlling the protagonist uses the portal gun to open portals through space and move objects. The portal gun can create two distinct portal ends, orange and blue. The portals create a visual and physical connection between two different locations in three-dimensional space. Neither end is specifically an entrance or exit, all objects that travel through one portal will exit through the other. The portals create a visual and physical connection between two different locations in three-dimensional space.

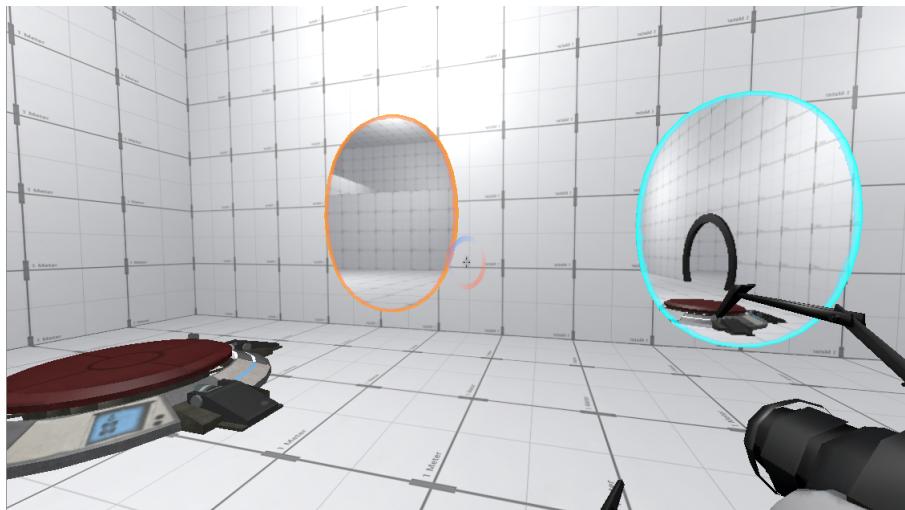


Figure 2: The Portals

2.2. The Challenge

Chell and all other objects in the game that can fit into the portal ends will pass through the portal. However, a portal shot cannot pass through an open portal; it will simply deactivate or create a new portal in an offset position. Creating a portal end instantly deactivates an existing portal end of the same color. Chell is sometimes provided with cubes that she can pick up and use to climb on or to hold down large buttons that open doors or activate mechanisms. The challenge for the player is to figure out how to move these objects to trigger the necessary mechanisms which will allow him to exit this room.

2.3. Game Tasks

When a player plays portal they spend time performing the following tasks in the approximate distribution.

- 10% – Exploring. This is the time players orient themselves with their surroundings and notice all the scene objects and creatures.
- 20% – Puzzle Solving (thought). This is the time the player is spending thinking about what to do with the given set of scene objects and the configuration of the room.
- 70% – Puzzle Solving (action). At this point the player knows how to solve the puzzle, but is in the process of acting out that solution. This part takes the longest because of the skill and timing needed with the portals to finish the game puzzles.

2.4. Difficulty

Although the game itself doesn't have any difficulty settings and thus doesn't allow the player to set the difficulty of the game, the levels of the game are designed to get progressively more difficult. Moreover as the player progresses, each level may possibly require that the player comes up with a new idea on how to tackle a problem that he has already revisited on the past level, or face entirely new challenges which require the use of new mechanics.

3. Game Characters

3.1. Chell

Chell is the main character of the game and has the appearance of a typical action character. She has three animations attached to her model. The Idle the Walking and the Jump animation. The model can't be seen as the game is played in first person perspective, but if you get close on the two portals the model sometimes appears within. Chell doesn't speak but the sound of her footsteps is audible.

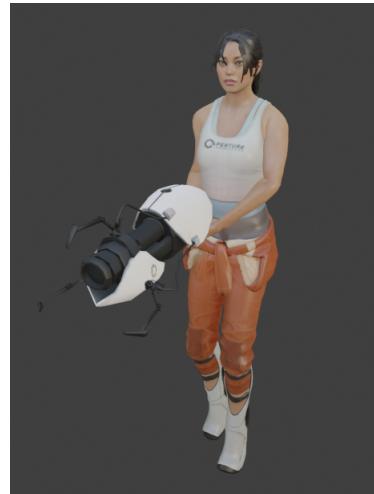


Figure 3: The Chell Model

In order to be able to fall from extreme heights, Chell is equipped with mechanized heel springs to prevent damage from falling.



Figure 4: The Mechanized Heel Springs

4. Game World - Story

4.1. Basic Setting

Portal takes place in an abandoned underground research facility responsible for the creation of the Portal Gun. The location of the complex is somewhere on Earth and the time period of the events occurring in the game is somewhere between the 20th and 21st century.

4.2. Physical Surroundings

The physical dimension of the game is 3D. The game world exudes the minimalism and austerity of a real life lab. The design of the surroundings allows the player to experiment and try multiple solutions to the puzzle. Although the initial condition of the room can be messy with cubes lying around in random positions, every condition that is required for the solution of each puzzle is visible to the player.



Figure 5: 3rd person perspective

4.3. Story

Chell wakes up in a room not knowing her whereabouts only to find a portal gun besides her. Abandoned and alone feeling like a prisoner, she tries to escape from this place and reach the surface although she doesn't know what lies outside.

5. Core Mechanics

5.1. Game Objects

5.1.1. Cube

A cube is a basic box of various designs. It can be moved in any direction by the avatar either by pushing it or by lifting it with the portal gun.

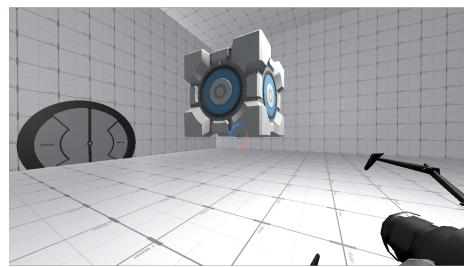


Figure 6: Holding Cube

Each cube collides and reacts with other gameobjects (e.g. other cubes) and walls.

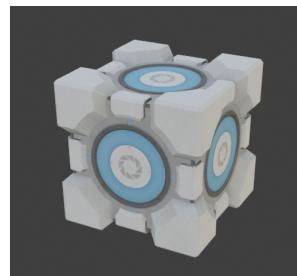


Figure 7: The Original Cube

They are mostly used to press and hold down buttons which trigger events, the player can also stand on them.



Figure 8: The Heart Cube

5.1.2. Button

This triggers something when pressed. The triggering event usually is opening a door. Chell can press buttons by simply walking on them or by putting cubes on top of them. Buttons can only appear on the floor of the levels and can never be on the walls or ceilings.

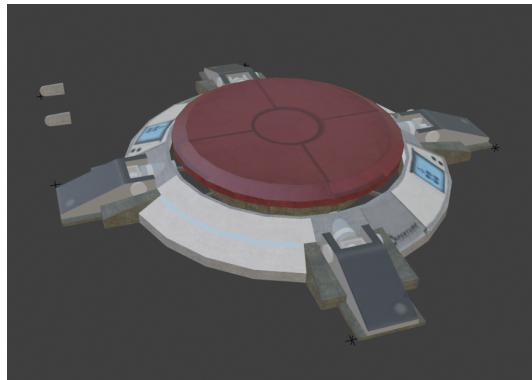


Figure 9: The Button

5.1.3. Door

Doors are the physical barrier between rooms. Once opened they grant access to the next level. In order for the door to be open something must exist on top of its respective button.

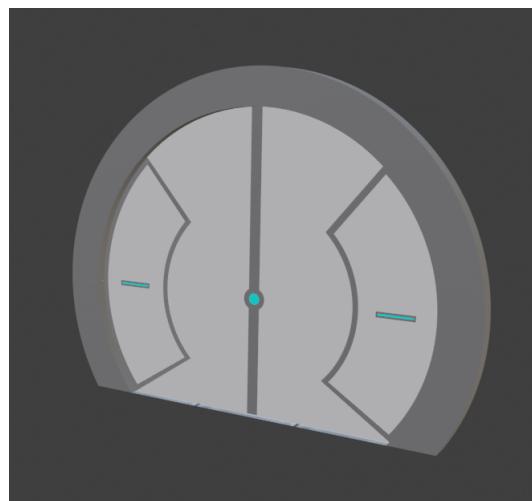


Figure 10: The Door

5.1.4. Portal Gun

The portal gun can either shoot portals or hold items. The left mouse click always spawns the blue portal replacing the previous blue if exists and the right mouse click spawns the orange portal. The keyboard button "E" is used for holding items with the portal gun. A visual target is displayed where the player is looking at all times to make it easy for the player to aim and judge distance. Portals are placed with their centers at the center of the mouse position upon the firing of the portal. If a given mouse position creates an invalid portal(e.g., on top of cubes) a noise will signal a fail portal and no portal will be created.

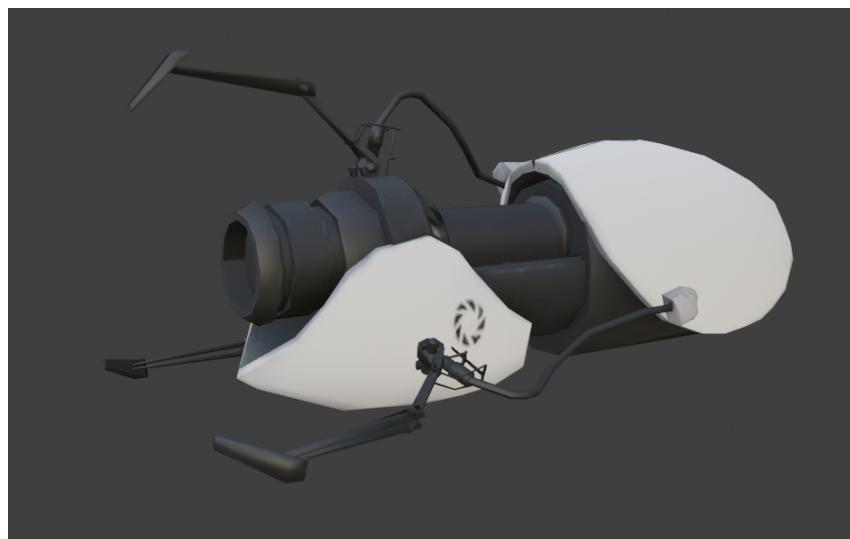


Figure 11: The Portal Gun

5.1.5. Portal

Portals break 3D space in a way so that it was as if there weren't a portal at all. Looking through a portal you can clearly see what it leads to. Objects and Chell can freely move through these portals. Orientation changes between portals are handled with respect to the portals' relative orientations. For example, entering while facing into the blue portal on a wall means that you will face out of the orange portal on another wall. Some practical uses of portals include:

- Climbing Ledges and Crossing Gaps - Make a portal in the ceiling above the ledge, then a portal in the floor below your feet. You'll fall in and land on the ledge.
- Moving Objects – Make a portal in the wall or ceiling where you want the object, then a portal below the object. It will fall in and fly out at the other end.

5.2. Physics

5.2.1. Momentum Redirection

An important aspect of the game's physics is momentum redirection. As moving objects pass through portals, they come through the exit portal at the same direction that the exit portal is facing and with the same speed with which they passed through the entrance portal. For example, a common maneuver is to jump down to a portal on the floor and emerge through a wall, flying over a gap or another obstacle. This allows the player to launch objects or the main character over great distances, both vertically and horizontally.

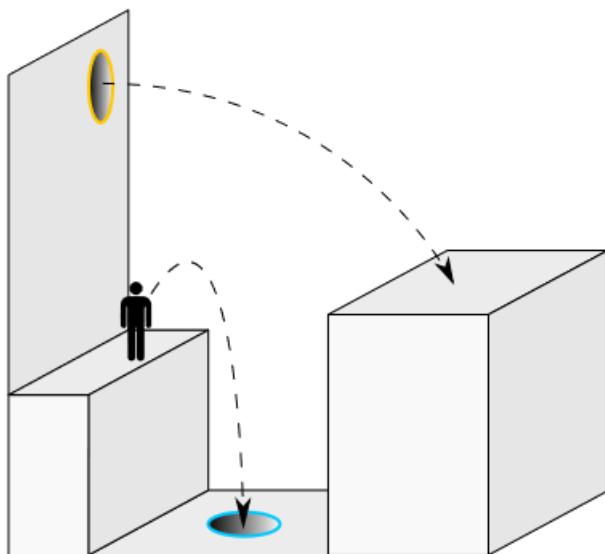


Figure 12: Momentum Redirection

5.2.2. General Physics

Simple Newtonian physics model. All objects have mass and velocity and are moved by forces. Cubes can be stacked. Sliding objects have friction. The gravity conditions are similar to Earth's.

5.3. Progression Mechanisms

The game progresses linearly from room to room. Once a room is solved the door to the next level opens. It is possible to bring objects from the solved room to the next unsolved room.

6. Levels

6.1. Tutorial Levels

The initial levels of the game are designed to be very simple so that the player can learn the basic mechanics of the game.

6.2. Level 1

When the player enters the room they see a cube, a button and a door. The player can push the button with their body in order to open the door but the door closes when the button is released. They are forced to move the cube, either by pushing it or with his portal gun, on top of the red button to keep the door opened in order to move to Level 2. No portal can be opened in this room.

6.3. Level 2

Once the player enters the second room he witnesses the same objects with the addition of the two portals, the blue and the orange one. The door and the cube are unreachable because the player has to climb a high wall to reach them. The player is forced to open a portal on the higher floor in order to reach the cube. Then they have to either push the object down to the lower floor or throw it in the portal in which he came or even move within the portal while holding the cube. After this they can trigger the button and return to the now open door in order to proceed to the next level.

6.4. Level 3

Demonstration chamber with the only purpose to show how the cube keeps the energy while free falling in one of the two portals thereby redirecting its momentum.



Figure 13: Tutorial Layout

6.5. Game Balancing

Since the player has the freedom to essentially teleport anywhere inside the bounds of the game world measures had to be taken in order for the game to have a balanced and challenging feel and not being overly easy. Thus some surfaces have been rendered useless for portal spawning. Our game doesn't include any RNG elements.

7. Controls - Movement

7.1. Keyboard



Figure 14: Keyboard Mapping

- WASD - Arrow Keys : Control Movement
- Mouse : Control Camera
- Left Click : Shoot Blue Portal
- Right Click : Shoot Orange Portal
- "E" : Pickup-Release Cube
- "Space" : Jump
- "Esc" : Start Menu
- "Shift" : Run

7.2. Controller



Figure 15: Controller Mapping

1. Run
2. Shoot Orange Portal
3. -
4. Pickup-Release Cube
5. -
6. Jump
7. Control Camera
8. Control Movement
9. Control Movement
10. Shoot Blue Portal
11. -
12. -
13. -
14. Start Menu