Computer Science 2016
Summative Proposal

Parallax

Computer Science ICS4U

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Intro

Parallax is a platformer puzzle game. The idea is that the map is pitch black. The character is a light source; this means you can only see a small area around you. Maps are much harder as you struggle to beat the levels without a clear understanding of the layout and what's coming up.

Game Physics

Parallax tries to mimic real world physics. The map is created by 64x64 pixel tiles. Each tile is defined as 1 meter, therefore the game is scaled as 1 meter / 64 pixels.

The world has gravity of 9.81 m/s^2 [down]

The player is ball with a radius of 0.875 m, with a light extending from its center that shines with a radius reaching 8m.
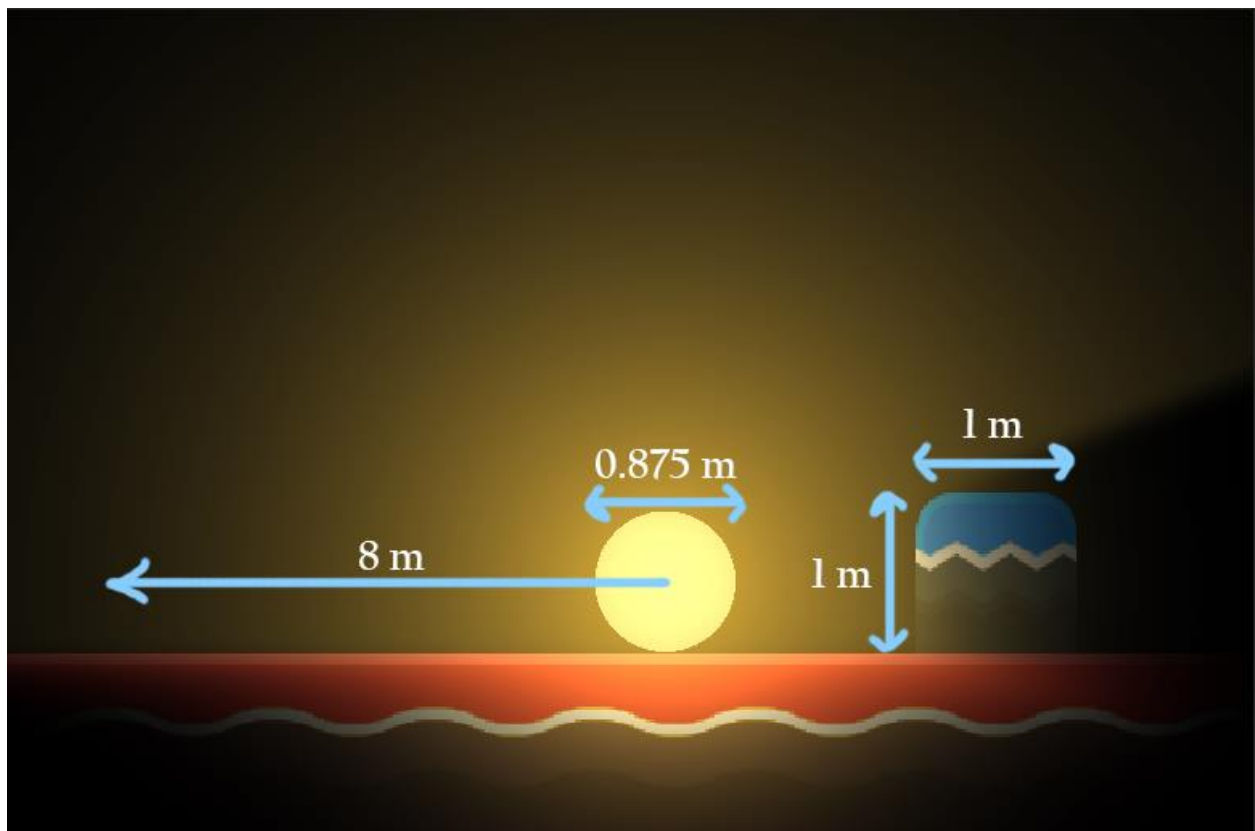
The lights in the game try to follow real world physics as well. The light radiates from the player. Any objects or platforms will cast a shadow, and the light cannot go through walls.

The player can jump a maximum of 2 blocks vertically.

Movement will feel "slippery". After pressing a movement key, the player will begin to accelerate from 0 m/s, up to a maximum of 4 m/s. If the player attempts to change directions while moving, the ball will not instantly change directions, but will begin to slow down until it reaches a velocity of 0 m/s, then begin accelerating in the opposite direction. Similarly, when the player lets go of the movement button, the ball will slow down until it reaches rest, rather than stopping instantly.

Collisions will work as expected, if the circle is in contact with any platform or object, it is in contact and will not be able to move in that direction. The player will also be able to roll on any platforms with a slope that is not horizontal.
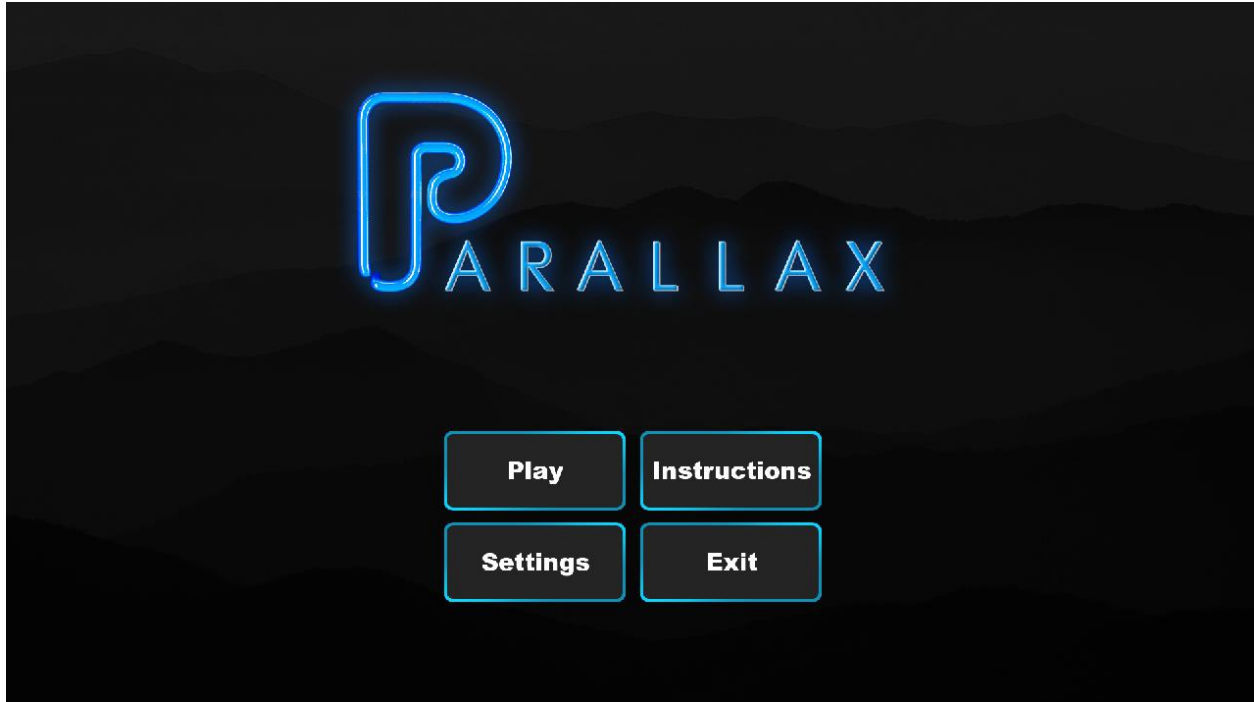
Game States

Splash Screen:

A static image at the beginning of the game saying "Ra2ed Studios", is shown for 3 seconds before the main menu pops up.

Main menu:

Main menu will have the game logo, and under it will have 4 buttons for Play, Instructions, Settings, and Exit.

(Rough design, not final)

Button Design:

Unclicked   Hovered   Clicked

Instructions:

The instructions page will have a brief summary of the game, and describe how the game mechanics work. It will have some visuals to help the user understand how the game works.
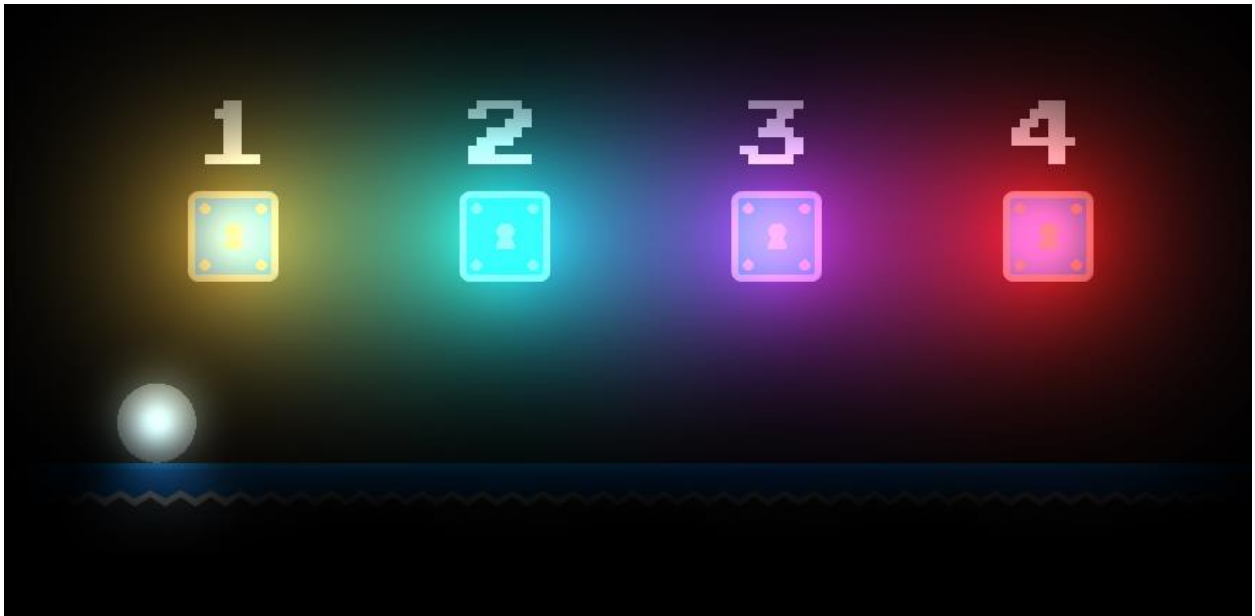
Settings:

This page will have options to change display settings (full screen, 1080p, 720p) and the key bindings.

Level Select: pressing the play button will take you into the level select screen. This screen will place the player (ball) into the world. There will a block for each level, with the level number on it. If the level is unlocked, the block will be lit up. To get into a level, you must jump and collide with the corresponding block.

Only Level 1 unlocked

Levels (1 – 4) unlocked

Pause Menu:

Pressing the escape key will pause the game. On the screen, there will be a button to return to game, a button to return to main menu, a button to go to settings and a button to exit the game completely. Pressing return to game button will resume the game where it was paused.

Game Mechanics

Whenever a new concept is introduced, there will be text on the screen explaining the new mechanic to the player.

Checkpoints: The player will begin the level with full light energy. As time progresses, the player's light will get dimmer. The checkpoints will be glowing orbs. Collecting the orb will restore your player to full energy, and change your color to the color of the orb. If your energy reaches 0, then you will die. (Introduced in level 3)

Player Death: when the player dies, their position will reset to the last checkpoint, and their light will go back to maximum brightness.

Winning: each level has a flag at the end of the map. Reaching the flag will end the level, and you will be sent back to the level select screen, and the next level will be unlocked.

Obstacles

Slopes: standing on a slope will make it harder to move up or cause you to roll down

Spikes: colliding with a spike will kill you immediately (all angles and sides)

Trampoline: Jumping onto a trampoline will cause you to shoot up into the air higher than you can jump (usually to reach a much higher platform)

Moving platforms: moving platforms will move in a predetermined path. The player will be able to use the moving platform to access areas of the map that are otherwise inaccessible.

Doors: doors will be closed. You will have to find a switch somewhere on the map in order to open the door.

Levels

Level 1: This level serves as a tutorial. There will be text on screen which will teach the basic movements to the player. There will be a few easy jumps to introduce the player to the jumping mechanics. It will also show the player how the spikes work. This will be an easy and short level.

Level 2: the second level will take all the concepts introduced in level 1 and apply them. There will be no new concepts introduced. This level will be more difficult than the first level.

Level 3: this level will introduce the player to checkpoints and orbs. It will have some text on the screen explaining to the player how the dimming mechanics work. The player will have to collect a checkpoint orb which will be easy to reach. After that, the level will have elements from the first few levels, with the introduction of a few very easy to see orbs.

Level 4: this level will expand on the concept of orbs and checkpoints. It will implement them into the level design, in addition to more difficult jumps and spike placements.

Level 5: This level will have more difficult applications of the checkpoints. In this level, the checkpoints will be hidden and harder to see, so the player will have to go looking for them instead of them being easily accessible. This will mean that the player will have to rush in this level to find the orbs quickly before dying.

Level 6: this level will introduce the player to the trampoline. It will have an introduction stage where text on the screen will have instructions, and a few easy jumps to introduce the player to the concept. After that, the level will have elements similar to level 5, but add a few trampolines.

Level 7: this level will not introduce any new concepts. It will be a combination of everything learned in the game so far. This level will faster paced and will have more trampolines and harder jumps.

Level 8: this level will be the first to introduce the player to moving platforms. At the beginning, there will be a moving platform with text on the screen to show the player how they work. After that, the level will contain various elements from all previous levels. It will have spikes, trampolines, orbs and a few moving platforms.

Level 9: this level will not introduce any new concepts, but will be a harder level that has all the concepts learned in previous levels. It will be a harder and longer level.

Level 10: this level will introduce the player to how doors work. There will be an easy to reach door at the beginning with text on the screen explaining to the player how they work. After that, there will be a few harder applications of the door with addition of all the previous elements.