SFWRENG 4GP6: Software Design IV
Capstone Computer Game Design Project
High-Level Concept

Roygbiv

Gameboys

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1 Game Description

1.1 Back-story and Game World

It all started with the bullying of the main villain, a cube named Cubingham, in a school of primarily spheres on the farthest planet in the solar system; planet Naysh. As a result, he developed severe insecurities and focused his anger and frustration onto everything that is spherical, thus initiating his crimes. Aware of this, the spheres built the protagonist, a robot named Craig, to protect them from Cubingham. Craig is completely self-aware and even has a life of his own. One day, he was waiting to pick his kids up from school when an explosion rocked the town, and the villain emerged. Before he could react, the villain kidnapped all the spherical kids and held them hostage for ransom. He trapped them on every planet within the solar system, in a series of elaborate puzzles, in which Craig has to overcome in order to save the victims. This game follows a linear progression, with a level-based design system. Upon the completion of a level, the player progresses to the next one in sequence. Those handcrafted levels are themed according to the planets that the player visit. Throughout the game, there exists special collectibles at specific locations that aid the player in succeeding.

1.2 Genre

Roygbiv is a three-dimensional platform action/arcade game, that incorporates various puzzles that the player must strategically solve to win.

1.3 Target Market

Roygbiv targets players that are ten years old or older. The intended design of the game incorporates puzzles of various difficulties and platforming that both teenagers and adults find enjoyable. The experience to be designed engages the player by presenting them with multiple challenges, while maintaining an adequate level of fairness. Thus, players that enjoy strategic puzzle games are the main target.

2 Player Experience

2.1 Goal

Each level within this game is composed of an arena that contains the player's controlled character, and seven other spheres, each has a color corresponding to one color of the rainbow; red, orange, yellow, green, blue, indigo and violet. All of the spheres are assigned zero-friction, and mostly bouncy, materials in order to stay in constant motion once their movement is initiated. The player's main goal is to complete the seven levels included in this game, to save the kidnapped spheres. To beat a level, the player must chase after and tag each of the colored spheres based on their color, from red through violet, as they occur in the rainbow. A fair comparison to Roygbiv, is the famous playground game, Tag! In addition, the levels in this game reflect inspiration from other three-dimensional platform action/arcade games; integrating collectibles within the levels and simply how platforming is conducted by the player.

2.2 Primary Interaction Model

The player can utilize their mouse to select an option whenever a menu is presented. While orienting the camera with the mouse, the player can utilize arrow keys on their keyboard to navigate the arenas.

2.3 Termination Conditions

As mentioned above, the player must chase after and tag each of the colored spheres based on their color, from red through violet, as they occur in the rainbow. This feature makes the player fail the current level if they break that ordering system as they come in contact with a sphere that has already been, or is not yet to be, tagged. They would then have to restart that level. Once the player completes all seven levels of the game, they are ready to clash with the final boss. Roygbiv is complete upon beating the final boss battle.

2.4 Challenges

This game incorporates physical and coordination challenges, with regards to the players speed and reaction time, as they are required to chase after a given sphere, while avoiding all others. Also, as the player remembers the correct order (red, orange, yellow, green, blue, indigo and violet) and tags the spheres accordingly, challenges of memory and knowledge are introduced. There also exists exploration challenges, specifically spatial awareness, as the player learns their way around each arena, and locked doors, as in some levels they must locate the spheres and eliminate any barriers that may be blocking them. Lastly, the player should have an intuitive understanding of physics regarding the bulk elastic properties of the different materials that are used in this game.

2.5 Motivation and Role

The player takes on the role of Craig, the protagonist, who is trying to save the kidnapped spheres, from Cubingham. The hero's motivation comes from his fatherly instincts; wanting to protect his kids. The hero's journey demonstrates his character development as his skills and determination increase. The motivation for the villain's cruel acts originates from his childhood as observed in the back-story. The ridicule from his fellow spherical classmates has driven him to insanity, resulting in anger and hatred towards the spheres in the universe. Thus, a villain is born.

3 Design Overview

3.1 General Features

The principle camera model for this game is a third-person camera in which the player orients. That provides the player with the freedom to explore and navigate within each level. The atmosphere and overall graphical aspects of the game is consistent throughout, but vary in theme, as the player travels from one planet to another. For example, one level is set in a dense green forest, while another is set on a planet where it constantly snows. There is ambient music playing in the background that will relate to each level based on the main elements that exist within it. An example being levels that have high winds will have wind chimes playing in the background, where as a forest level has animal sounds. Lastly, in terms of general mechanics, saving and loading is based on preset checkpoints to give incentive for the player to progress. The player, however, can pause the game as they desire.

3.2 Unique Features

- Unique level designs and multiple puzzles
- Reliance on logical skills and sharp reflexes
- Minimap to show where player is with respect to other objects
- Live ranking system which will place players on a leader-board based on the points that they earn in levels

- Shield collectible

4 Similar Games

4.1 Marble Blast Ultra

A three dimensional puzzle-action game where the player is a marble, and navigates around a platform towards the finish pad, while avoiding obstacles and utilizing power-ups. The user rolls the marble using the arrow keys on their keyboard, and the camera angle automatically updates to the direction they are going. The user has to avoid holes the ground and make jumps across platforms to get across each level.

4.2 Portal

A platform-puzzle video game where the goal of the game is to advance through each level by solving puzzles to open doors and move to new areas. The player has a portal gun that allows them to teleport themselves and also objects from one flat plane to any other flat plane in their view; usually crucial for solving most of the puzzles.

4.3 Rocket League

A cross-platform soccer video game, that consists of two teams, each of one to four players, that use rocket-powered vehicles, attempting to land the ball in the opponent's net. The ball is significantly larger than the vehicle, and the vehicle can jump in the air and drive on the walls within the arena. Once the ball is hit, it can bounce freely within the arena, with similar physics to that of a real life soccer ball.

4.4 Super Mario Galaxy

A three-dimensional platform game where the player travels through different planets, completing each level by collecting objects throughout, and reaching the end of the level.

4.5 Tag

A popular playground game that involves two or more players, where one player is the tagger and chases after the others in an attempt to tag another player, making them the tagger.

5 Plan

All 7 levels have been designed and implemented. However, multiple feasible additions and modifications are to be made throughout every deliverable until the final demonstration. They are organized as presented below:

- There will be an arcade mode added to the game (accessible from the main menu) for those who would prefer a fast paced game with no terminating condition other than losing. This mode attracts those who set a high-score and then continuously attempt to beat it, or challenge others to beat it. It will be very similar to the current level one, but instead of terminating when the violet sphere is tagged appropriately, the player must then repeat the tagging sequence starting at red. For each correct tag, the player is awarded one point.

- Instructions are yet to be included in their dedicated menu in the main menu. Also, the ROYGBIV logo is to be colored accordingly in every menu and especially in the pause menu to help the player remember the order of the colors if paused. This relates to issues #4, #66 and #31 (duplicate), which have been assigned to Kareem.

- There will be one collectible type and that is a shield-type collectible. They will be picked up by tagging them, the same way that a sphere is tagged. Once tagged, the shield will instantly be equipped and will remain for either ten seconds or until the player tags an incorrect sphere. The player's color will change to green throughout the duration that the shield is equipped. These collectibles will not stack in the sense that if the player picks up two then they have twenty seconds, rather only ten seconds from when the last shield has been picked up. This will aid the player in winning by giving them a small advantage, once per round. This will definitely be need in the harder levels.

- The sphere materials are to be modified to further aid the player in distinguishing the between similar colors. This relates to issues #5 and #56 (duplicate), which have been assigned to Kareem.

- The background music style is still to be selected along with refined sound effects including those associated with player and sphere movement as well as hovering over menu options and selection. This will contribute to the player immersion in this game as it will help in developing the game atmosphere. Sound effects will be very useful for providing the player with feedback within menus and interacting with the spheres within levels. This relates to issues #25, #47, #48, #49, #64 and #90, which have been assigned to Kareem. In addition, issue #11 states that the game over sound is too loud. However, this loudness is intentional, to make some players "jump".

- The player character will have a more precise collider box as well as all generic surroundings borrowed from external sources. This will increase the accuracy regarding collisions and will disable the player from clipping to any of the assets. This relates to issues #16, #40, #96, #99, #104, #10, #113 and #117, which have been assigned to Kareem.

- There will be a scoring system in which the player is awarded points based on how hard they tag each of the spheres. There will be a minimum amount of points required to pass each level. This will disable the player from tagging the spheres very lightly and causing them not to move. This will be a fair system as the harder the player tags the spheres, the harder the game gets, and thus more points. This relates to issue #81, which has been assigned to Kareem. In addition, issue #50 states that the levels should be timed. However, the game's scoring system works independent of any timer. Also, by adding a timer, there is another unnecessary challenge introduced.

- Saving and loading will be achieved through Unity's PlayerPrefs. This will include saved settings as well as levels unlocked and high-scores. All saved data will be loaded when the game is started. This implies that there will exist only one slot for saving, which can be reset through the game settings. The game will auto-save whenever the player beats a new level, a high-score or changes any of the settings. The player will not have an option to save manually, as it will not be necessary with such a feature present. This will allow the player to resume their game from the beginning of the last level that they had reached. The player will also be able to return to any saved level. This relates to issue #60, which has been assigned to Kareem.

- A new feature will be added and that is player stamina. The player will not be able to run continuously throughout the whole course of the game. They will need to release the shift key to rest their character and run again once stamina is replenished. Similar to any of the Grand

Theft Auto games, the player will not be presented with a bar that displays their stamina. This adds one more challenge for the player to overcome, and that is to use their stamina wisely and not run all throughout the level.

- A minimap will be implemented to help the player see if a sphere is coming towards them, yet without revealing the whole map. It will only show the top-view of the map section that the player is presently in. This relates to issues #36 and #46, which have been assigned to Kareem.

- The player will no longer be able to walk using the shift key alone. This feature will be removed. The player movement will be encompassed by fast-walking (using the WASD keys) and running (when shift is held down while a movement key is in use). This feature was a test feature and it does not add or take away anything from the game.

- The player will be given the option in settings to select how far from the player the camera is placed; providing them with a wider or narrower field of view depending on their preferences. This relates to issue #23, which has been assigned to Kareem.

- The player will be given the option in settings to lock the camera; having them control their viewing direction through their keyboard key movement mechanism (using WASD). This relates to issues #75, #107, #108, and #109 which have been assigned to Kareem.

- If the option above is not selected, the player will be given the option to invert the camera vertically and horizontally as well as control its sensitivity. This relates to issues #10, #59 and #89 (duplicate), which have been assigned to Kareem.

- The player will have the option in settings to mute and unmute music and sound effects individually. This is for the player's convenience; whether they would like to hear the music alone, sound effects alone, both or none.

- An option to reset the game settings will be provided, which will reset all player preferences, keeping the saved levels. In addition, the player will have another option to reset the whole game including unlocked levels. This is for the player to start the game over again (perhaps if they have a friend playing it on their computer).

- Loading screens during the switching of any two scenes are yet to be incorporated. This will let the player know that the game is not frozen, but loading, between the switching of scenes. This relates to issues #6, #41 (duplicate), #71 (duplicate), #82 (duplicate) and #82 (duplicate), which have been assigned to Kareem.

- All menus are yet to be polished and presented in an appealing way for the player. In level selection, the player will be placed in an arena with seven objects; each representing a level. The player will be able to run and tag any of those objects, which will present them with a menu to confirm their level selection. This will enhance the overall quality and aesthetics of the game, making it more appealing for the player. This relates to issues #7, #12, #24 (duplicate), #28, #51 (duplicate) #67, #68, #69, #70, #72, #78, #79, #95, #103 and #114 which have been assigned to Kareem.

- Level 2 bug fixes and suggestions are assigned to Victoria. With regards to issue #26 and #84, dying when you surpass the arena limits is intentional, however we will add a clearer indication of this death by including it in the instructions. Also, in issue #62, we were informed that the moving platforms are placed too far apart, so we will be decreasing the distance between those. There has also been issues with players touching the lava and not dying, issue #22. The colliders will be adjusted to correct this. Issue #17 informs us that it is possible to not finish the game if a ball you hit knocks another ball into the lava. We will make it so that you

will lose the level if you do so, and there will be a warning of this possibility at the beginning of the level.

- Level 3 bugs are assigned to Puru. Such as issue #15 which will be fixed by realigning floor assets. For issue #85 a light source will be added to convey realistic reflections. Because of issue #112 a greater effort will be made to create optimized levels to avoid high strain on GPU's.
- Level 4 bug fixes are assigned to Rehan. Such issues are: #55 where the yellow ball's model is within another 3D model, or #97 where models are misaligned to what they should be aligned to.
- Currently there is no settings menu in the game it is yet to be implemented. When it is implemented it will close issue #87. Regarding issue #86, and #91 the bug of pressing shift to propel further in jump will be taken away. As this leads to improper animations. However, addressing the issue of jumps not feeling fair to the player will be addressed by slightly decreasing jump distances on harder jumps. This way it is fair to the player and avoids the issues of making jumps too easy. Looking at issue #61 the suggestion of increasing player movement speed will be added in to game. However, the addition of park-our elements in to the game does not fall under our vision of what the game the should be. These issues will be assigned to Puru.
- To address issue #65 there will be a death animation added in. And loser text will be changed to match the aesthetics of the game. The bug of walking stated in issue #73 will be fixed by getting rid of the walking functionality all together. The issue of unrealistic shadows will be removed as stated in issue #74 by improving the lighting system that is currently in place. These issues will be assigned to Puru.
- Issues regarding falling off the level are assigned to Rehan such as issues #7, #8, #38, #54, #76 (duplicates) will be fixed. The bug occurred because the variables used to detect death were not within proper ranges. A fix for this issue would be associate a 'death' tag with certain objects/areas of the level(s).
- Regarding issue #13 where holding only the sprint key causes the player to slow walk; this is an intentional feature that is there as part of the players core mechanics and will be left as is.
- Issues regarding rendering and hitboxes of objects in level such as issue #14 will be handled by Viraj. The game objects that were used have parts missing which causes these issues. The main solution here would be to cover the rendering issues up with walls, as the objects with rendering issues aren't critical to the game. With hitboxes, the scaling of the objects with the hitbox issues are most likely the cause of this issue and the scaling will change to accommodate.
- The loading time when replaying will be shortened due to a few issues regarding confusion for players (namely issue #21). Players are experiencing 'crashes' when trying to load/reload levels. This is not the case, the game loads just fine. However, the game remains frozen as the level loads and - currently - there is no loading screen to tell the player that the game is loading, so it's understandable that the player would assume the game crashed. This issue will be fixed with the addition of a loading screen in later revisions.
- Cursor related issues such as #9, #20, #30, #32, #39, #80 will be assigned to Rehan. These bugs are caused by Unity engine related bugs, and will be researched about as they appear to be common Unity bugs.
- Movement issues #18, #19, #83, and #98 pertaining to environment based running speeds, and input based jumping will be addressed by Rehan, as a feature for a new animation and run speed will be implemented based on a function of angle of elevation.

6 References

Adams, Ernest. Fundamentals of Game Design. 2nd ed. Berkeley, CA: New Riders, 2010. Print.