Game Design Document

Cosmic Gravitation
EnvyUs

Team Members

Name	Roles	E-mail
Aviral Goel	*Captain, Player Movement*	*aviral.goel@usc.edu*
Shweta Kumari	*Analytics, GDD*	*shwetaku@usc.edu*
Niranjanaa Mohanbabu	*Collectibles, Stenographer*	*nm51604@usc.edu*
Rahul Aggarwal	*Collectibles, Sounds*	*rahulagg@usc.edu*
Sharan Murli	*UI, Player Trail, GDD*	*murli@usc.edu*
Kang Pin Chan	*Player Movement, Gameplay Management*	*kangpinc@usc.edu*

Everyone is expected to code, design, and implement new game mechanics.
Reference: *Roles & Role Resources*

Important References

Engine	*Ex: Unity*
GitHub	*https://github.com/aviralgoel/CSCI526TeamProject*
Playable Alpha Build	https://shwetakumari14.github.io/GameProjects/EnvyUS/Week9/
Playable Beta Build	https://shwetakumari14.github.io/GameProjects/EnvyUS/Week12/
Latest Build	https://sharanmurli.github.io/game/week12/
Playable Gold Build	https://sharanmurli.github.io/game/week15/

Gameplay and Analytics Video:(Gold)

Youtube Link: https://www.youtube.com/watch?v=Cs-Nc141sjk

Gameplay and Analytics Video:(Beta)

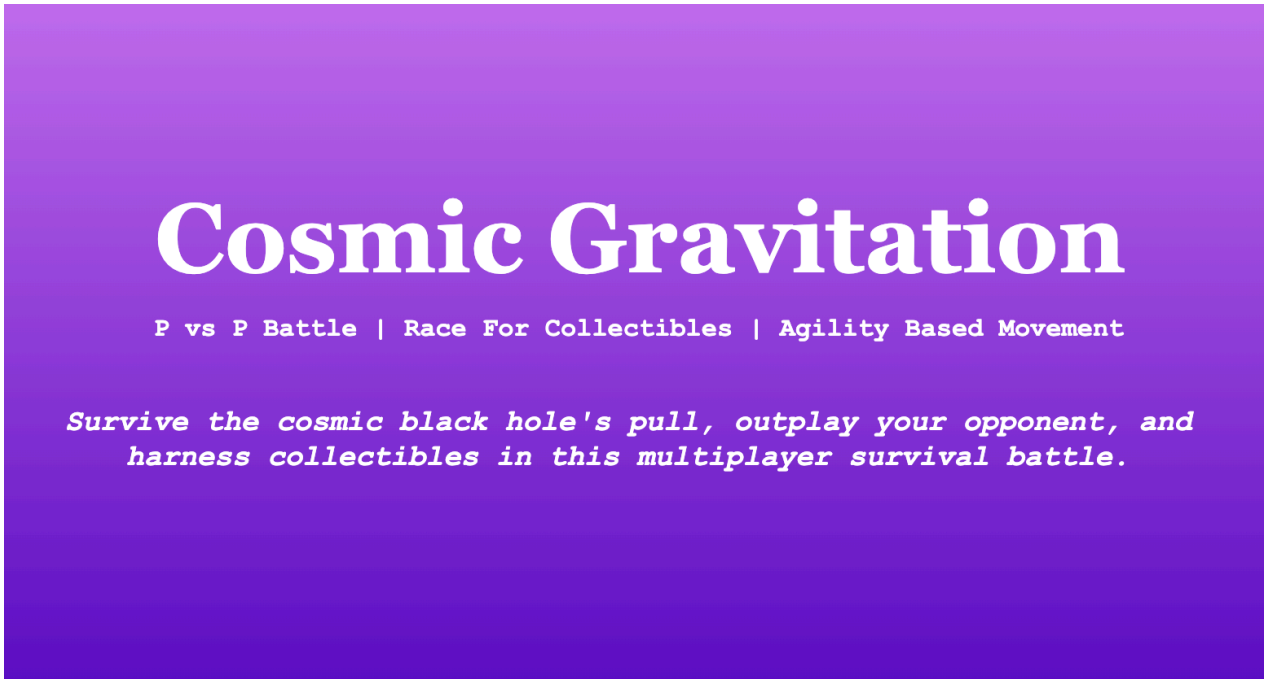
Youtube Link: https://www.youtube.com/watch?v=JWWFG6_QJYk

Drive Link:
https://drive.google.com/file/d/1XMVUfERKqpvNfne8OQUfftclSQQ48opm/view?usp=sharing

Weekly WebGl Build Links:

Prototype WebGl Link	**Week 6:** https://play.unity.com/mg/other/webgl-builds-373385 **Week 7:** https://shwetakumari14.github.io/GameProjects/EnvyUS/Week7/ **Week 8:** https://shwetakumari14.github.io/GameProjects/EnvyUS/Week8/ **Week 9:** https://shwetakumari14.github.io/GameProjects/EnvyUS/Week9/ **Week 10:** https://shwetakumari14.github.io/GameProjects/EnvyUS/Week10/ **Week 11:** https://shwetakumari14.github.io/GameProjects/EnvyUS/Week11/ **Week 12:** https://shwetakumari14.github.io/GameProjects/EnvyUS/Week12/ **Week 13:** https://sharanmurli.github.io/game/week12/ **Week 14:** https://sharanmurli.github.io/game/week14/ **Week 15:** https://sharanmurli.github.io/game/week15/

Game Introduction



Survive the cosmic black hole's pull, outplay your opponent, and harness collectibles in this multiplayer survival battle.

Logline

Survive the cosmic black hole's pull, outplay your opponent, and harness collectibles in this multiplayer survival battle.

Reference: *Marketing - Loglines*

Goal

The ultimate goal of the game is to be the last player standing, defying the relentless pull of the black hole and outlasting your opponent. To achieve victory, you must either survive until your opponent succumbs to the gravitational force or strategically decrease your opponent's health using collectibles and power-ups.

General Description

"In 'Cosmic Gravitation,' embark on an adrenaline-fueled multiplayer journey where two players find themselves in the perilous grip of a relentless black hole. As they teeter on the brink of oblivion, they must strategically press keys to gain momentum and escape the inexorable gravitational force that threatens to consume them. But survival is just the beginning, as players discover a universe filled with mysterious collectibles and power-ups, each with unique properties that can be wielded to gain an advantage or decrease their opponents health.

Strategize, maneuver, and unleash the power of cosmic artifacts to outmaneuver your opponent. The game's true test lies in your ability to balance evasion and offense, as you can use these powerful tools to eliminate your adversary, but beware, they can do the same to you. As time ticks away, the black hole's pull intensifies, demanding quick thinking and precise moves.

Only one player can defy the cosmic odds and emerge victorious. Be the one to outsmart the black hole's pull and your opponent in this high-stakes, gravity-defying race.

Detailed Design

Game Element

- **Central Black Hole:** This serves as the gravitational focal point of the game, constantly pulling the players towards its center, creating the primary challenge. This makes the overall player movement fun and exciting.

- **Initial Circular Motion:** Players are initially set in circular motion, akin to an orbit, due to the gravitational attraction, making movement unpredictable and challenging.

- **Designated Control Keys:** Players have access to specific keys or controls that allow them to alter their trajectory, providing a means to break free from the gravitational pull and navigate the game environment effectively. When a key is held down, the player can rotate 360 degrees and change their direction.

- **Collectibles**: These are items that appear in the game and play a significant role:
    - Good Collectibles (Beneficial): These items enhance the players' abilities, potentially increasing their chances of successfully escaping the black hole's pull or gaining an edge in the game. Collecting them increases the player's health, helping them stay in the game.
    - Bad Collectibles (Detrimental): These items hinder the players' progress, potentially making it more challenging to escape the blackhole's pull or disrupts their movements. Avoiding them is crucial to ensuring that their health does not decrease.

- **PowerUps:** Adding power-ups to the game enhances the overall gameplay by giving players temporary advantages and altering the game dynamics for a specified amount of time.
    - These in-game items or abilities provide players temporary advantages, such as freezing the opponent, fire walls, slicing charge up mechanic, homing missile or other unique skills. The strategic use of power-ups adds an exciting and ever-changing dimension to gameplay, allowing players to adapt and thrive in challenging situations.

- **HealthBar:** This health bar depletes gradually over time, reflecting the player's health status. To maintain or increase their health, players must collect specific in-game items or power-ups, such as health packs or restorative objects. Additionally, players have the option to increase their health by colliding with their opponent using their blade, effectively boosting their health in the game. However, it's essential to note that venturing into the black hole due to its powerful gravitational pull will decrease their health, adding an extra layer of challenge and strategy as players aim to avoid this dangerous hazard while actively managing their health to stay in the game.

- **Player Collider:** Each player has a collider located in their head. Colliding with another player increases their health and causes the collided player to lose health while respawning and returning to the game. This strategic interaction allows players to regain health while affecting their opponents' health status.

- **Respawn Mechanic:** Only on player-to-player collisions and black hole collisions, the player respawns and loses health. This health mechanic adds an additional layer of challenge to the game, as players must strategically navigate the environment while managing their health to outlast their opponent.

Game Objective and Strategies

- **Last Player Standing:**
  The primary objective is to be the last surviving player in the game.

- **Survive Gravitational Pull:**
  Outlast the relentless gravitational pull of the black hole, ensuring you're still in the game while your opponent succumbs to the force.

- **Strategic Elimination:**
  Alternatively, you can achieve victory by strategically using collectibles and power-ups to eliminate your opponent while avoiding the gravitational pull.

- **Adaptability and Strategy:**
  Adapt to the changing circumstances, devise effective strategies, and use the available resources to secure victory.
  .
- **Powerups usage:** Certain power-ups scattered throughout the game world can significantly boost your health, providing a valuable advantage during the cosmic battle. These health-enhancing items allow players to endure the black hole's pull and player collisions, increasing their chances of becoming the last survivor. Strategically collecting and using these power-ups becomes a key aspect of the gameplay.

- **Sole Survivor:**
  Your goal is to become the sole survivor in the intense battle against your opponent and the powerful forces of the black hole, asserting your cosmic destiny.

This game incorporates all these elements to create a dynamic and challenging gaming experience within a visually captivating celestial environment.

Controls:

- **Player 1**
  Press L for Player 1 to join the Game
  Hold L to turn Player 1 (default movement is circular that attracts the player towards the blackhole)
- **Player 2**
  Press A for Player 2 to join the Game
  Hold A to turn Player 2 (default movement is circular that attracts the player towards the blackhole)

Game End Condition:

- Player vs player collision - resulting in loss of health(Health bar decreases) and the player respawns back in the game.
- Coming in contact with the blackhole - resulting in loss of health and the player respawns back in the game.
- The health also decreases with time, which adds more difficulty to the game as the player would need to collect more good collectibles and power-ups to gain more health and stay in the game.

Final End Condition: Either of the player's HealthBar becomes Zero. So, the last man standing wins.

Game Mechanics (How to Play)

- **Player Movement Control Mechanic (Implemented) - Aviral Goel**
  - Gravitational Pull: The player is constantly pulled towards the black hole.
    - The player has to work against the game's intrinsic pull of black hole, which ends the game.
  - The Player's movement is purposefully constrained
    - Players cannot freely move in WASD style. It can only control its ability to turn. A player must navigate the level with this constraint.
    - The player is given the ability to make sharp turns only if he times the turn and intensity (holding turnKey for a longer amount of time).

- **Blackhole Concept(Implemented) - Rahul Aggarwal**
    - In the game, the presence of the formidable black hole presents a constant and ever-present threat to the player's survival. Here's how it works:
        - When a player collides with the black hole, it results in the player's respawn. However, this collision also comes at a cost, as the player loses health in the process. It's a high-stakes encounter that players want to avoid.
        - The black hole exerts a relentless gravitational pull that affects the player throughout the entire game. This gravitational force continually tugs at the player, making it more challenging to move freely and navigate the game environment.
        - The player must skillfully manage their limited movement capacity in the face of this gravitational pull. The gravitational force restricts the player's ability to move with ease, adding a layer of challenge to the game. Skillful and precise movements become essential to avoiding both the black hole and potential collisions with other players.
    - In this way, the player's ability to outmaneuver the black hole and their opponents becomes a key element of the gameplay. It underscores the importance of strategy, precision, and adaptability as they strive to be the last player standing in the cosmic battle while actively managing their health and movement to survive the game's challenges.

- **Freeze Mechanic(Implemented) - Niranjanaa Mohanbabu**
    - Introducing the Freeze power-up, a game-changing element that adds a layer of challenge and strategy to the gameplay. When a player collects this power-up, they gain the ability to momentarily freeze their opponent, paralyzing them and rendering them unable to move.
    - This creates a unique tactical advantage, as the player can then strategically choose their next moves. They might opt to collide with the frozen opponent, gaining more health while simultaneously decreasing their adversary's health. This maneuver not only enhances their chances of outlasting their opponent but also adds an element of surprise and strategy to the cosmic battle.

    - Alternatively, the player can utilize this frozen moment to navigate the game environment and collect valuable green health collectibles, further bolstering their health status. This power-up demands quick thinking and adaptability, as players must seize opportunities to maximize their advantage while also staying vigilant to avoid becoming the frozen target themselves.
    - The Freeze power-up not only provides an exciting twist to the game dynamics but also underscores the importance of timing and strategic decision-making in the intense battle for survival.

- **Fire Walls Mechanic(Implemented) - Sharan Murli**
    - This power-up serves to not only enhance the strategic depth of gameplay but also to change the landscape of the battlefield. When a player collects the FireWall power-up, it triggers an intriguing twist in the game dynamics.
    - Upon activation, the FireWall power-up animates fiery barriers that constrict the playground, bringing the walls closer to the formidable black hole. This strategic move reduces the overall area of play, intensifying the risk of players colliding with the menacing gravitational force.
    - However, navigating around the FireWalls becomes crucial, as any contact hinders movement and inflicts damage, causing players to lose health for the duration they are in contact with the fiery barriers.
    - This added layer of complexity encourages players to carefully consider when to activate the FireWall power-up, as its effects can significantly impact the game's dynamics, creating an exciting and challenging environment where strategy and adaptability are key to success.
    - Players cannot deploy this barrier themselves, but when they collect the FireWall power-up, it triggers the animation of fiery barriers. These barriers then constrict the playground and bring additional challenges to the game, increasing the risk of collisions with the black hole and the potential health loss upon contact with the fiery walls.

- **Slice Chargeup Mechanic(Implemented) - Shweta Kumari -**
    - The slice mechanic is a dynamic feature that adds an element of strategy to the game. Here's how it works:
    - Every 20 seconds, a random slice in the level playground is selected. This chosen slice is distinguished by a green tint, making it visually distinct from the others.
    - Green Tint: Players positioned within the slice marked with the green tint experience a beneficial effect.

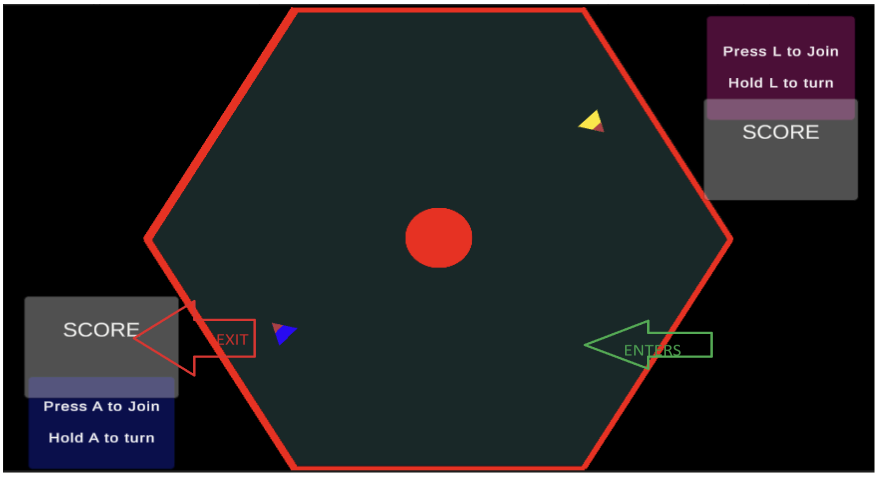
        - They gain +2 health every second while they remain inside this area. This boost is represented by a "+2" text that appears near the player, signaling that they are gaining health. The health bar of these players visibly increases, reflecting their improved health status.
    - The slice effect lasts for 5 seconds. After this time, the tint and associated effects disappear. Following the 5-second slice duration, there is a 20-second cooldown period during which no special slices are active.

- **Players can shoot other players/collectibles out of the way using missiles (*Homing Missile - Implemented*) - Kang Pin Chan**
    - Powerup Activation: Upon collecting the missile powerup, players gain the ability to launch a homing missile instantly towards their opponent.
    - Instant Homing Missile Launch: Activation triggers the immediate launch of a homing missile targeted at the opponent. The missile actively tracks the opponent's path, providing a swift and dynamic gameplay element that requires quick thinking and reaction from both players.
    - Targeted Damage: The homing missile inflicts damage upon reaching the opponent, affecting their health(decreases their health by -10). The damage could be balanced to ensure that while it offers a potent offensive advantage, it doesn't guarantee a one-hit elimination, maintaining a fair and competitive gameplay environment.
    - Strategic Decision-Making: The availability of the homing missile introduces a strategic element. Players must decide when to deploy it for maximum impact, whether for a surprise attack, to gain a lead, or as a defensive maneuver. Strategic usage becomes crucial for success in engagements.
    - This powerup adds a dynamic and strategic layer to the game, encouraging players to think tactically about when and how to deploy the homing missile for optimal effectiveness.

- **Player-vs-Player Collision(Implemented) - Kang Pin Chan**
    - Players have the ability to kill other players in the game.
        - If the player hits another player with its pointy tip (head), it can kill the other player in the game
        - Resulting in +4 points for the killer, -4 points for the killed, and -1 live for the killed.
        - If any of the players lose all their lives. The game is over.

        - The other player can see the player's attack and has an opportunity to avoid the attack, if possible.
        - This ability involves skillful movement, timing, and strategy for a player to kill another player.

- **Points Collectible (*Inspiration Coins in Mario - Implemented*)**
    - Positive Collectible: Collectibles spawn randomly in the game. The player can increase their health by picking these up.
        - The player must ensure he has more health than his opponent.
        - This is an incentive to collect the positive collectibles.
    - Negative Collectible: Collectibles spawn randomly in the game. The player can lose points by picking these up.
        - The player must ensure he has more coins/score than his opponent.
        - This is an incentive NOT to collect the negative collectibles.

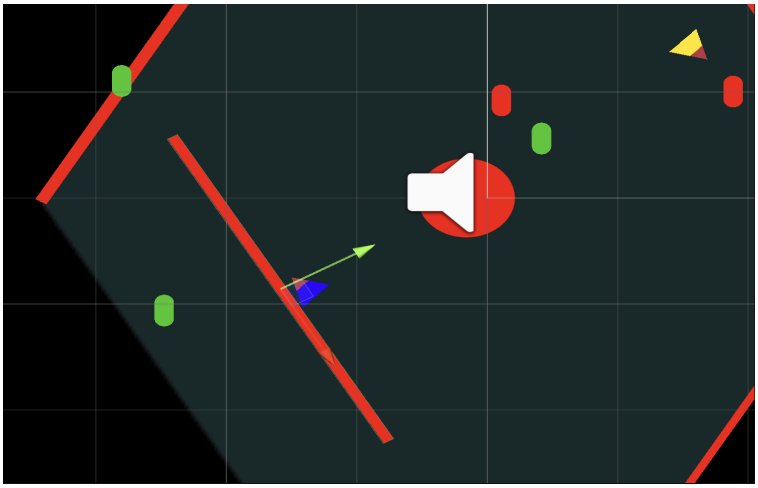
- **Walls can turn into portals for a short time (*Work in progress - future updates*)**
    - For a limited time in the game (controlled by a special collectible), players can escape and reenter the level from the diametrically opposite end of the 2D Hexagon.
    - 

    - This ability has to be collected by the player. It is useful when/if the player wants to avoid collision with other players/obstacles.

- **Blackout Mechanic *(Work in progress - future updates)***
    - At certain game intervals, the level area will have very limited visibility.
    - This will force the player to be more cautious or be willing to take higher risks.
    - Higher Risk: Use Offensive Attacks, betting that the opponent cannot see the attacks and escape.
    - More Caution: Realize that the opponent might have a similar strategy, and thus using a defensive strategy (such as a possible shield) may be better.

- **Spring Mechanic *(Work in progress - future updates)***
    - When a player collects the spring mechanic powerup, the playground walls are infused with a temporary spring effect. Visually, this could be represented by a distinct color or glowing pattern on the walls, indicating the active state of the springs.
    - Upon activation, players can utilize the spring effect by running into the designated spring-loaded walls and initiating a bounce. The bounce should be dynamic, allowing players to reach higher platforms or cover greater distances, adding a vertical element to the gameplay.
    - The spring mechanic introduces a tactical element to the game. Players can strategically time and plan their bounces to surprise opponents, evade incoming attacks, or quickly close the gap between them and an opponent for a surprise attack. This encourages creative and skillful navigation of the game environment.
    - It will be activated only for a short duration of time.

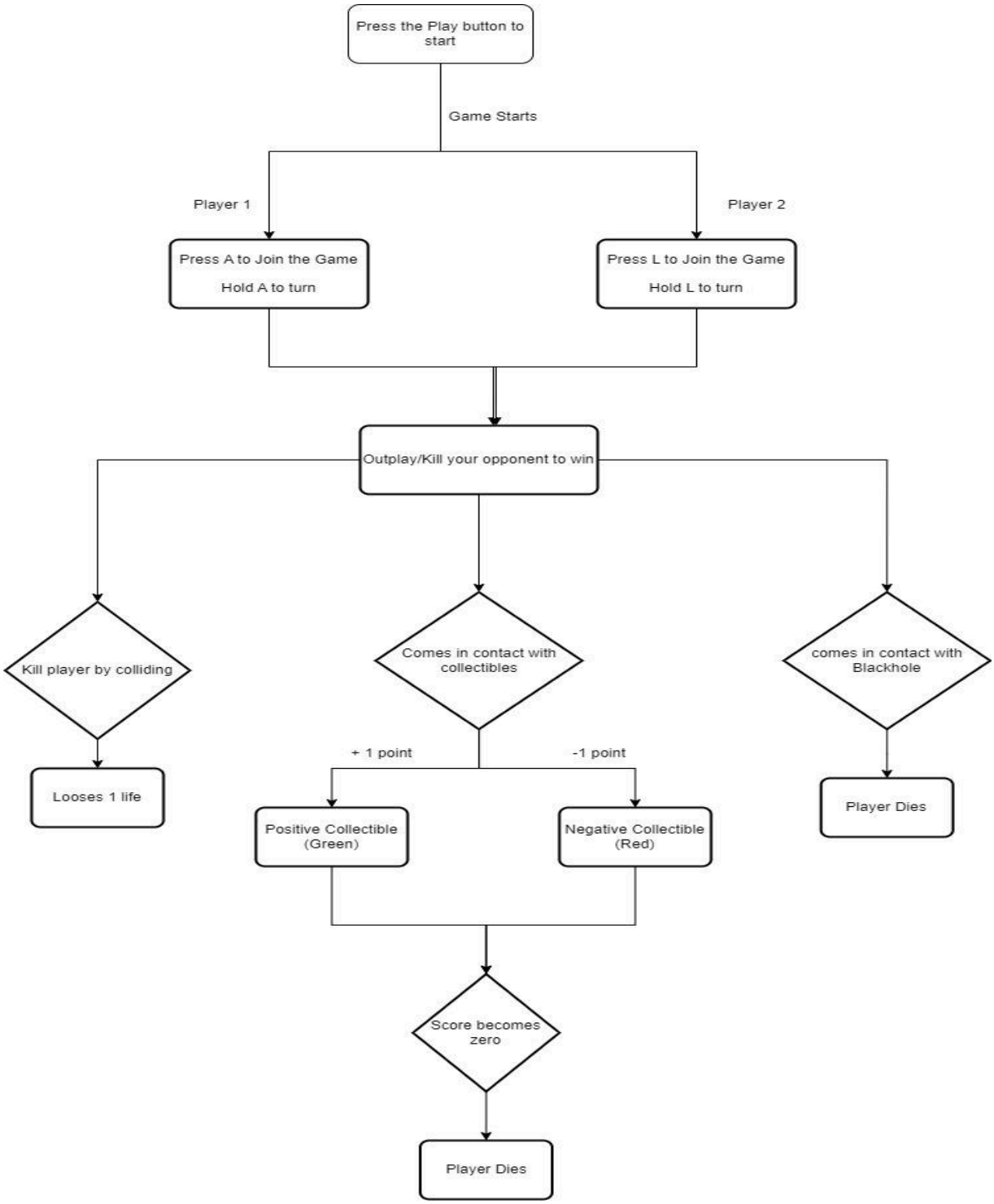
- **Similar to the Firewall mechanic we can push one slice wall of the player towards the blackhole(*Work in progress - future updates*)**
    - At certain times in the game, the walls will cave in spontaneously.
        - Players must watch out for these events.
        - Players must skillfully navigate their way away from the black hole if pushed.
        - Other players may use this opportunity to their advantage.



(wall caving in and pushing the player closer to blackhole (end condition))

- **Other areas of improvement (*future updates*)**
    - **Intuitive UI**
        - Use little to no text in the game and let the UI be the tutorial/guide.
    - **Particle Effect**
        - Use particle effects to make the game appealing and explain the role of collectibles.
        - Particle effects can be used to depict that the player is low on lives or has a shield on
    - **Camera Movement**
        - Experiment with manipulating the camera view to see if other mechanics can be enhanced. (for e.g,. shaking camera → wall push mechanic is about to trigger)

Gameplay Loop



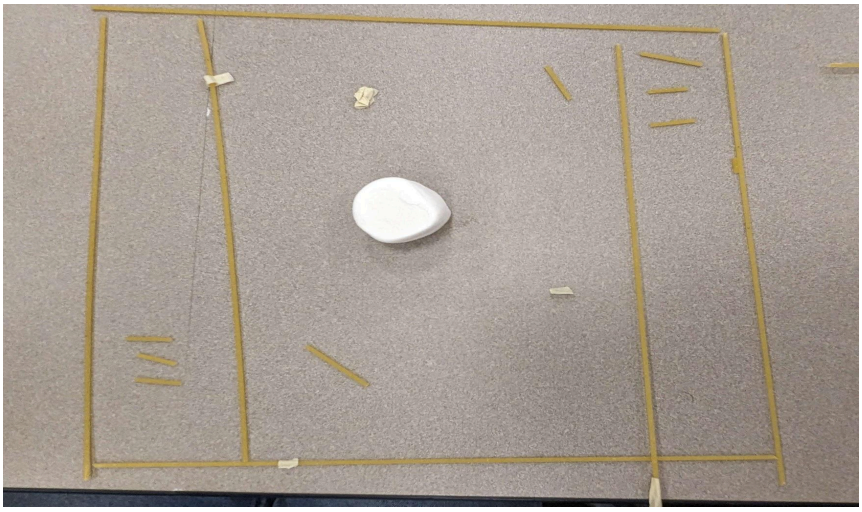
Weekly Prototype Descriptions

Describe your weekly prototypes here, noting additions, changes, and improvements.

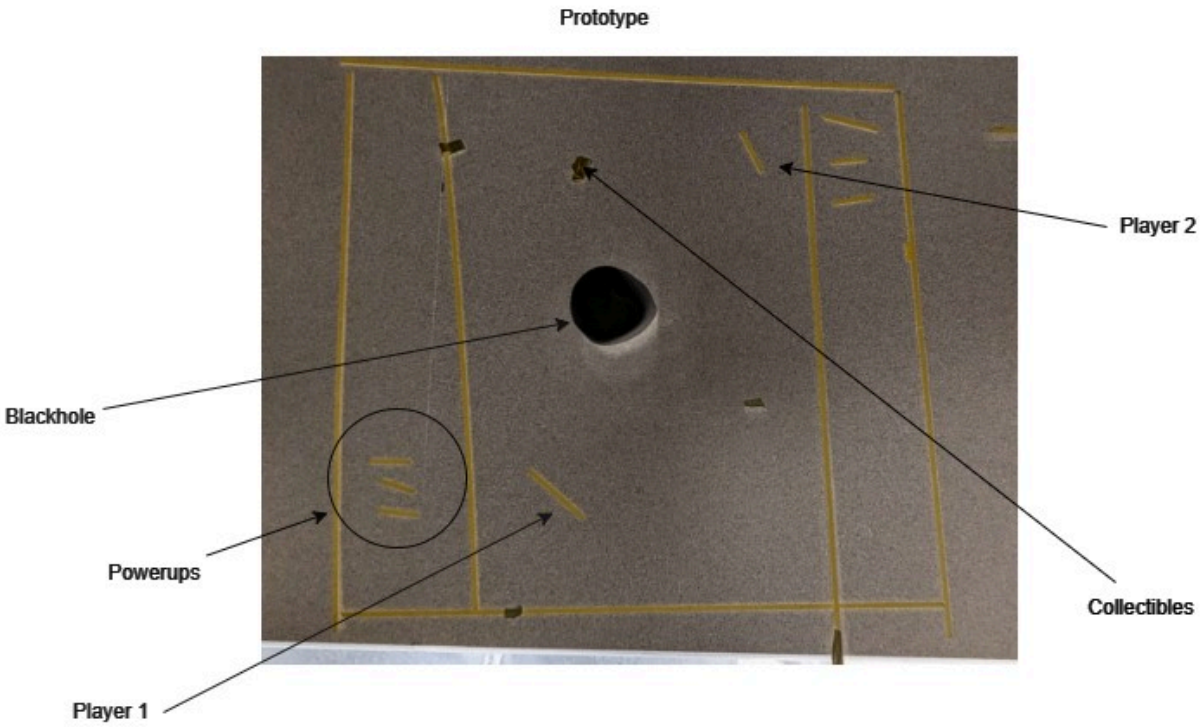
Week 6: Initial Game ideation phase

We initially conceived the idea of incorporating a battle royale structure into our two-player game. The central feature of this game is a black hole with a gravitational pull that exerts force on the players, drawing them toward it. To counteract this pull, players must hold certain keys that allow them to move away from the black hole. Their objective is to collect collectibles scattered throughout the game environment to accumulate points.

We developed this game concept during the Marshmallow Challenge, utilizing pasta sticks and marshmallows as part of our initial prototype design.



Initial sketch of the game design



Elements of the game design

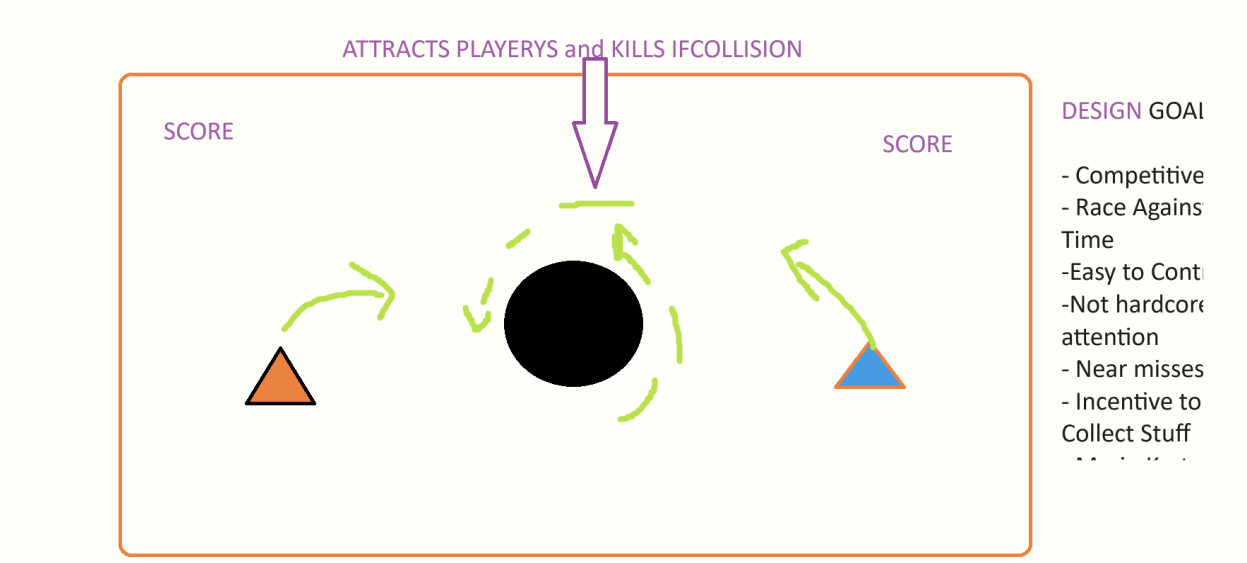
The fundamental game design concept involves a central black hole with a gravitational force that exerts a pull on the player, drawing them toward its center. An initial circular motion in response to this gravitational attraction characterizes the player's movement.

To navigate and escape this pull, players must utilize designated keys that allow them to change their direction within the game.

<u>Tasks completed for the week</u>:

- Basic Player movement
- Black hole gravitational pull implementation
- Started working on the basic UI design for the game (Start and End Scene, basic designs not included in the build)
- Working on collectibles (powerups) logic and ideation
- Listing down the elements where sounds are to be added(Future implementation)
- Listing down the important data attributes in the game for which we can collect data and analyze it to improve our overall game.

Week 7: Adding some UI components and improving the player movements



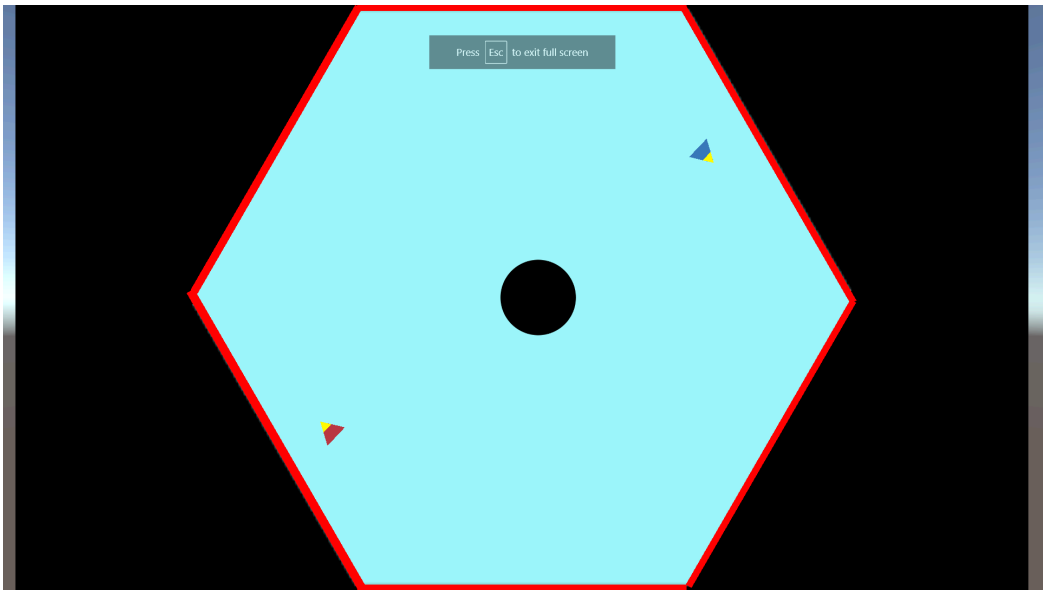
Two Player base level Design sketch

The players' movements are initially set in circular motion due to this gravitational attraction. Still, they possess the ability to alter their trajectory using designated control keys, enabling them to navigate and escape the relentless pull of the black hole. As they traverse this celestial battlefield, various collectibles appear on the screen, distinguishing between beneficial green collectibles that enhance their abilities and detrimental red collectibles that hinder progress. Additionally, we plan to include player trails that contribute to the overall immersive experience, creating a mesmerizing visual

effect as players strive to outmaneuver the gravitational forces and collect the right items.

Tasks completed for the week:

- Completed Player movement for player1 and player2
- Created a Game Manager Script to manage the game data and analytics
- Collected the start time data to analyze how quickly the player understands and starts the game along with other data attributes.
- Added UI components to the start scene along with the control instructions for the player
- Added positive and negative collectibles that randomly appear and disappear in a certain span of time. Worked on player collecting the collectible on collision.
- Added an end scene for the player to know that the game is over once a player dies.
- Collectively worked on improving the Analytics data and overall gameplay



Two Player implementation in unity

Week 8: Adding more mechanics to the game

Tasks completed for the week:

- Experimented with player movement

- Added a visually appealing player trail that follows the player's movement.
- Refined the code for collectibles, ensuring they appear and disappear as intended during gameplay.
- Completed the UI components for various scenes, including the start scene, end scene, instructions, score display, and lives remaining. These components update dynamically as the player collects collectibles or loses lives.
- Combined different game scenes in the correct order to create a cohesive and engaging gaming experience.
- Created a score manager script to keep track of player score when collecting a positive or negative collectible and updating it to +1 (positive collectible) and -1 (negative collectible). It also tracks no. of lives, no. of kills due to blackhole, no. of kills due to player collision.
- Added analytics script to collect types of kills, collectibles, and active time for total game engagement.
- Worked on new ideas to enhance the game's overall experience.
- Discussed the various improvements to be done for the next week.
- Listed weekly tasks for each member and noted the priority for each task.

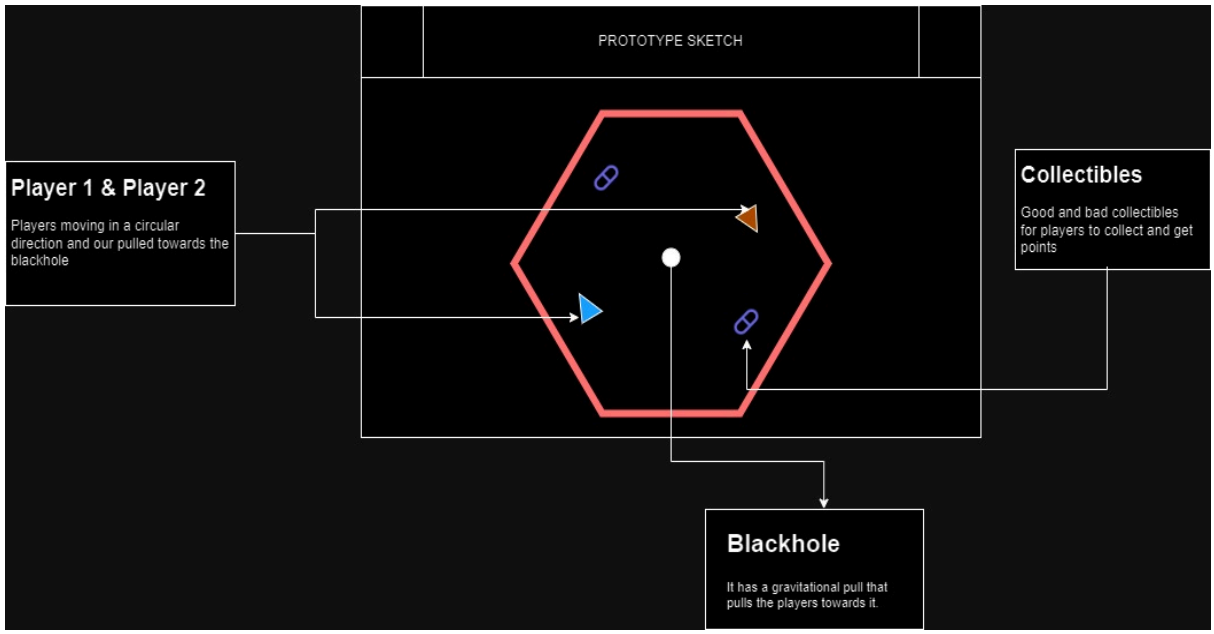
We have implemented the movements for both players and included clear control instructions for players to grasp and initiate the game easily. The game manager and score manager scripts are responsible for dynamically updating the player's score and the number of lives. Additionally, we've established the game's end conditions: a player loses a life upon direct contact with the black hole, when their score reaches zero from a predefined starting point, or when a player collides with another player, resulting in a life loss. To maximize their score, players must focus on collecting the beneficial green collectibles while avoiding the randomly appearing detrimental ones. Furthermore, a player who loses a life will respawn back into the game, ensuring continued participation.

Week 9: Version Control, Playtesting, and Debugging the code

<u>Tasks completed for the week:</u>

- Adjusted the speed of the player to increase the difficulty aspect.
- Integrated background music to the game
- Implemented the system for collectible spawning and improved the collision mechanisms
- Integrated analytics tools to collect player behavior data and developed graphs to visualize this data.

- Drawing conclusions to make more informed game design decisions from the data analyzed.
- Managed version control, resolved merge conflicts, and conducted debugging to ensure the code functions smoothly.
- Conducted code refactoring
- Maintaining and updating the Game Design Document (GDD) and ensuring it remains up-to-date and accurate.



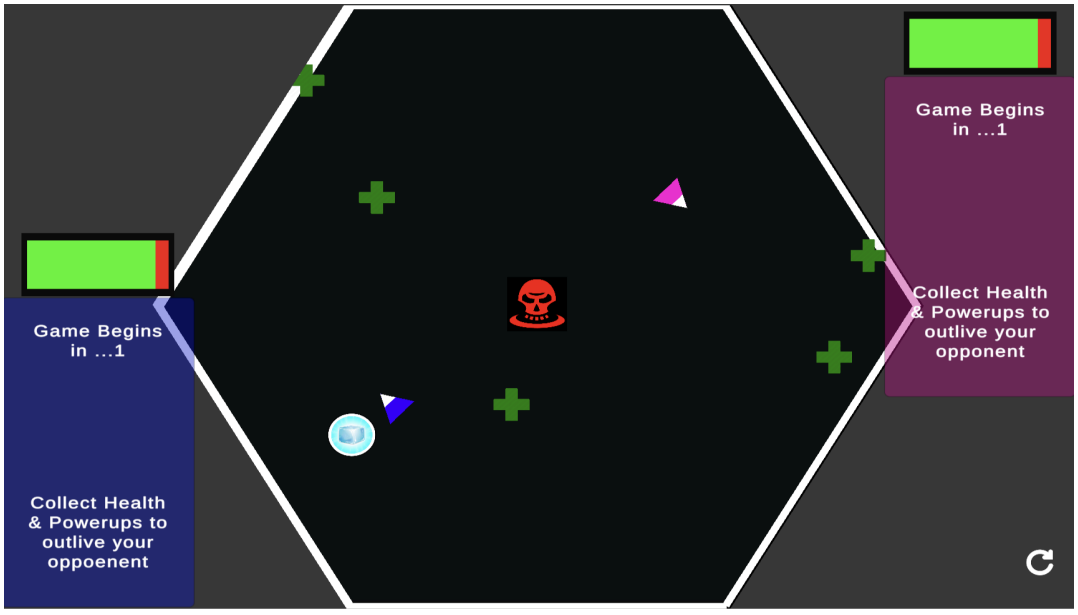
Week 9 Prototype Sketch

Implementation with score and no. of lives

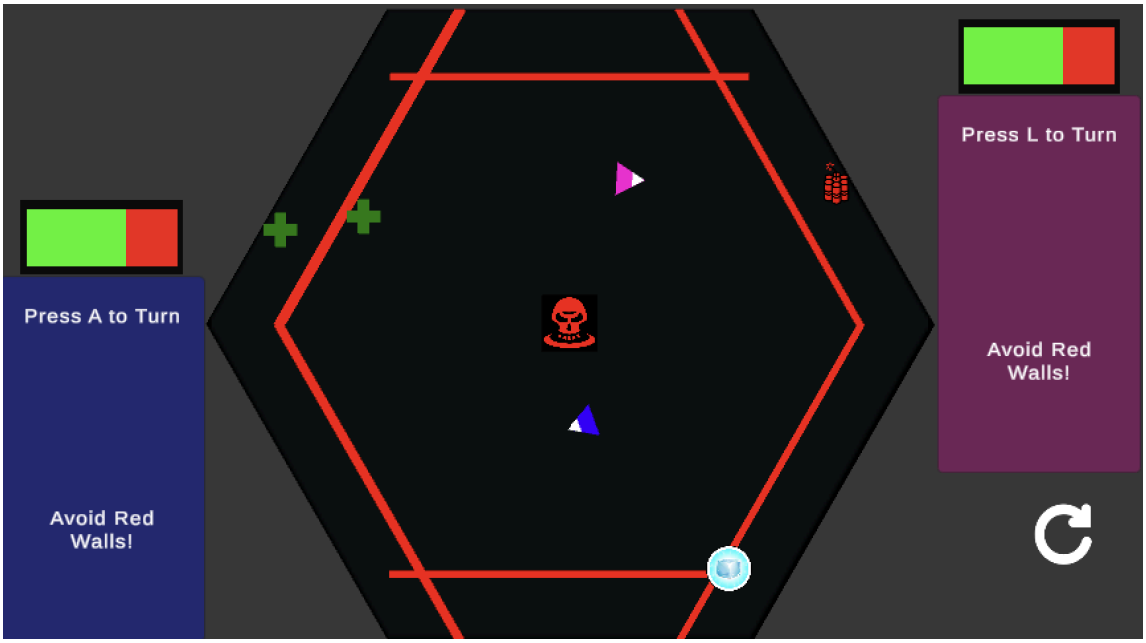
Week 10: Adding more mechanics and working on tutorialization/scaffolding to teach mechanics

<u>Tasks completed for the week:</u>

- Added a tutorial section in the game with easy navigation for users to first understand the game mechanics and then proceed with the game.
- Improved the color scheme for the entire game to make it more intuitive and easy to understand.
- Changed from lives and score approach to health bar approach for easy understanding of the game for the user and made the game time-based.
- Added new assets and animations for collectibles to make the changes happening in the game more obvious to see and understand.
- Introduced two new power ups in the game, i.e. Freeze the other Player and Making the gameplay area shorter for some time to make the game more interesting.
- Collected all previous analytics data and drew graphs to get new insights and scope for improvements in the game.
- Modified analytics scripts to accommodate changes and collect data for newly added features.
- Worked and implemented the feedback received from different pods and the teaching staff.



Tutorial section with instructions for each move



PowerUP for decreasing the gameplay area

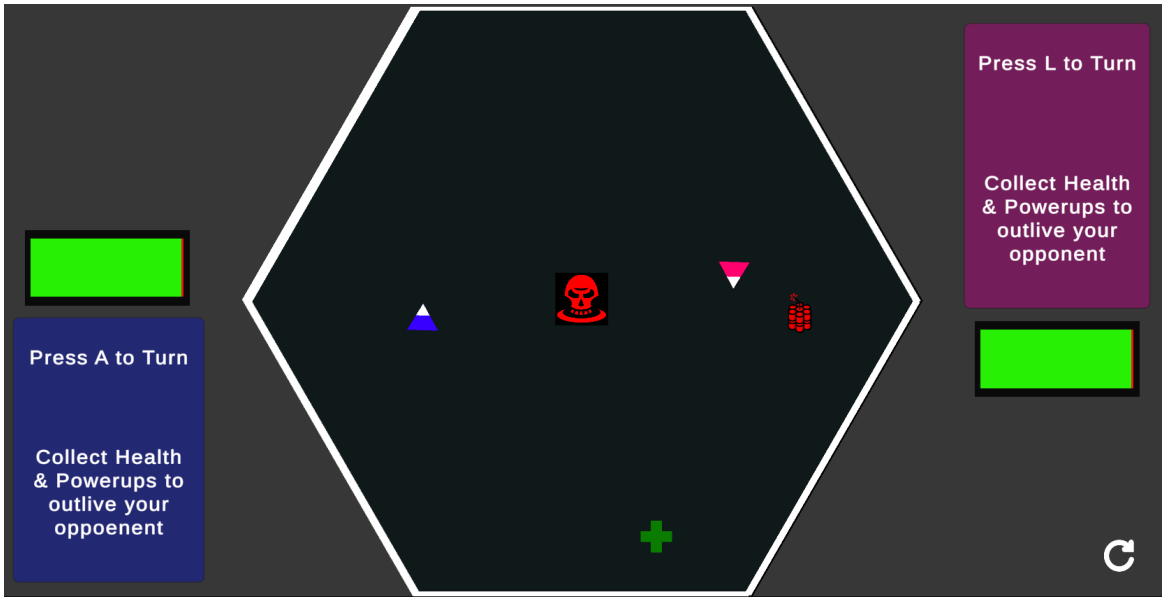
Week 11: Refining the overall game and tutorialization/scaffolding scenes to teach the mechanics in an intuitive manner. Refined the Analytics as well to get a detailed insight on the player interaction with game

<u>Tasks completed for the week:</u>

- Added sound effects to various game elements to convey information and enhance player awareness. These sounds signify both positive and negative events, making the game more engaging and helping players better understand in-game events.
- Improved the game tutorial scenes to provide players with a more intuitive understanding of player-player collision and various game mechanics. This refinement includes tutorials for player joining, player movement, and collecting collectibles, ensuring players grasp the fundamentals of gameplay more easily.
- Successfully incorporated all six game mechanics, each accompanied by proper visual cues to aid player comprehension. This includes the addition of a dynamic Slice Chargeup power-up that adds an exciting dimension to the game.
- Improved the randomness and frequency of collectibles and power-ups spawning in the game. This optimization allows players to strategize more effectively, adding depth to the gameplay experience.

- Added a new slice mechanic, which slices the game area into 6 parts every 20 sec for a duration of 5 seconds in which one slice (green tint) will allow the player to boost their health which is selected randomly.
- Implemented all four analytics and added improved scripts to get more precise data and explanations for each metric.
- Refined the overall game code to ensure optimal performance and checked for any bugs or issues. This process enhances the game's stability and player experience.
- Updated the Game Design Document (GDD) to reflect the latest changes and additions to the game.
- Included a design matrices table to illustrate the relationships between different game mechanics and their interactions
- Added tutorialization sketches to help convey all these mechanics to the player in an intuitive and easy manner.
- Worked on the feedback provided in Beta Progress check and incorporated all the changes to improve the overall game.

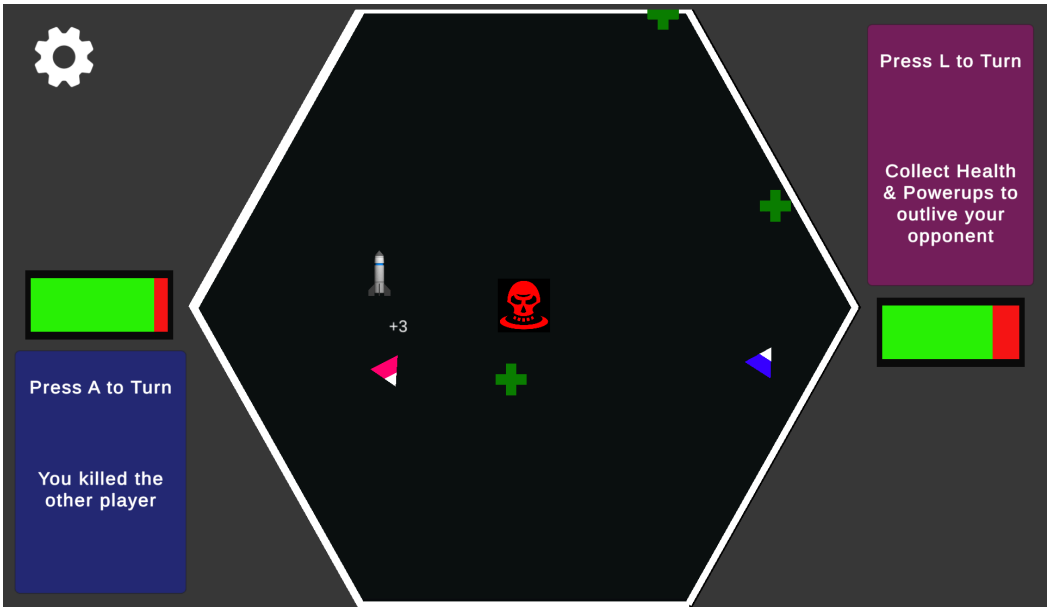
These tasks collectively represent significant improvements and additions to the game, making it more engaging, informative, and enjoyable for players while providing valuable insights through analytics.



Week 12: Refined the overall analytics, optimized the user interface, improved the tutorialization, added additional sound effects, and introduced a new gameplay mechanic in the form of homing missile. Discussed the idea of adding a level to the game to increase the difficulty.

<u>Tasks completed for the week:</u>

- Designed and implemented a new gameplay feature in the form of homing missiles. Balanced the mechanics to ensure it adds strategic depth without disrupting game balance. Integrated the homing missile seamlessly into existing gameplay dynamics.
- Explored the idea of introducing different difficulty levels to cater to a broader range of player skill levels. Discussed potential rewards or challenges associated with each difficulty level to incentivize player engagement and progression.
- Incorporated new audio elements to enrich the overall game experience. Maintained a balance between audio cues and overall gameplay immersion.
- Implemented a distinctive illusionary effect in the game by introducing dynamic movement for collectibles and power-ups within the playground. This enhancement aims to increase the level of challenge for players, requiring enhanced navigation skills to capture these in-motion items.
- Integrated the above with all the other gameplay dynamics.



Homing Missile mechanic implementation

- Refined the overall code and checked for bugs in the game.
- Completed the playtesting of 15 games individually and gave feedback for each game.
- Noted down the beta playtesting feedback for the game and came up with different issues within the game during playtesting.
- Started with the beta playtesting hypothesis for the different issues in the game as per the data collected through analytics

Week 13: Writing hypothesis based on the playtesting feedback and analytics data, worked on the extra credit proposal, fine tuned the overall game and made minor changes, Improved the overall Tutorialization

<u>Tasks completed for the week:</u>

- Gathered and analyzed feedback from playtesting sessions.
- Identified areas of the game that may require improvement or adjustment based on direct input from players during playtesting.
- Examined data collected through analytics tools during gameplay.
- Utilized quantitative data to understand player behavior, preferences, and engagement patterns, informing data-driven decisions for game improvement.
- Formulated a proposal for additional features or content beyond the core game scope. Explored opportunities to enhance the game experience by suggesting optional content or features that could be implemented for added player enjoyment.
- Made subtle adjustments to various aspects of the game. Refined game elements, addressed minor issues, and focused on polishing details to improve overall gameplay quality.
- Enhanced the instructional aspects of the game to guide players more effectively. Streamlined the tutorial experience to ensure a smoother learning curve, helping players understand game mechanics more intuitively.
- Structured the overall code.
- Worked on the GDD to complete the weekly tasks and added hypotheses.

Week 14: Code refinement and checked for any existing bugs in the game, Worked on hypothesized issues based on feedback, Fine tuned the sounds in the game, Improved the overall analytics and mapped them with the hypothesized issues, Made minor changes in the game mechanics.

Tasks completed for the week:

- Ensured game stability and performance by meticulously refining code and resolving existing bugs, addressing user feedback to enhance overall playability.
- Proactively addressed user feedback by investigating and resolving hypothesized issues, enhancing gameplay based on player input.
- Enhanced immersion with precise sound adjustments, ensuring an enriched auditory experience for players.
- Elevated overall game analytics, correlating them with hypothesized issues for a data-driven approach to further refine and optimize the gaming experience.
- Implemented subtle adjustments in game mechanics, refining the player interaction and flow for a more engaging and enjoyable gaming session.
- Worked on player respawn time after it gets killed by coming in contact to the blackhole.
- Modified the existing powerup and collectible spawning code so that they appear on regular time intervals to improve player interactivity.
- Modified the playground by adding the illusion effect where powerups and collectibles move which increases the difficulty level in the game.
- Updated the Game Design Document (GDD) to incorporate refined code, resolved bugs, improved sound tuning, optimized analytics, and minor mechanic changes, ensuring a comprehensive and polished gold presentation.

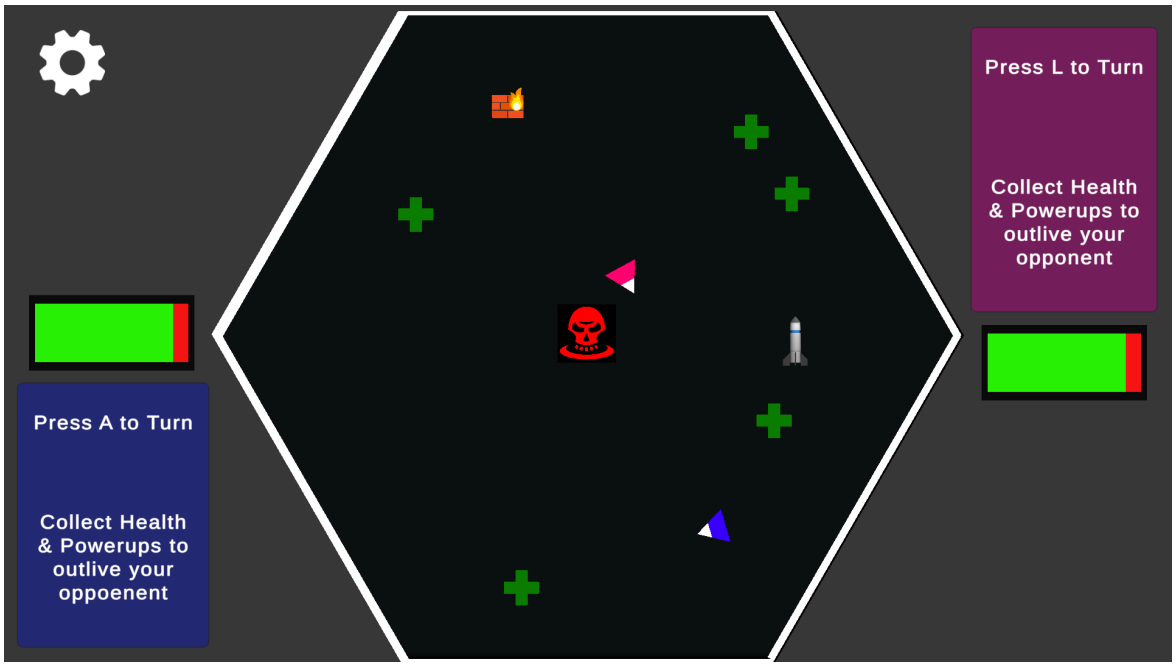
Week 15: Code refinement and Structuring, added guiding arrows for the player to navigate, polishing the overall game, checked whether sounds are in sync, final touches to the tutorial scene, game end scene implementation by properly structuring the UI, Completed the hypothesized issues and analytics

Tasks completed for the week:

- Conducted a comprehensive code review, enhancing readability and adhering to coding standards.
- Integrated guiding arrows into the game's UI for player navigation.
- Improved user guidance, especially for new features.
- Ensured interactive responsiveness and conducted extensive playtesting for feedback. Iterated on the design to optimize effectiveness.
- Fine-tuned graphics, animations, and visual elements for a polished aesthetic.
- Improved gameplay flow based on playtest feedback.
- Improved user guidance, especially for new features.

- Added game end scene to give a clear idea to the player about the winner when the game ends.
- Worked on the player respawn mechanic in the main game to show that the player needs to wait for some seconds to respawn after they hit the blackhole or are killed with player vs player collision. Added them to the main tutorial scenes as well.
- Fixed programming error and bugs in the whole game
- Enhanced gaming experience for the player with a single level which has an exciting set of mechanics and gameplay where the player needs to tactically outplay their opponents
- Fine tuned all the prefabs in the game to have a proper file and coding structure.
- Worked on version control and made minor modifications to improve the overall performance and response time
- Worked on the Game Design Document(GDD) as per the gold rubrics.

This week's efforts focused on refining the codebase, enhancing the player's journey with guiding arrows, polishing the overall game experience, ensuring synchronized audio elements, perfecting the tutorial scene, implementing a compelling game end scene, and utilizing analytics to make informed decisions. The collaborative and iterative nature of these tasks contributes to an improved, engaging, and well-rounded game experience.



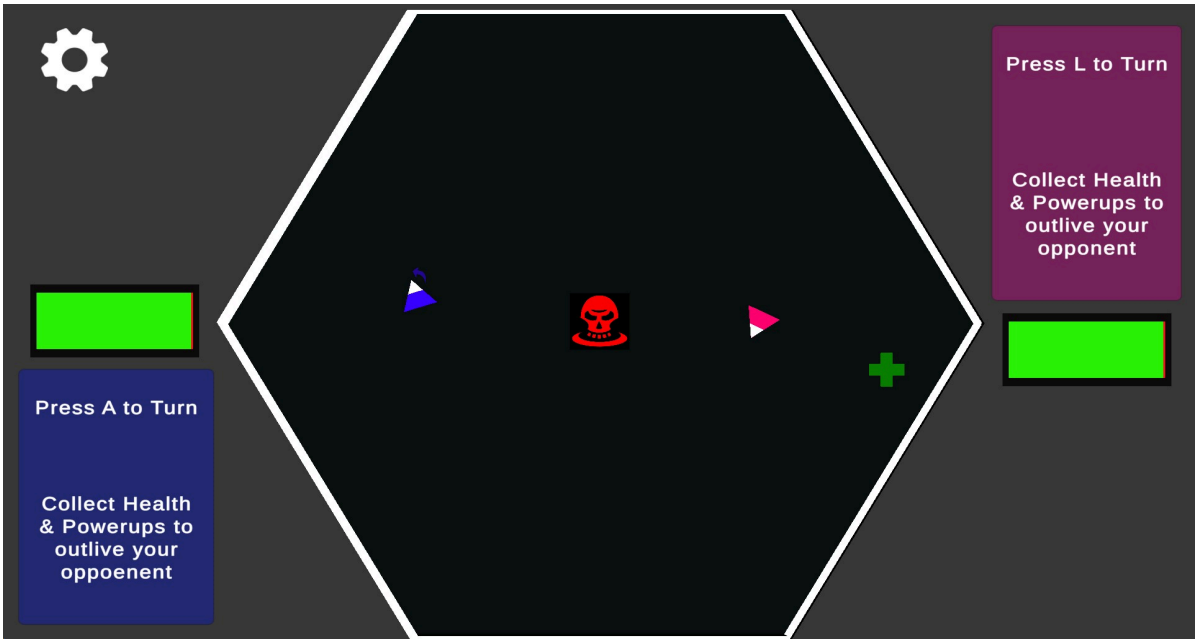
Final Game Design

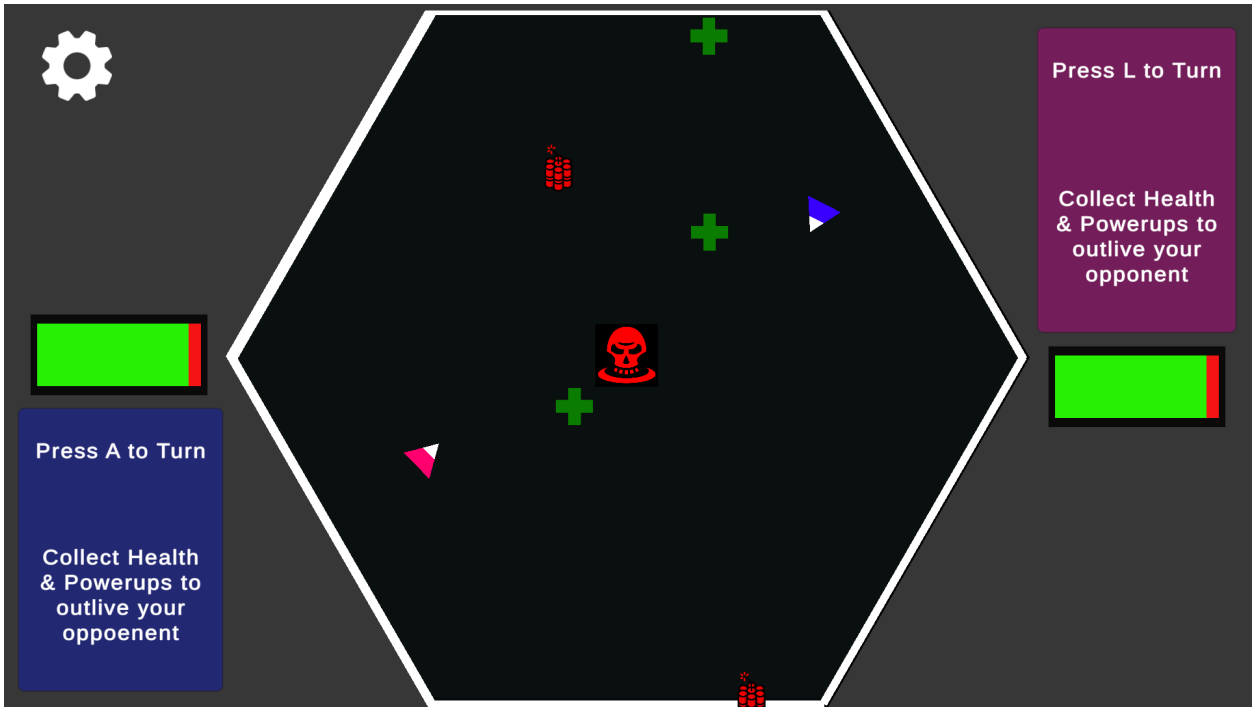
Game UI MOCKUP

We have initially created a basic UI for our game.

Game Start Scene: This is the first scene observed by the player. The player can start the game by clicking the play button.

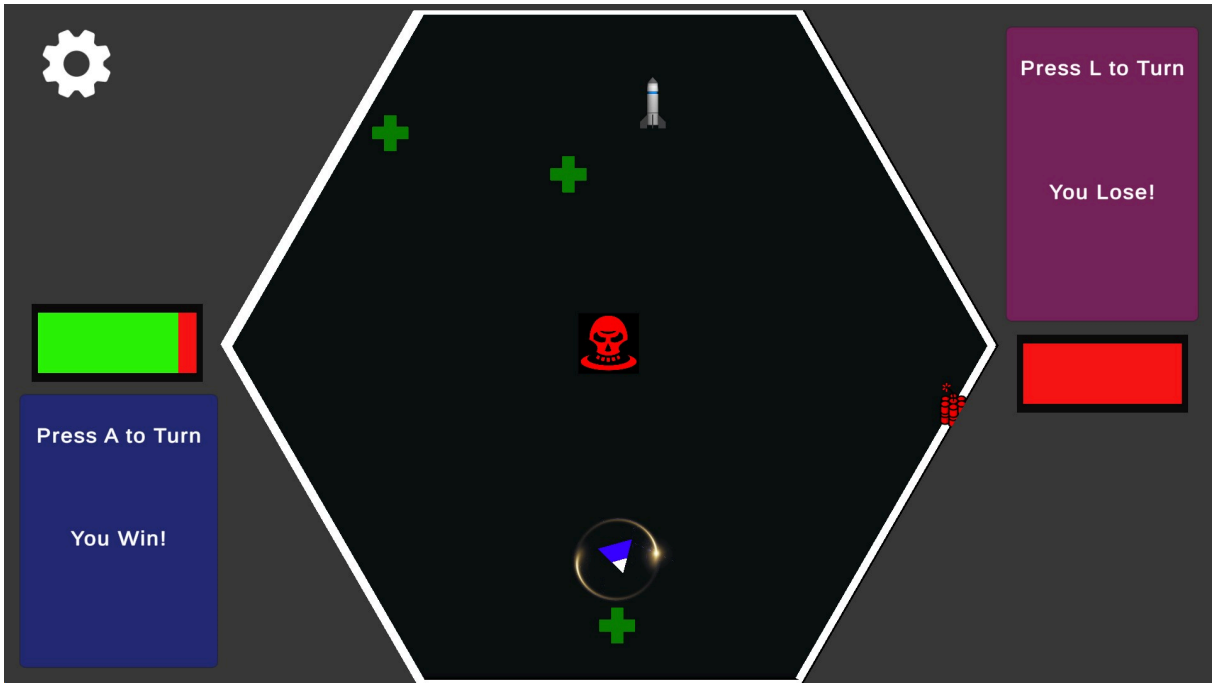
Main game scene: This is the main game playground where the actual game starts.



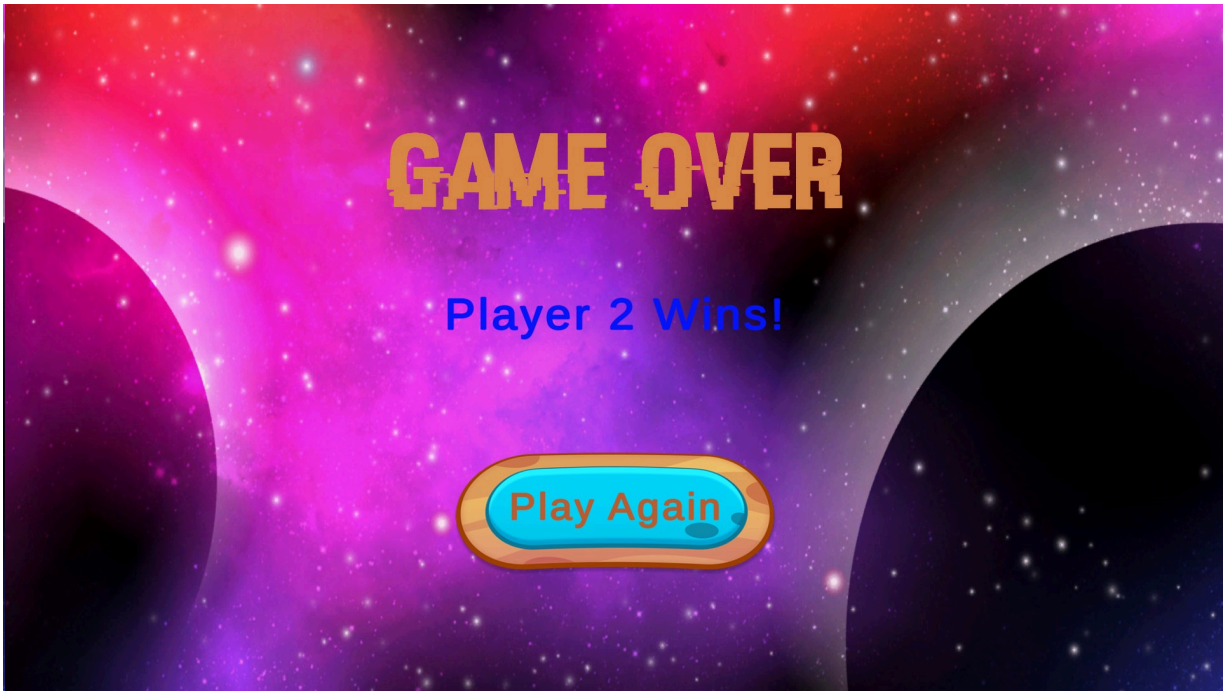


Settings Panel: Panel to restart and resume the game

Game End Scene: This is the game over scene which appears when a player loses the game as the player's health reaches zero. We have added a ring around the player to indicate that he has won.



The winner is highlighted with a ring around it along with on screen notifications



Final Game End Scene to display the winner

Level Mockup

Enhancing Gameplay with Power-Ups as Level Progression Mechanisms

In the realm of game design, the inclusion of power-ups is a well-practiced art, serving as a means to elevate the player's experience and intensify the challenge. While they can certainly be a source of advantage, their role as level mockups goes far beyond mere empowerment.

Power-ups, thoughtfully integrated into various game levels, act as pivotal instruments in heightening the overall difficulty and engagement. These in-game enhancements, represented in various forms, such as items, abilities, or collectibles, invite players to navigate each level strategically, pushing their skills to the limit.

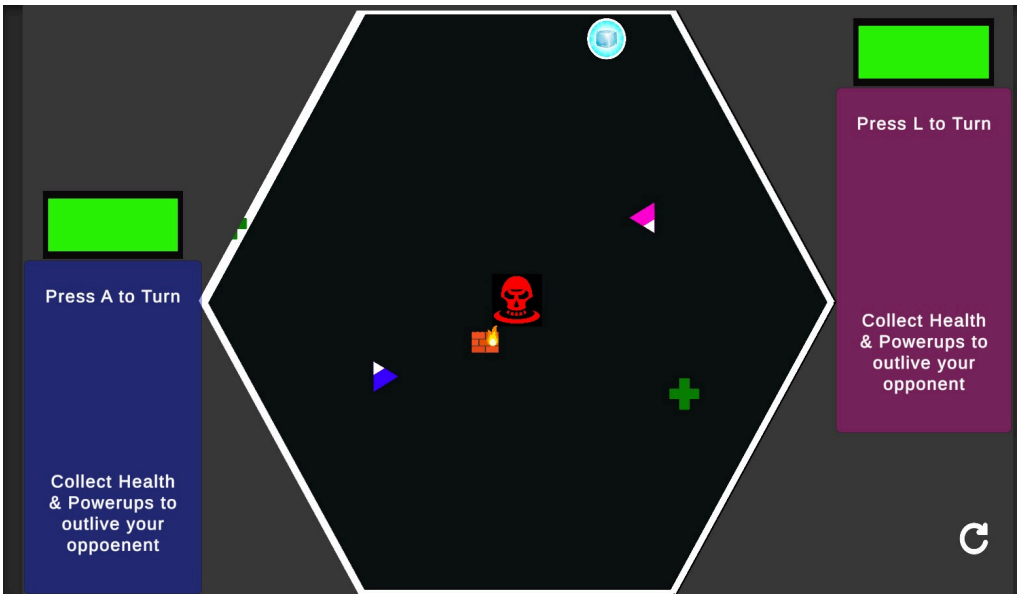
The essence of this design approach lies in its ability to provide a dynamic shift in gameplay. By skillfully distributing power-ups across levels, game developers entice players to explore and adapt, instilling a sense of adaptability and resource management. Collecting these power-ups becomes a test of wit and agility, effectively amplifying the challenge.

We have added the Freeze, Fire Wall and Homing Missile Mechanism to give a dynamic perspective to our game, which allows the player to tactically outplay their opponents, which makes it an exciting addition to the gameplay. We have also added a slice charge up mechanic that gets activated every 20 seconds in the game.

- **Powerups:**
    - **The FireWall power-up** transforms the battlefield, animating fiery barriers that close in on the black hole, intensifying the risk of collision. Players can't deploy the barriers but must strategically collect the power-up, as contact with the fiery walls causes health loss, adding a dynamic challenge to the game. Adaptability and precise timing are essential for success in this thrilling gameplay twist.

    - **The Freeze power-up** adds strategic depth by allowing players to temporarily immobilize opponents. This opens up opportunities for health gain through collisions or collecting items, enhancing their chances of

survival in the cosmic battle. Quick thinking and adaptability are key in this exciting gameplay twist.

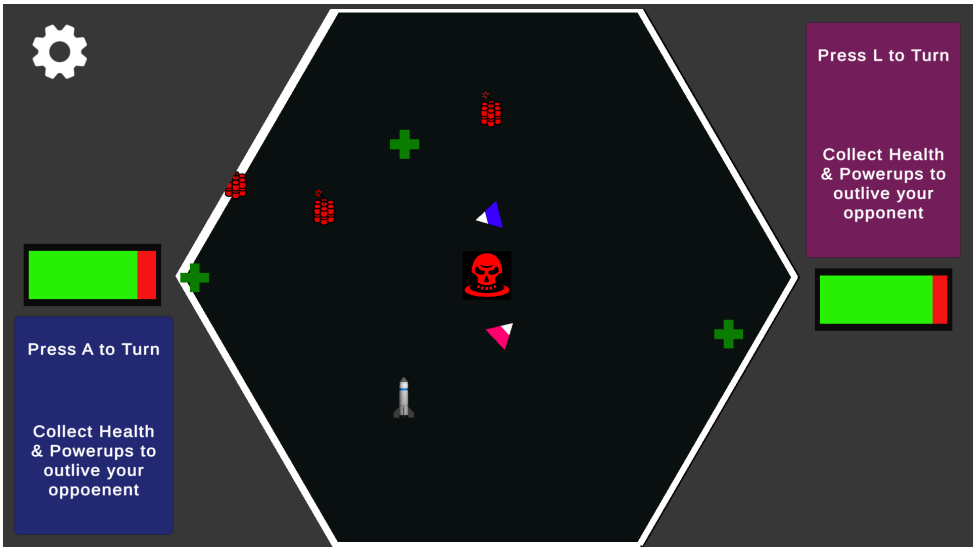


Powerups & Collectibles

- **Introducing the Slice Mechanic:** Every 20 seconds, a random slice of the game area is highlighted, with one slice marked in invigorating green and another in cautionary red. Players inside the green slice gain +2 health per second, enhancing their overall health.

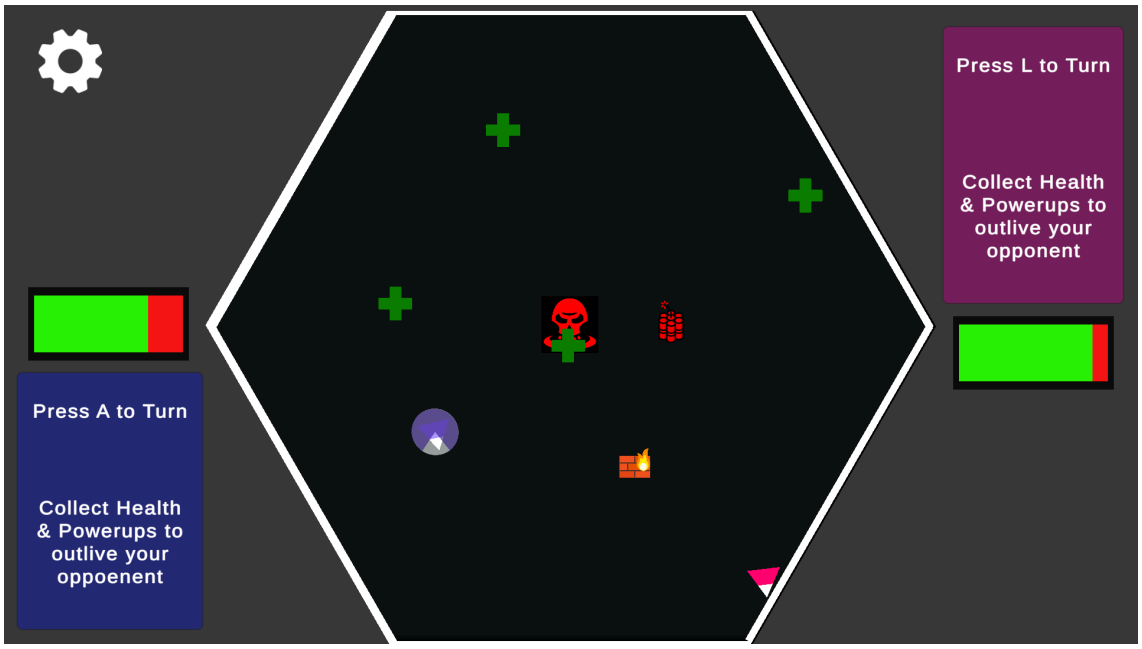
Slice Mechanic

- **Introducing the Homing Missile Mechanic:** "In our game, obtaining the missile powerup bestows players with a powerful advantage in the form of an instantly deployable homing missile. This enhancement is not only a game-changer but also introduces a strategic layer to the overall gameplay. To ensure clarity, the availability of the missile is visually indicated, allowing players to discern when this potent tool is at their disposal. The introduction of the homing missile adds dynamism to the gameplay. Unlike a straightforward one-hit elimination mechanic, the missile requires players to employ strategic thinking and timing. Players must assess the battlefield, considering factors such as the positions of opponents and potential obstacles. This creates a more nuanced and fair environment, as successful missile launches are contingent on the player's ability to tactically time their attacks rather than relying solely on the power of the weapon. The decision-making process becomes a key element in engagements. Players must weigh the advantages of using the homing missile for targeted damage against the risk of potential counterplay by opponents. This strategic depth not only fosters a more competitive gaming experience but also encourages quick thinking and adaptability in the heat of battle. In essence, the missile powerup introduces a layer of complexity that goes beyond sheer firepower. It rewards players who can make informed decisions on when and where to deploy the homing missile, promoting a more engaging and skill-based gaming environment. This addition elevates the overall gameplay experience by requiring players to think strategically and act decisively to maximize the effectiveness of this potent in-game asset."



Homing Missile Mechanic

- **Respawn effect in the main game:** When a player collides with the black hole or experiences player-to-player collision, the affected player is killed and subsequently respawns. The respawn process incorporates an animation timer effect displayed in a circular form over the player. This visual cue communicates the respawn duration, during which the player remains inactive before becoming active again, enhancing the overall gaming experience with a clear and visually intuitive respawn mechanism.



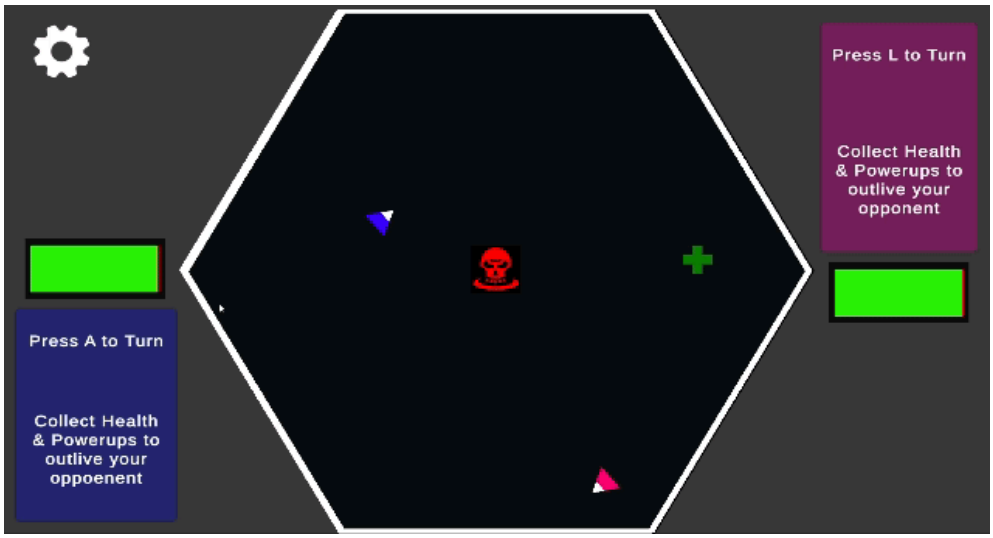
Player respawn

- **Illusion effect to elevate the gaming experience:** "In our latest game level, we've implemented a captivating illusion effect that significantly enhances the overall gaming experience. This particular feature introduces a dynamic element to the traditional static gameplay by incorporating movement into the placement of collectibles and power-ups within the game's playground. The illusion effect manifests as a visually intriguing scenario where these crucial in-game items appear to be in constant motion. This intentional design choice serves to create a visually deceptive environment, making it challenging for players to accurately predict the location and trajectory of collectibles and power-ups.

  The allure of this illusion lies in its ability to intensify the gaming experience. As players navigate through the level, the seemingly unpredictable movement of these items adds an extra layer of complexity. The challenge becomes not only

about collecting these essential elements but also about mastering the art of adaptation and quick decision-making within the visually dynamic setting.

This innovative approach not only tests the players' reflexes and spatial awareness but also encourages them to strategize and refine their gameplay techniques. By introducing an illusion effect that affects the movement of key in-game elements, we aim to provide a unique and immersive gaming experience that goes beyond traditional static environments. Players will find themselves immersed in a dynamic and engaging world where the pursuit of collectibles and power-ups is not just a task but an exhilarating journey filled with visual twists and turns."



Illusion effect Gif

- **Unique Feel Each Time The User Plays [REPLAYABILITY]**
    - The game incorporates randomness when it comes to spawning obstacles and power-ups.
    - Opponent behavior is also dynamic based on the experience of the game and can drive replayability
    - Progressively, the controls become difficult and require a level of mastery that serves as a motivation for players to battle again.

DESIGN MATRICES

Subject \ Object	Player Movement	Freeze	Firewall	Black hole	Slice chargeUp	Collectibles	Player vs Player Collision	Homing Missile
Player Movement Aviral Goel	Both players have identical movement abilities.	Player movement is slowed down on collecting Freeze	No effect	Player is pulled towards black hole at all times	Player has the opportunity to gain health by entering the green tint slice. Movement speed has no effect.	Player needs to collect green health collectibles to gain health and avoid red bomb collectibles.	Player can maneuver its movement and collide with the opponent to gain health.	The Missile follows the player movement path to inflict damage and reduce health
Freeze Niranjana…	Player movement is stopped /frozen on collecting Freeze	No Effect as its the Game Object	No effect	No effect	No Effect	When freezed the players movement becomes slow for a short duration so he will be unable to collect collectibles	Player has the opportunity to collide with the freezed player to gain health.	If a player is freezed and if he is targeted by the missile it becomes easier to inflict damage

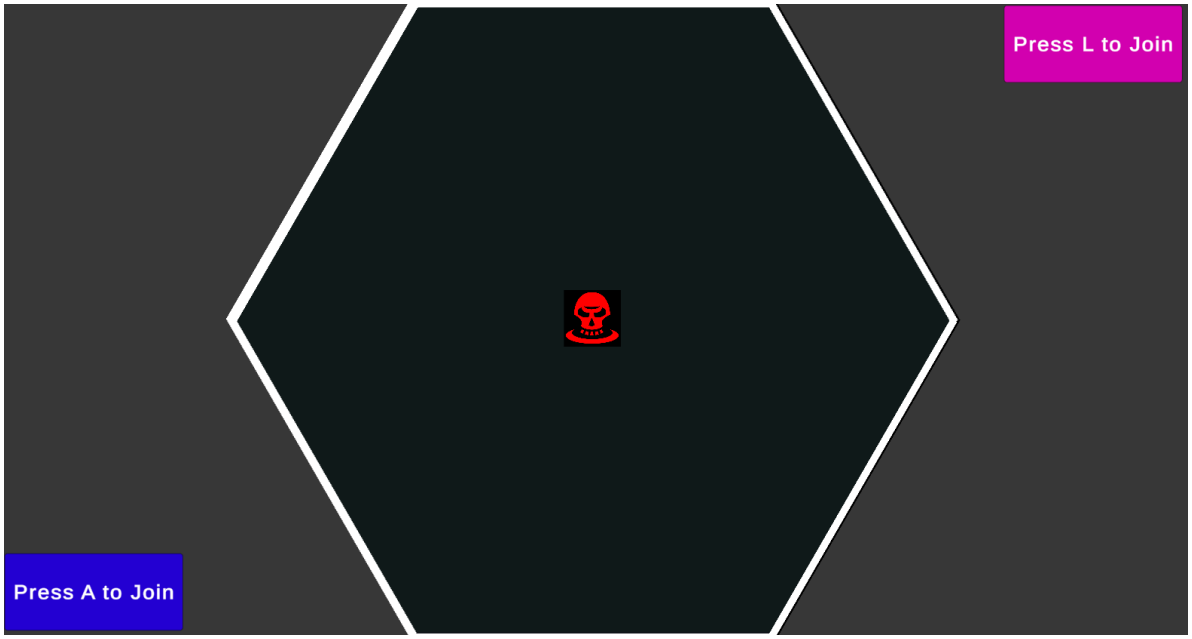
Firewall Sharan M…	The playground is minimized for a short duration and the player needs to control its movement to avoid the fire walls	No effect	No Effect as its the Game Object	The player has a higher chance of hitting the black hole and lose health	No effect	The collectible spawning area reduces and makes it difficult for the player.	Playground is minimized which gives the player an opportunity to collide and gain health in a small playground.	The playground area is minimized and it is easier to target the opponent with the missile.
Blackhole Rahul Ag…	Player is pulled towards the blackhole at all times. If it hits the blackhole it respawns and loses health	No effect	The player has a higher chance of hitting the blackhole and lose health	No effect	No effect	No effect	No effect	No effect
ChargeUp Area Shweta K…	No effect on movement	The freezed player will have a lesser chance of getting points if it is far from the Charge Up	Both players have lesser area to cover to reach the Charge Up area	No effect	Every 20 seconds, the game area is divided into 6 parts for a 5-second duration, with one green-tinted slice	No effect	To get the green health points the player deliberately navigates and enters the slice which can allow them to collide	No effect

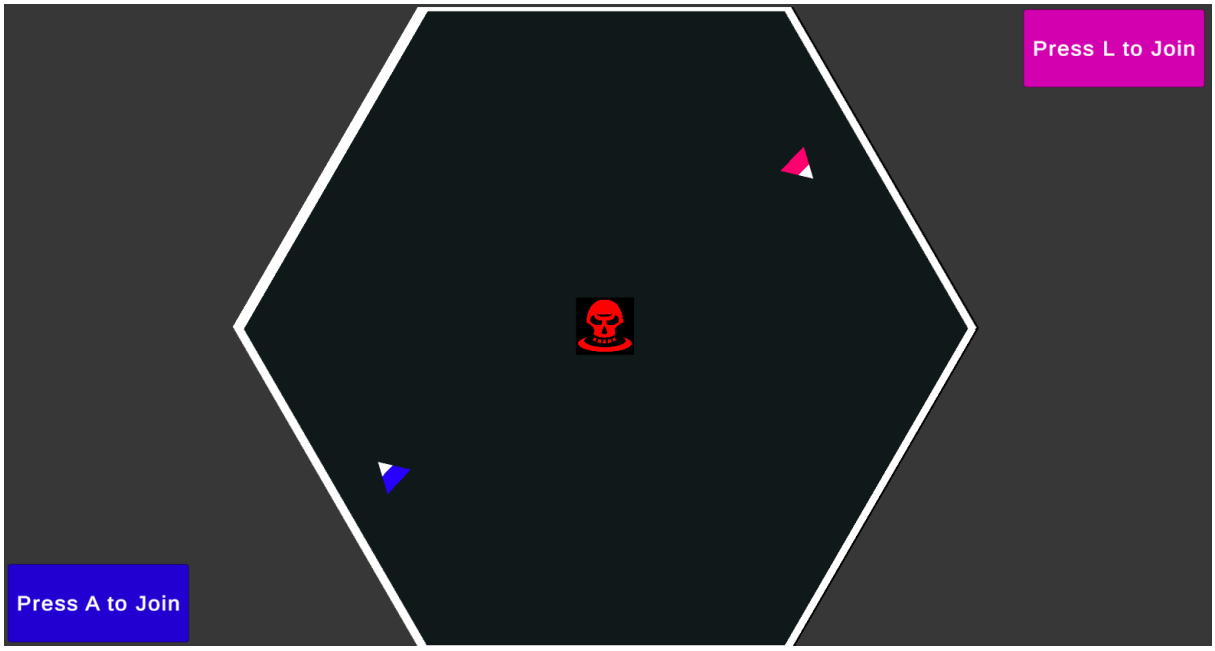
		area.			for health boost selected randomly.		and gain more health	
Collectibles	Randomly spawn in the playground and the player needs to navigate and collect it	Less chance to collect if a player is freezed.	Collectible spawning area reduces.	No effect	No effect	No effect as it is the gameobject	Player	No effect
Player vs Player Collision Kang Pin …	Player can maneuver its movement and collide with the opponent to gain health.	Makes it easy for the player to collide with their opponent who is freezed.	Playground area is minimized which makes it easy for players to collide and gain health.	No effect	To gain more health the player deliberately navigates and enters the slice which can allow them to collide and gain more health	No effect	No effect as it is the game object	No effect

Homing Missile Kang Pin …	The missile follows the player movement tracks and inflicts damage which reduces the overall health of the player.	The freezed player can be easily hit by the missile and it cannot escape the inflicted damage.	The area for missile launch is reduced which makes it easier to inflict damage and makes it tough to escape the missile hit	No effect	No effect	No effect	No effect	No effect as it is the game object

TUTORIAL / SCAFFOLDING

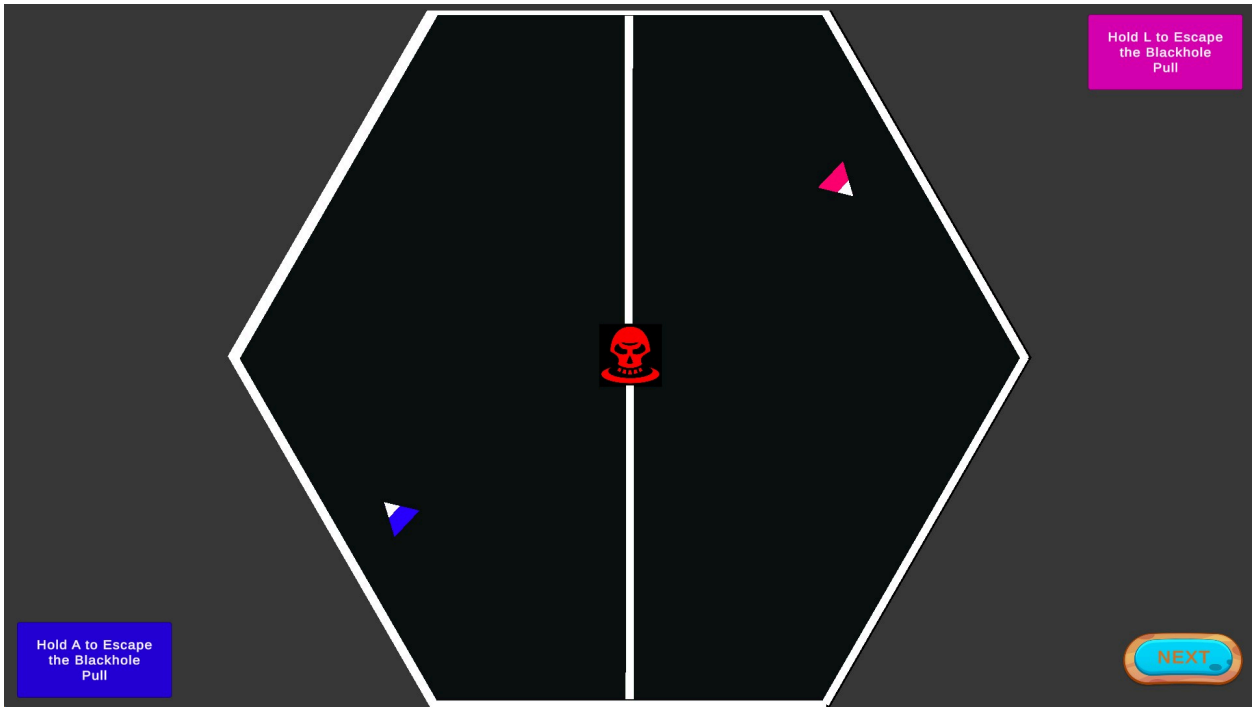
Tutorial Scene1: Instruct the player to join the game



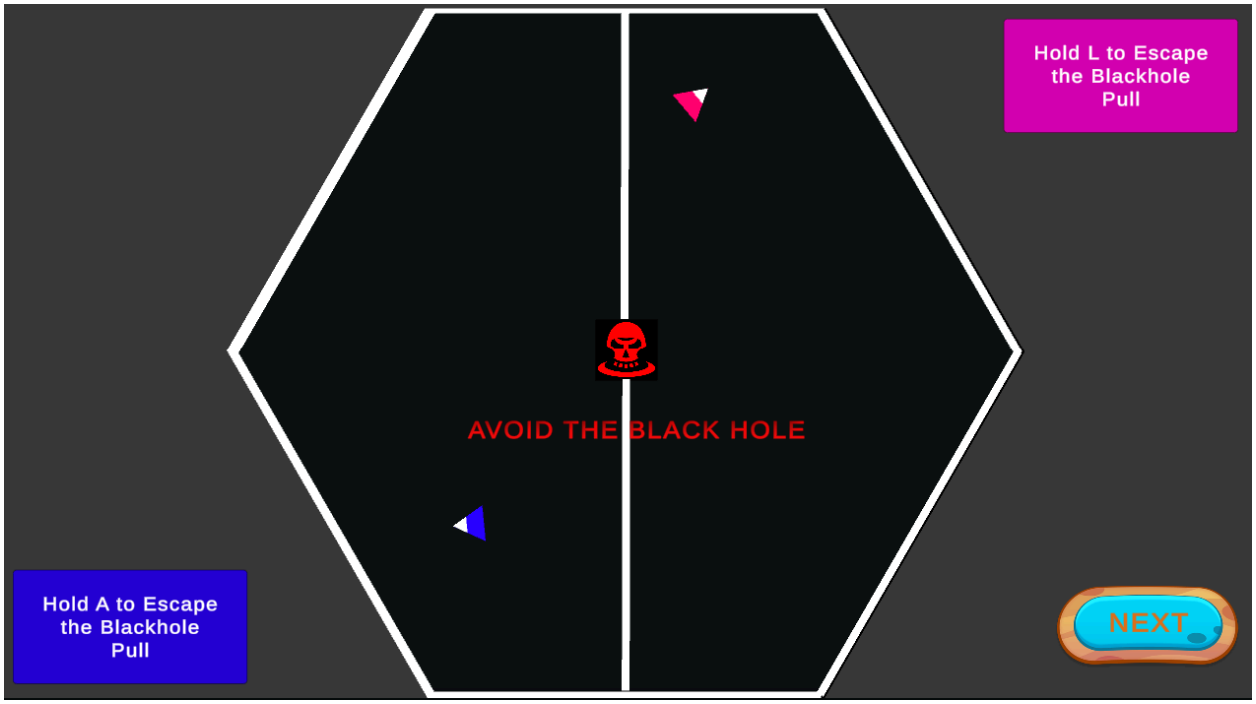


Player Joins the Game By pressing the Keys

Tutorial Scene 2: Help the player to figure out the controls of the game along with the significance of the blackhole

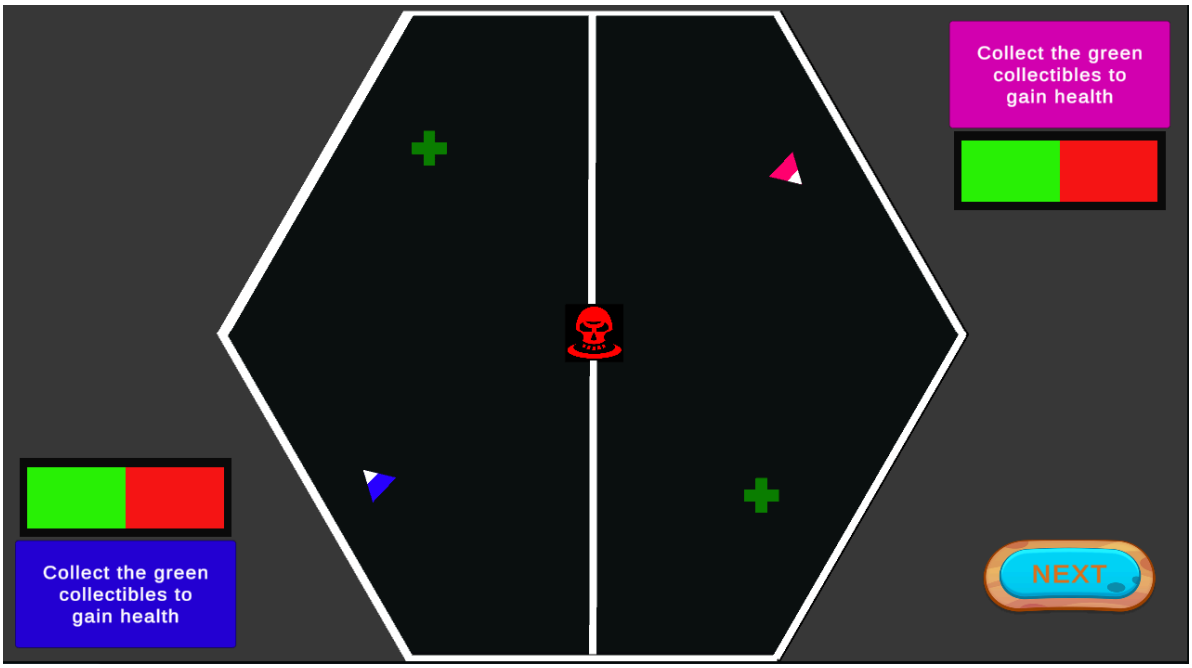


Player learns the movement by holding the keys and navigating it.

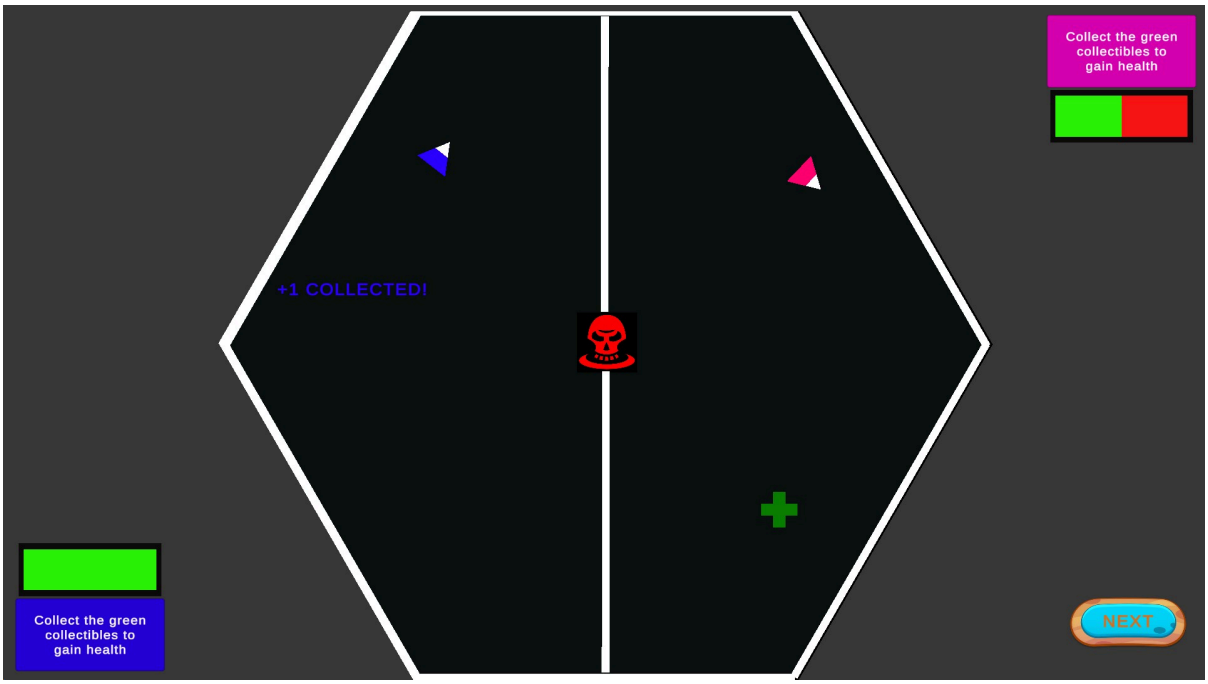


A message to avoid the blackhole pops up when the player moves

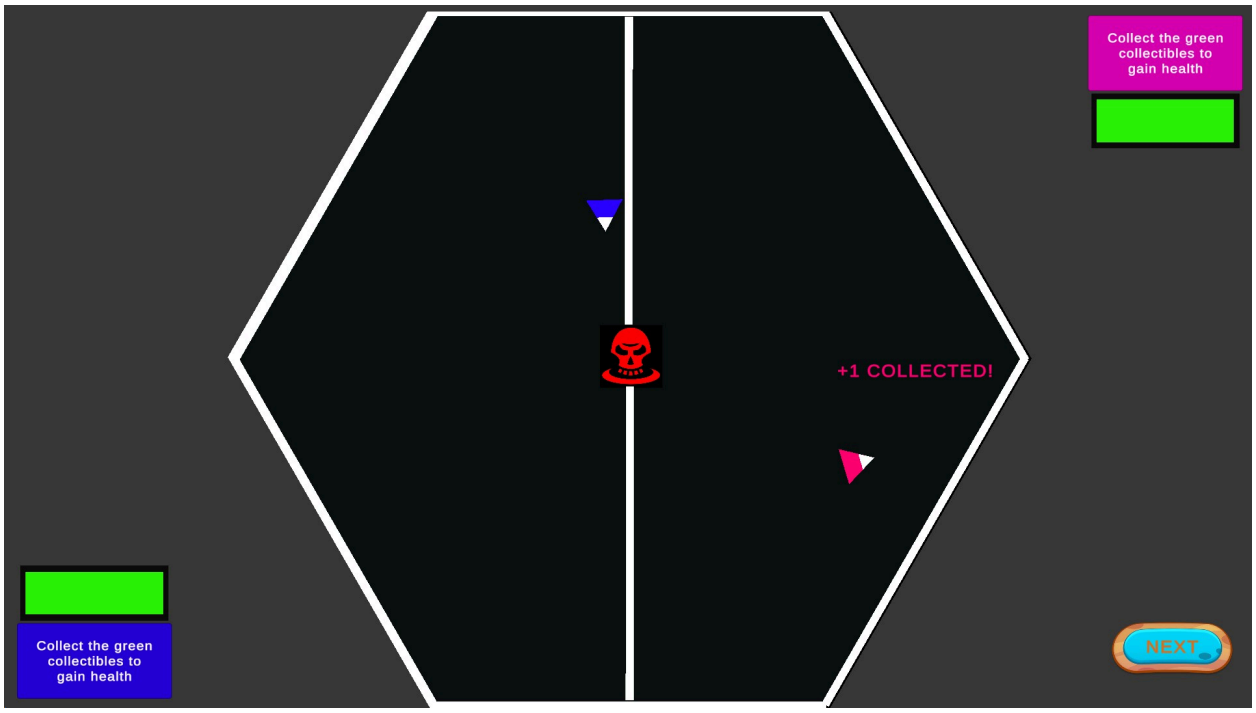
Tutorial Scene 3: Give a basic Idea of the goal of the Game: Collectibles Significance



Teaching how we can increase player health by collecting green health collectibles.

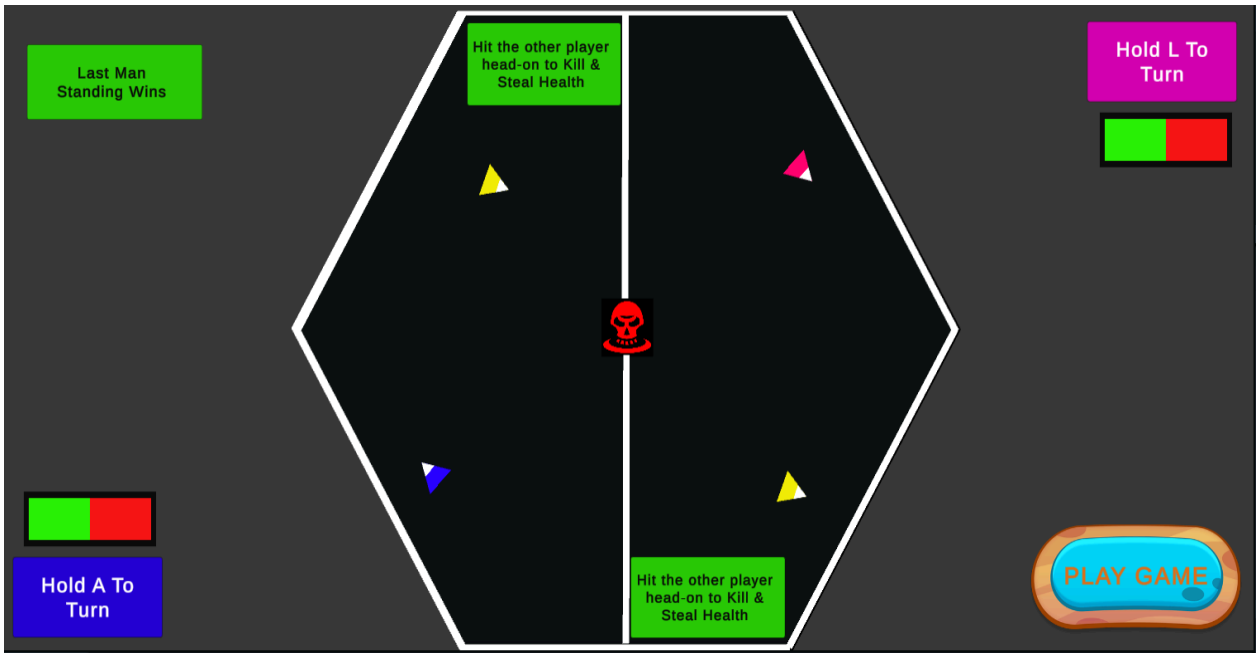


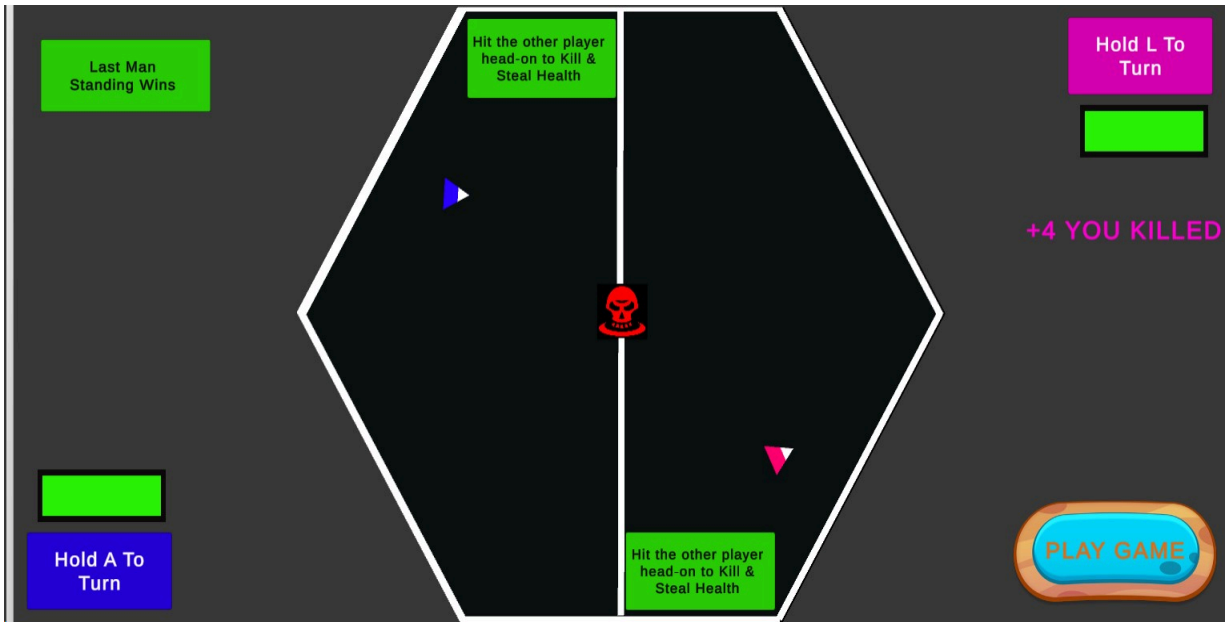
+points Animation text pops up on collecting the green health



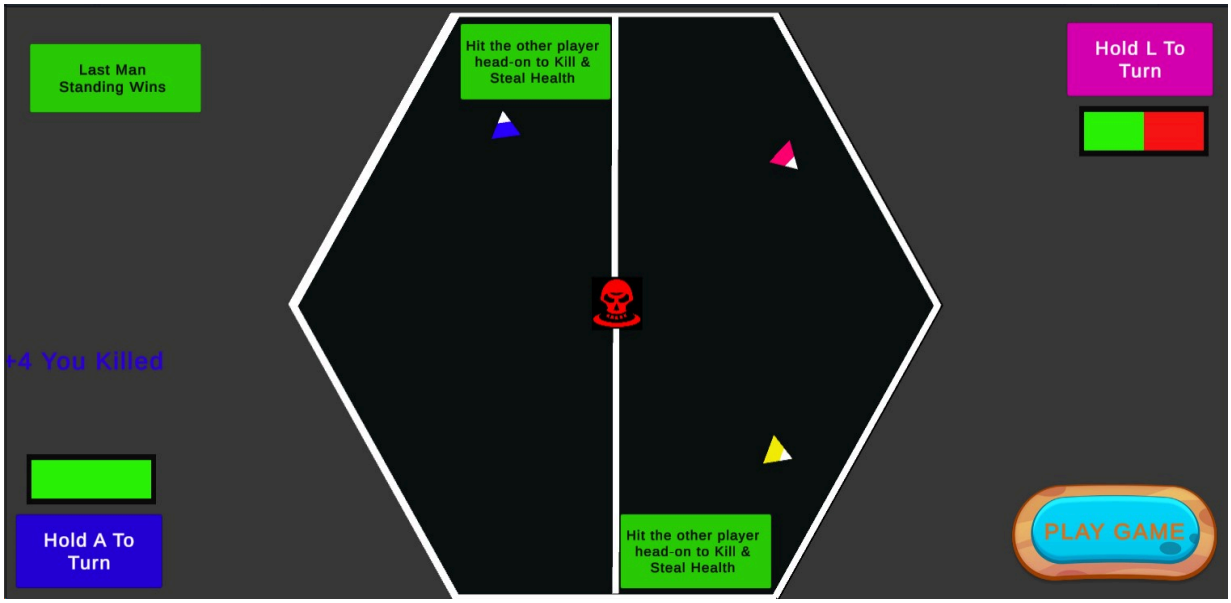
Tutorial Scene 4: Killing your opponent

Teaching how to kill a player to gain more health points during the dynamic gaming experience. It also specifies that the last man standing with more health would win the game.





+points Animation text pops up on killing your opponent and they respawn



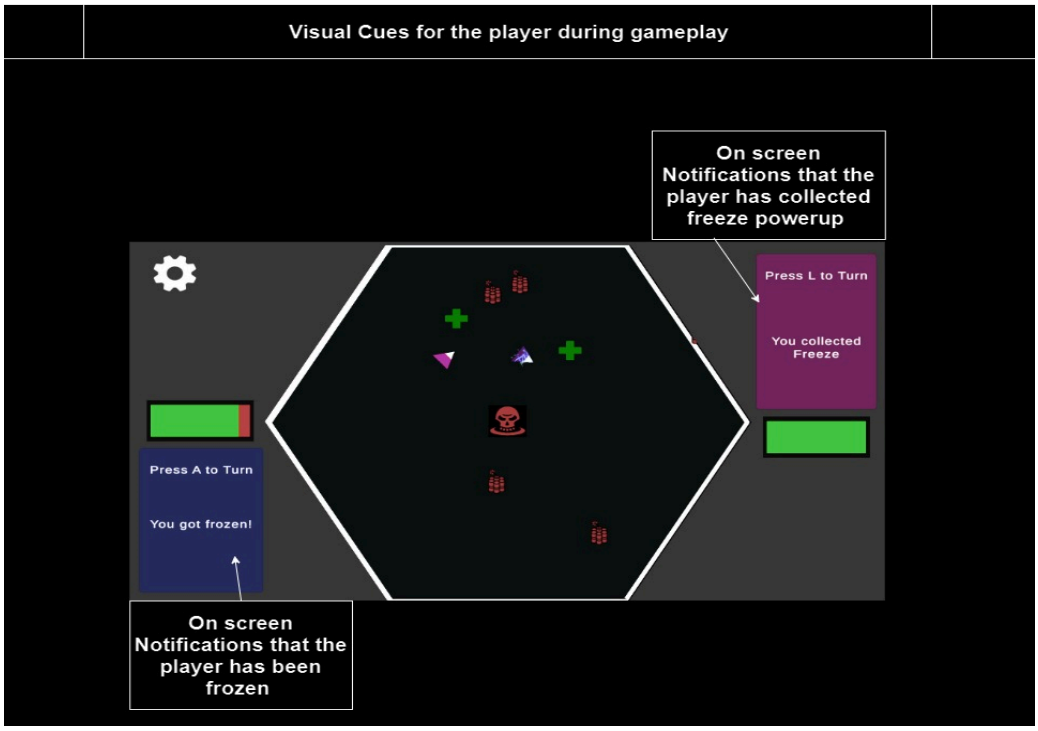
Both players are taught how to kill their opponent in the game

On-screen Notifications:

On-screen notifications are strategically placed in areas that are easily visible to the player without obstructing the main gameplay view. These notifications appear at the moment of a significant event, such as when a power-up is collected or activated. For example, when a player picks up a speed-boost power-up, a notification might appear near the character, accompanied by a brief visual effect like a burst of speed lines.

The text used in on-screen notifications is clear, concise, and easy to understand. Consistent formatting and visual style across all notifications ensure a cohesive and polished presentation. This consistency helps players quickly recognize and interpret the information conveyed by these notifications.

On-screen notifications are not limited to static messages. They can dynamically update to reflect changing conditions. For instance, if a power-up has a limited duration, the notification might include a countdown timer, providing players with real-time feedback on the remaining duration of the power-up.



Similar visual cues added for all powerups in the game in timely manner to give the player updates during gameplay

Progressive Game Design:

The game adopts a progressive approach to tutorials, introducing new concepts gradually rather than overwhelming players with information. As players advance through the game, tutorials build upon previously learned mechanics, creating a seamless learning curve.

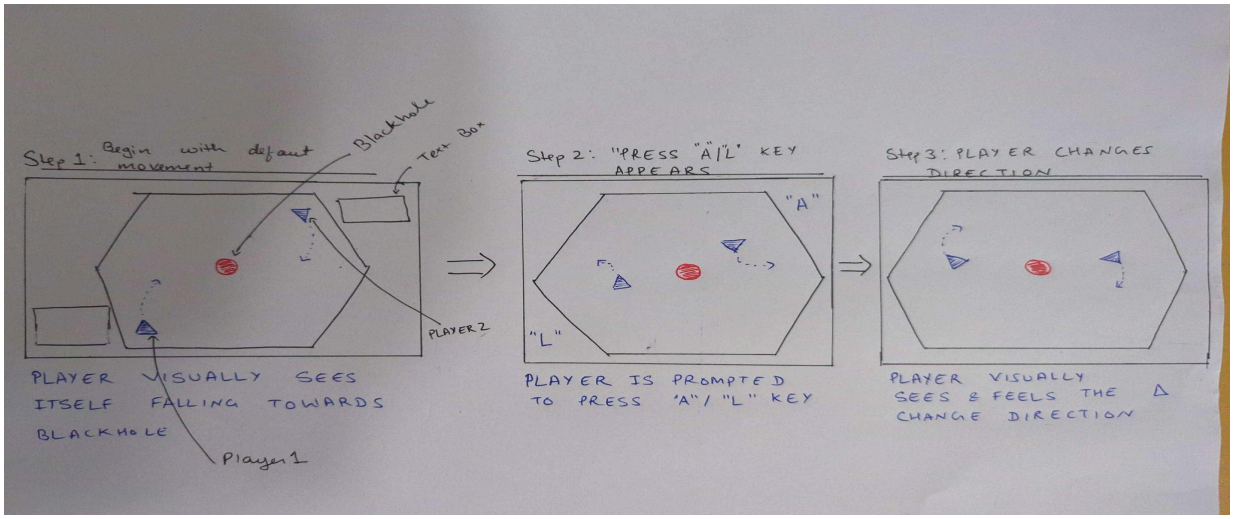
Tutorial messages are presented in a user-friendly manner, avoiding excessive text or complex instructions. Visual aids, such as arrows or highlighted areas, accompany the text to provide additional clarity. This approach ensures that even players new to the game can easily grasp the presented information.

By implementing these aspects, the in-game tutorials and on-screen notifications contribute to a player-friendly learning experience. They guide players through the intricacies of power-ups, fostering a sense of discovery and mastery as players navigate the game world. The combination of clear communication and interactive elements ensures that players can quickly adapt to new mechanics and enjoy a smooth and engaging gameplay experience.

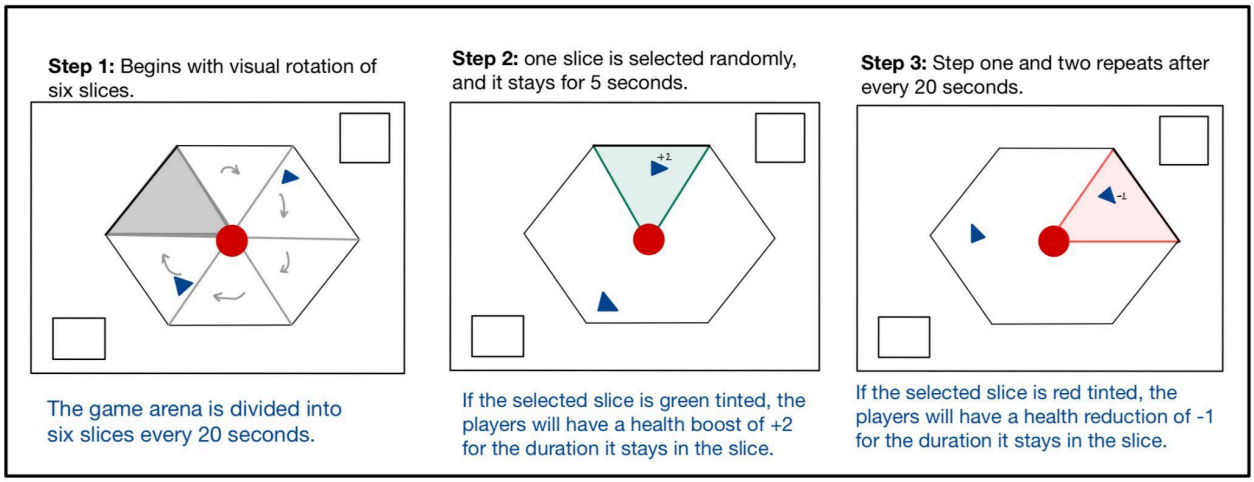
TEACHING THE MECHANICS

Player Movement Mechanic Sketches (Aviral Goel)

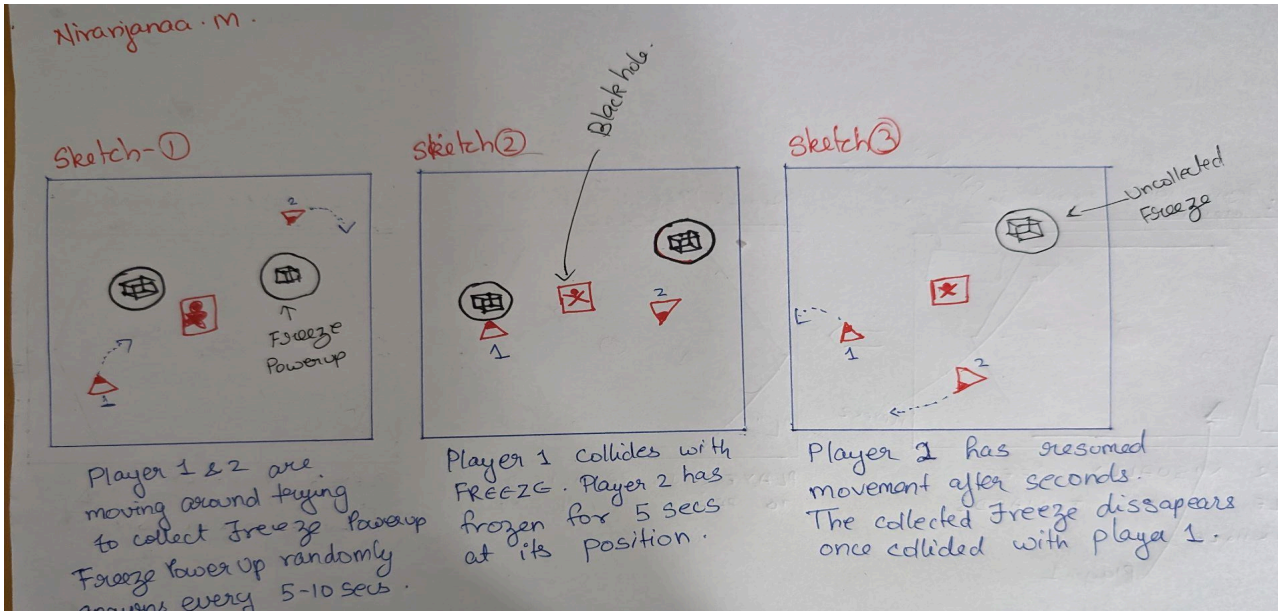
Tutorial Scene



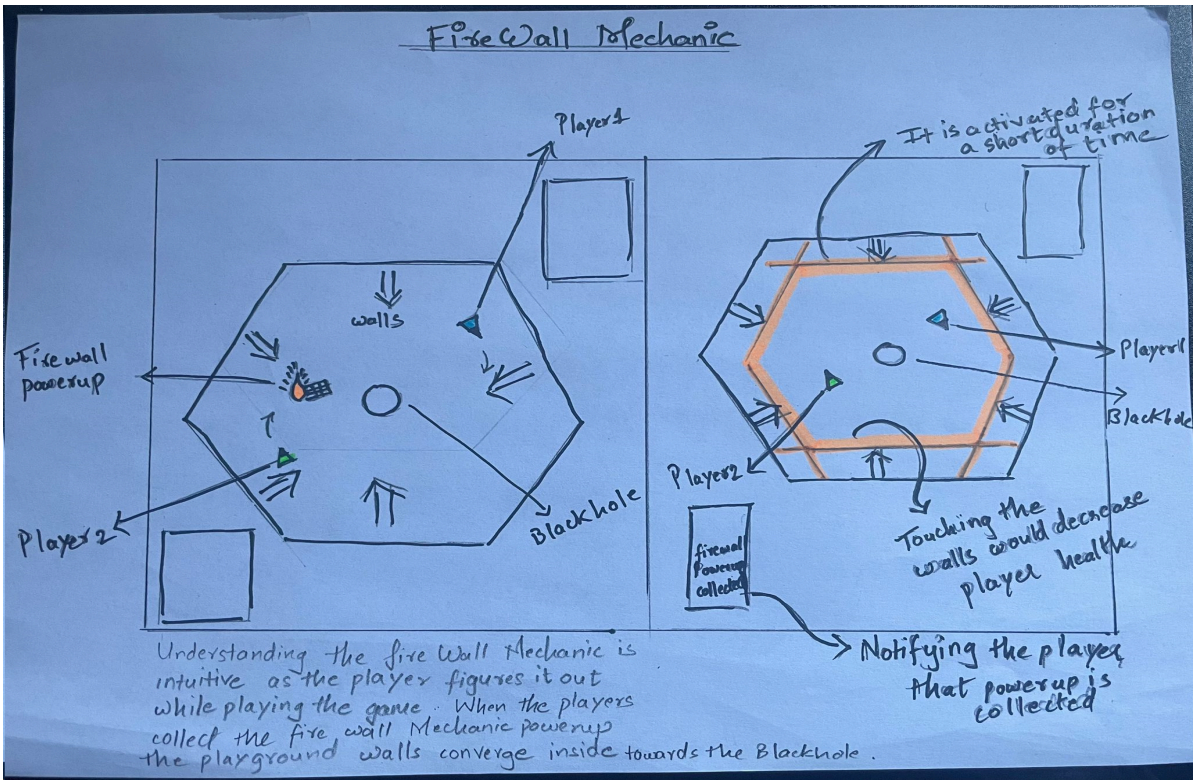
ChargeUp Area Mechanic Sketches (Shweta Kumari)

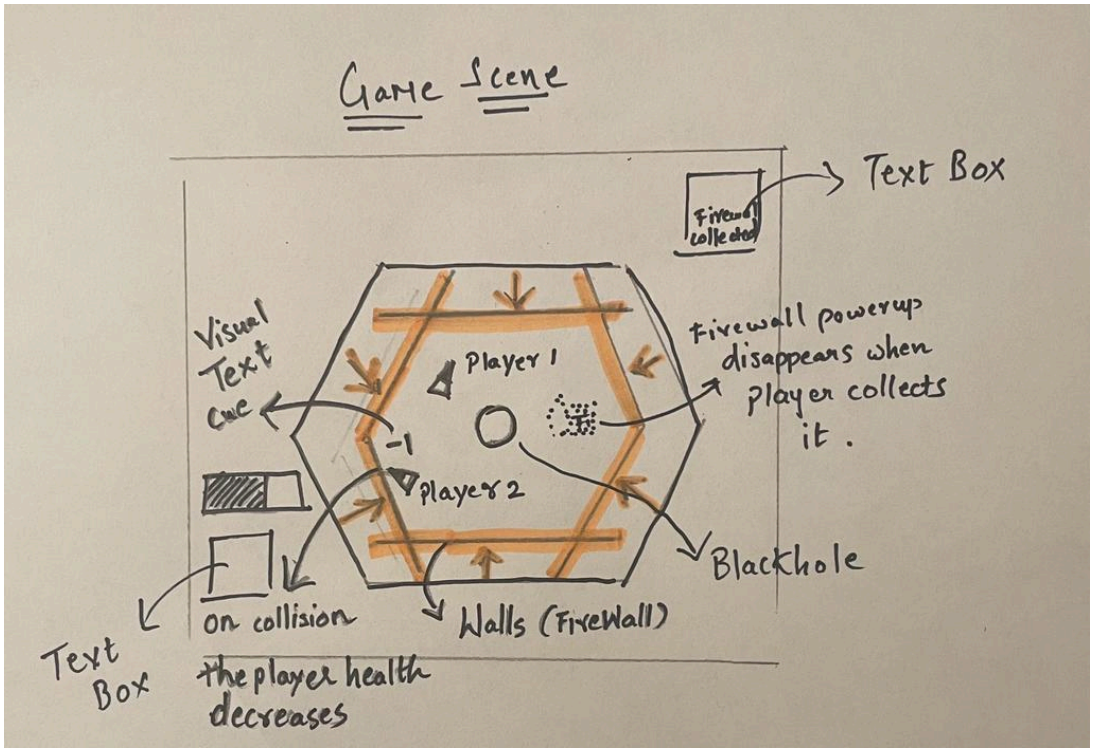


Freeze Mechanic Sketches (Niranjanaa Mohanbabu)

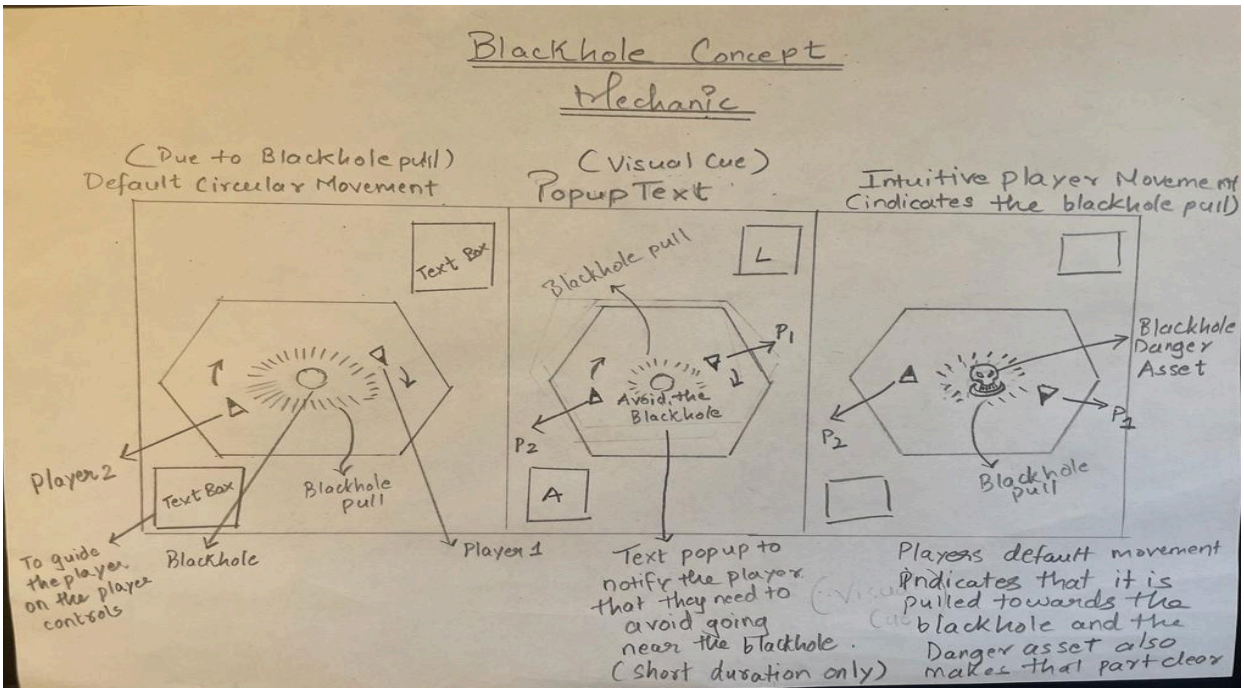


FireWall Mechanic Sketches (Sharan Murli -)

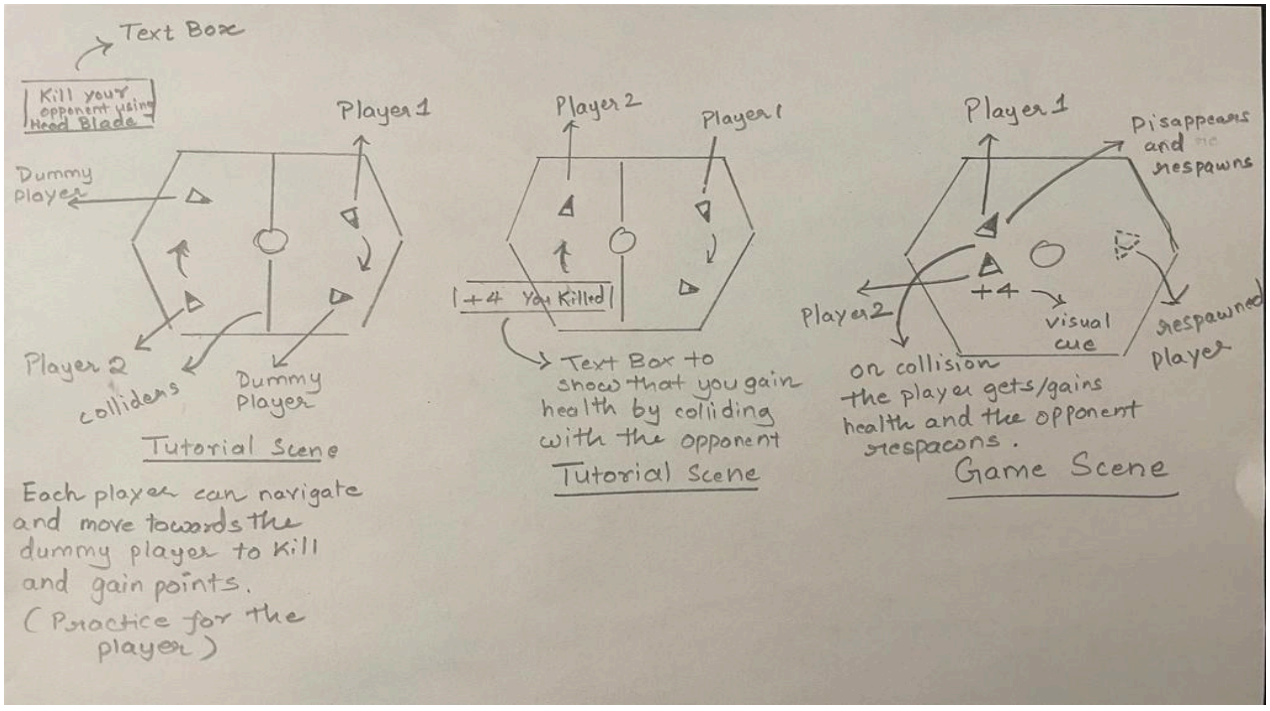




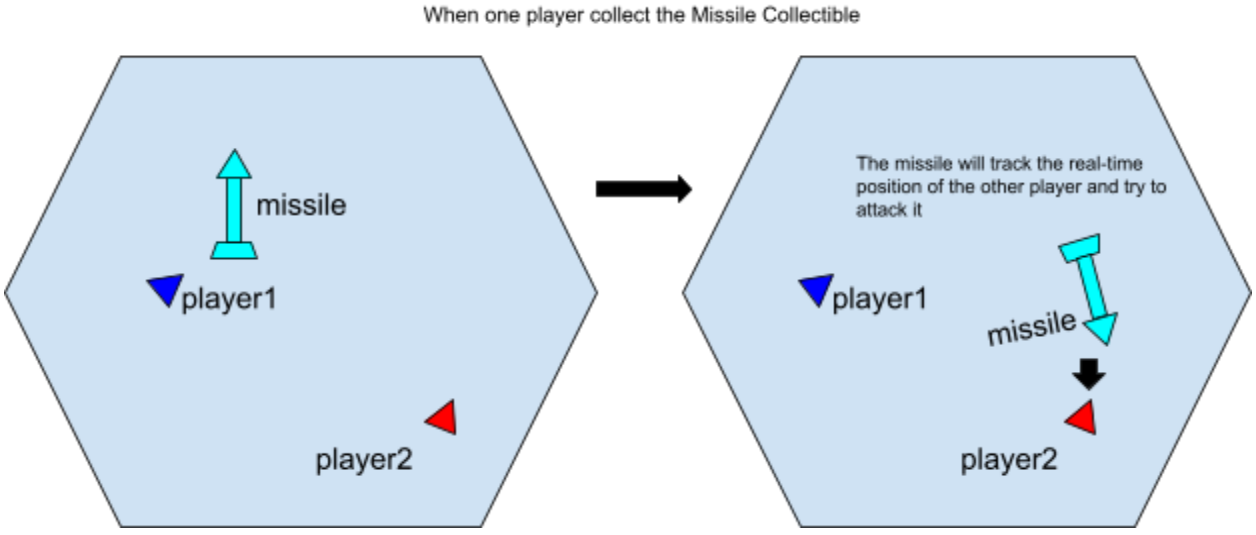
Blackhole Concept Mechanic Sketches (Rahul Aggarwal)



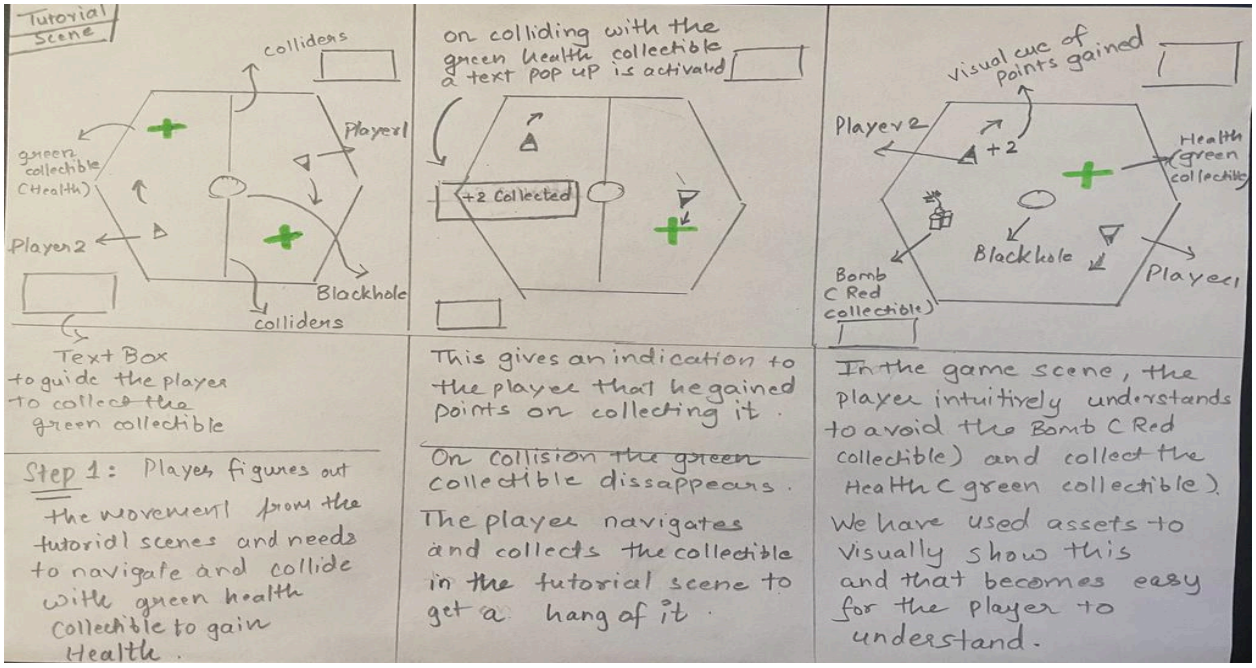
Player vs Player Collision Mechanic (Kang Pin Chan-)



Homing Missile Mechanic Sketches (Kang Pin Chan)



Collectible Mechanic Sketches



Analytics

Methodology

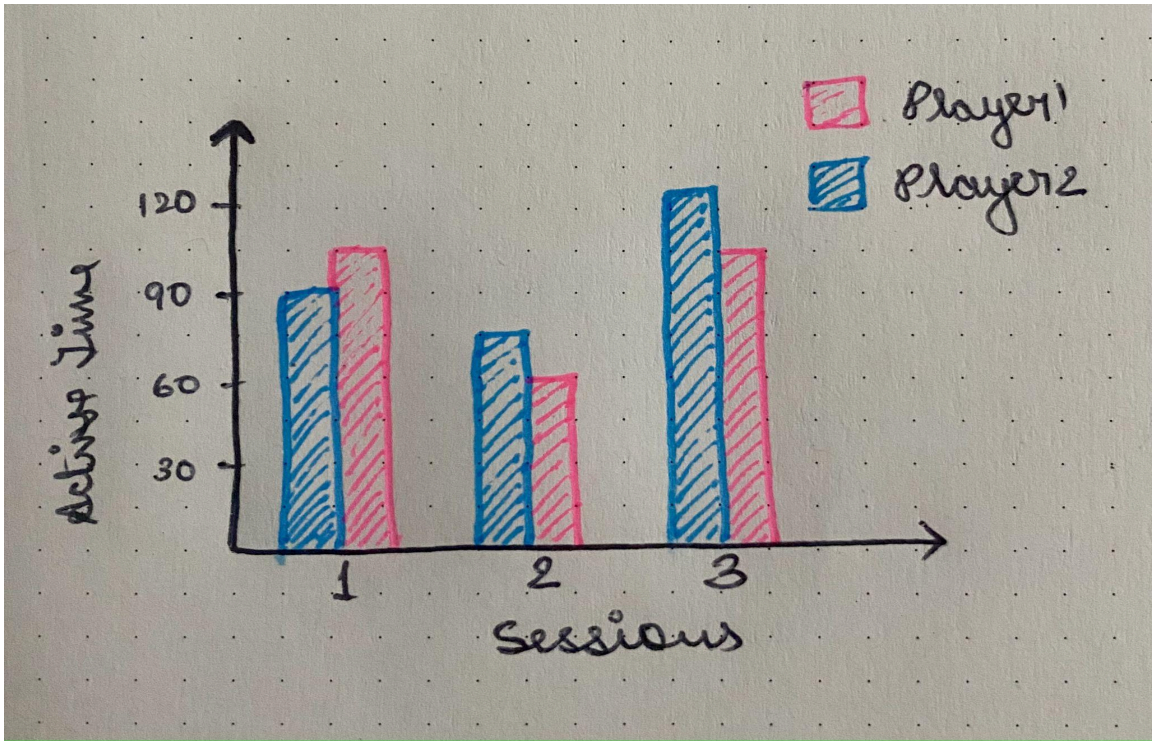
We used Google Forms to gather information for various fields in our game, which is integrated into our Unity Project using a C# script. After gathering the data, we utilized Python's Pandas Dataframe for data analysis.

Metrics and Graphs

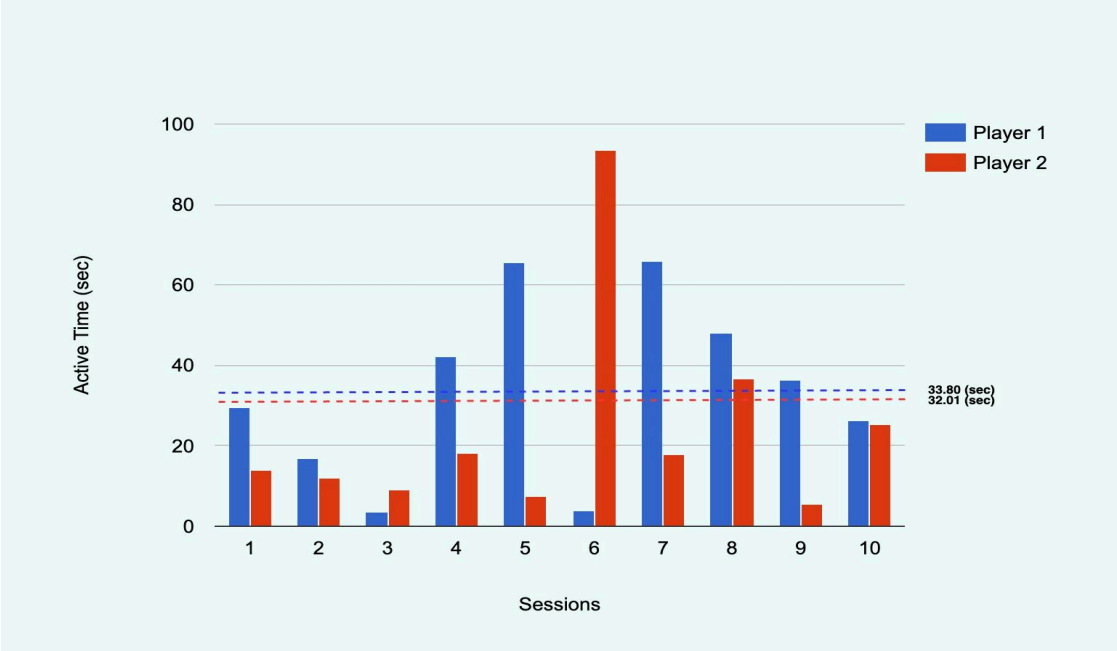
Metric #1: Analysis of Players' Game Engagement

Description: Mapping the amount of time both the players spend in one game session before they die and calculating the average game engagement from it.

Initial Sketch Diagram:



Pre-Mid Term Graph:



Graph1: Average Time Spent By Each Player In Each Session

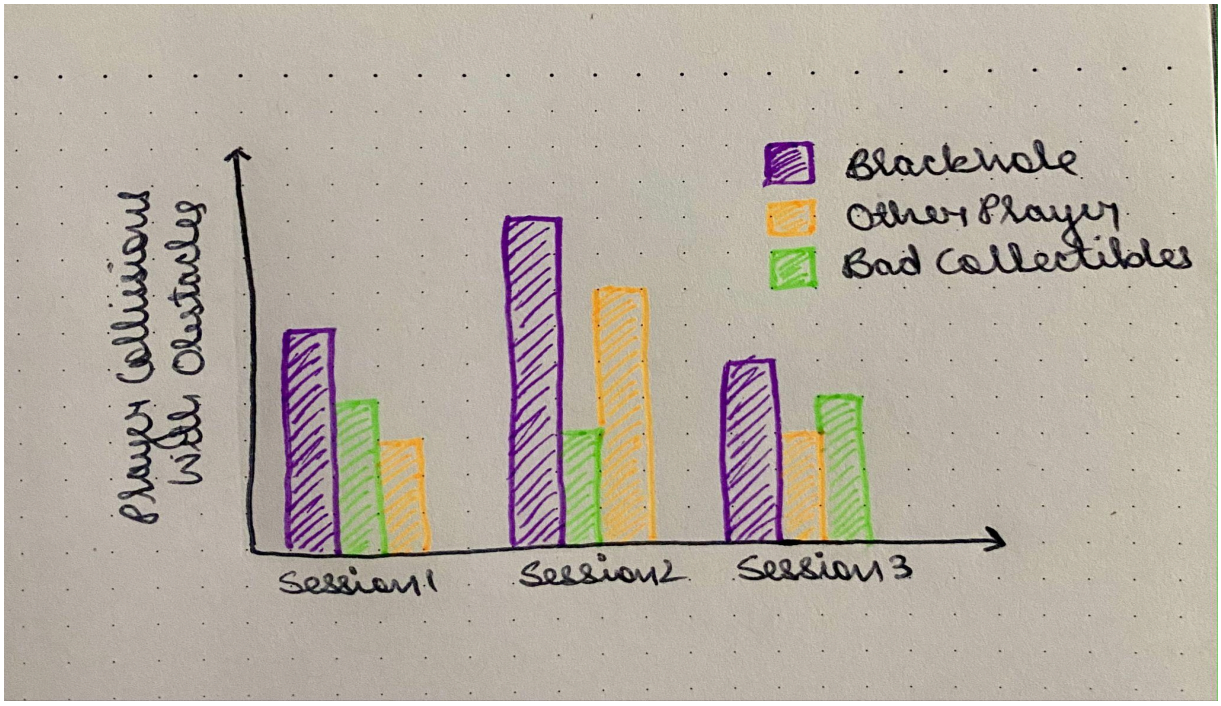
Explanation:
Measuring the time spent in the game by two players before it concludes is an important metric. This metric will offer valuable insights into the game's difficulty, player engagement with various elements in the game, and overall understanding as well as interest in the game. Analyzing this data allows us to understand how much time players invest in the game before dying.

Expectation:
The results of this metric will guide us in refining the game design. For instance, if players are taking longer than anticipated to finish certain levels, it may signal that these elements of the game are too challenging or confusing and require adjustment. Conversely, suppose players are completing the game relatively quickly. In that case, it might indicate that the game needs more challenging elements to enhance the overall experience, or the game ends before the user understands what needs to be done.

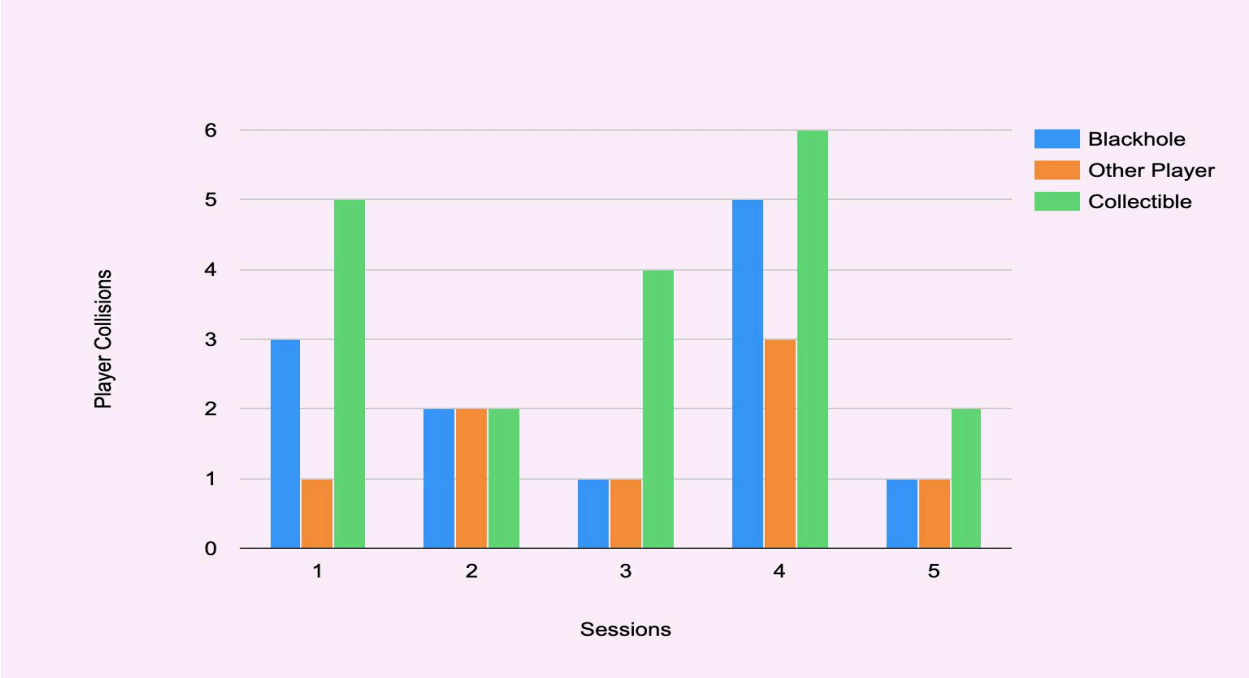
Metric #2: Analysis of Players Kills and Game End Conditions

Description: Mapping the number of times a player is killed by either a blackhole, another player, or a bad collectible in different game sessions.

Initial Sketch Diagram:



Pre-Mid Term Graph:



Graph2: Players colliding with Obstacles In Each Session

Explanation:

Measuring the frequency of a player's kill and score reduction by different obstacles, i.e. black hole, bad collectibles, and other players, is a significant metric since this gives valuable insights into the game's difficulty, comprehension, and overall navigation within the game. We aim to maintain a graph where the number of kills by blackhole, bad collectibles, and other players is as close as possible so that all game elements are explored, and we have a good game engagement.

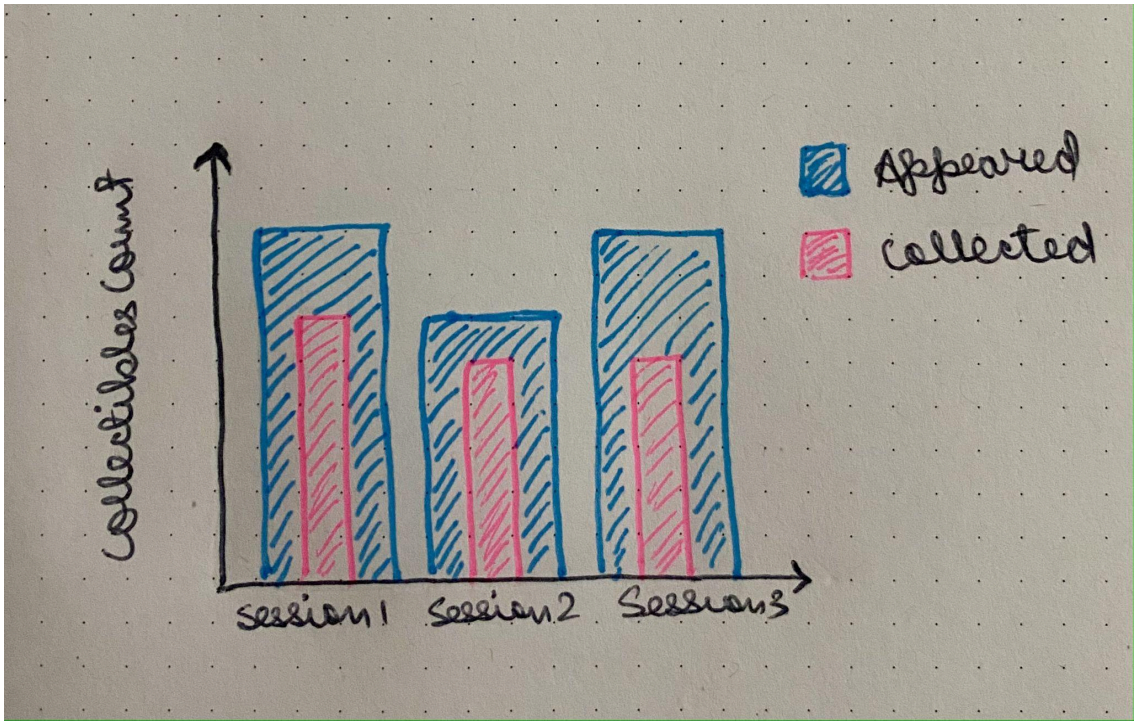
Expectation:

The importance of this metric will guide us in future game improvements. If the data reveals that players consistently meet their end due to a specific element, this aspect may be too formidable or unclear, necessitating adjustments. Conversely, if these encounters are infrequent, the game requires additional challenges to maintain player engagement and overall enjoyment.

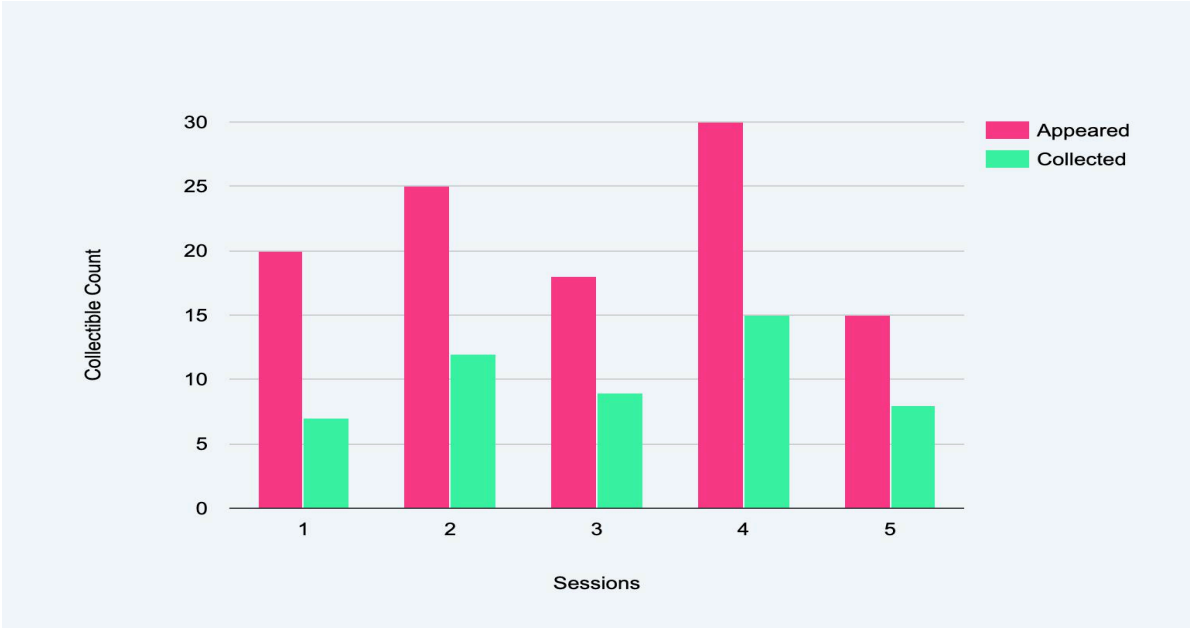
Metric #3: [Mock Up] Analysis of Collectibles that appeared vs collected

Description: Mapping the number of collectibles that appeared in each game session and the number of collectibles that the players collected.

Initial Sketch Diagram:



Pre-Mid Term Graph:



Graph3: Number of Collectibles Appeared vs Collected

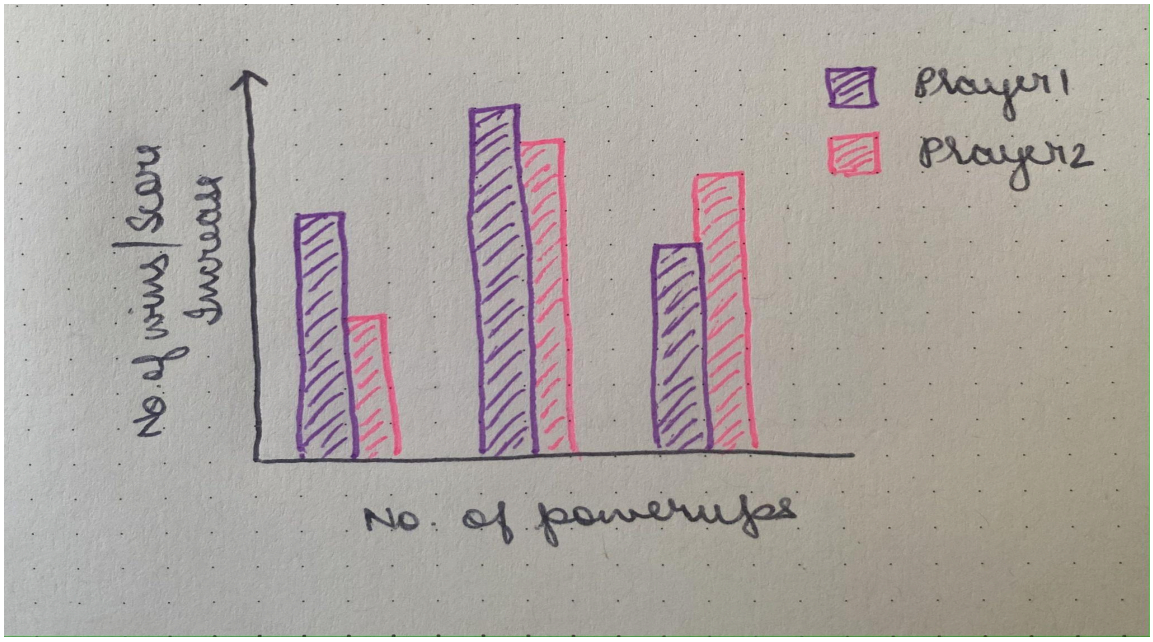
Explanation:
Assessing the correlation between the appearance of collectibles and the number of collectibles gathered is an important metric. It provides valuable insights into how well players engage with the game elements and their ability to navigate and seize these in-game items. Our objective is to achieve a balance where the number of collectibles that appear aligns closely with the number that players successfully collect, ensuring players have good control over the movement and the game is explored.

Expectation:
The significance of this metric will help us as a compass for future game enhancements. If the data indicates that numerous collectibles frequently go uncollected, these items are too challenging to obtain or are not adequately visible and need modification. Conversely, if players consistently gather most of the collectibles easily, it might suggest that the game needs to introduce more collectibles or increase their complexity to make the game more interesting.

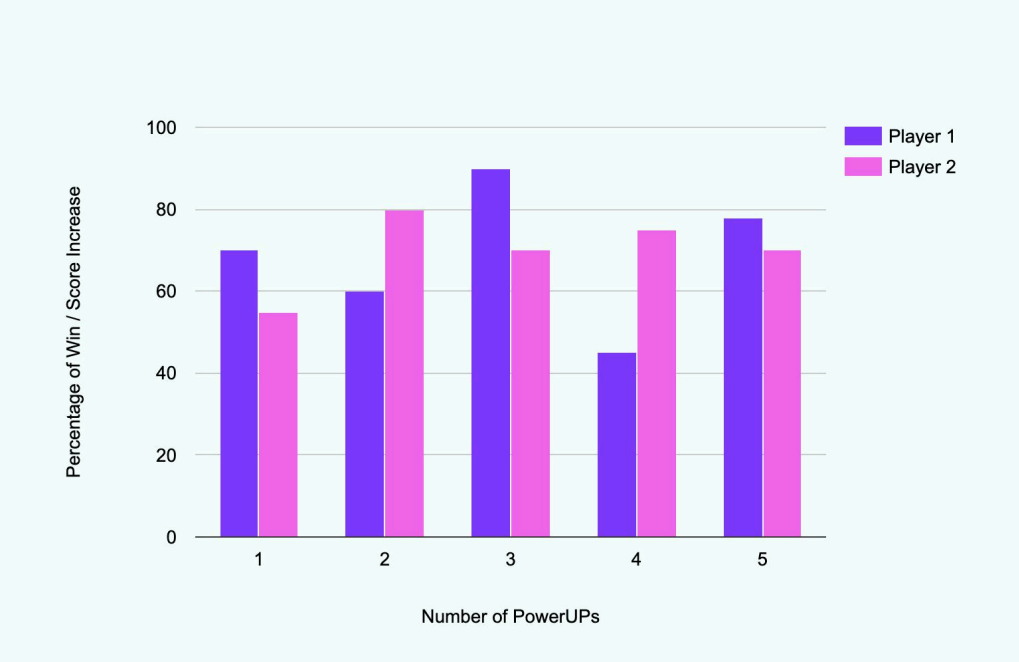
Metric #4: [Mock Up] Number of times the player collects powerups and shows their win condition/increase in score.

Description: Mapping the number of powerups that players collected in each gameplay and how it affected their win condition or increased in their score.

Initial Sketch Diagram:



Pre-Mid Term Graph:



Graph4: Percentage of Win/Score Increase with Number of PowerUps Collected

Explanation:

Employing this metric provides a clear retrospective view of how powerups enhance the player's score and, consequently, their likelihood of winning against opponents. As a result, data-driven adjustments can be made to the placement and characteristics of powerups, thereby enhancing the overall gaming experience. Strategic utilization of powerups is also anticipated to boost the game's average engagement duration

Expectation:

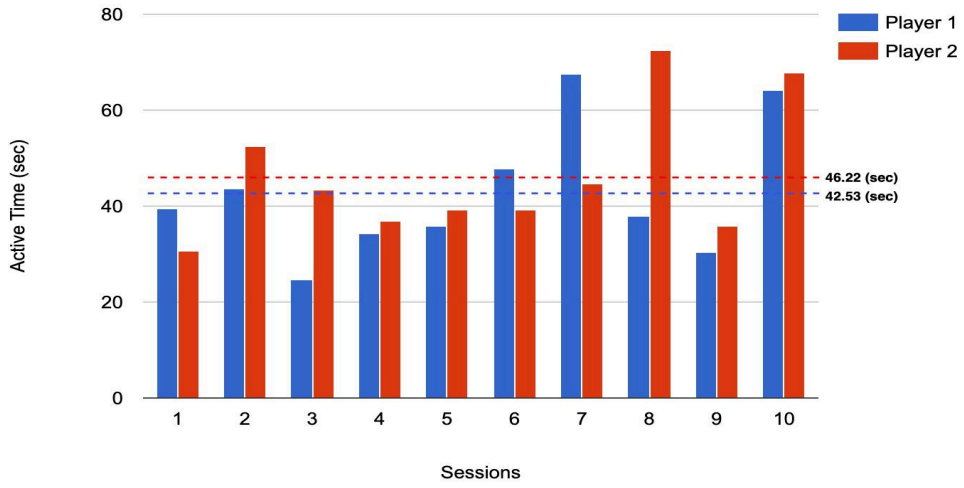
This metric is anticipated to shed light on the influence of powerups on the players' gaming experience and overall performance. It will guide decisions on optimizing powerup placement and attributes to ensure an engaging and competitive gaming environment.

Beta Metrics and Graphs

Metric #1: Analysis of Average Game Time

Description: Mapping the amount of time players spend in one game session before they die and calculating the average game engagement from it.

Post-Mid Term Graph:



Initial Analysis: Initially, players spent an average of 30 seconds in our game when it featured only good and bad collectibles. However, after introducing power-ups and additional game elements, the average game time increased to 45 seconds.

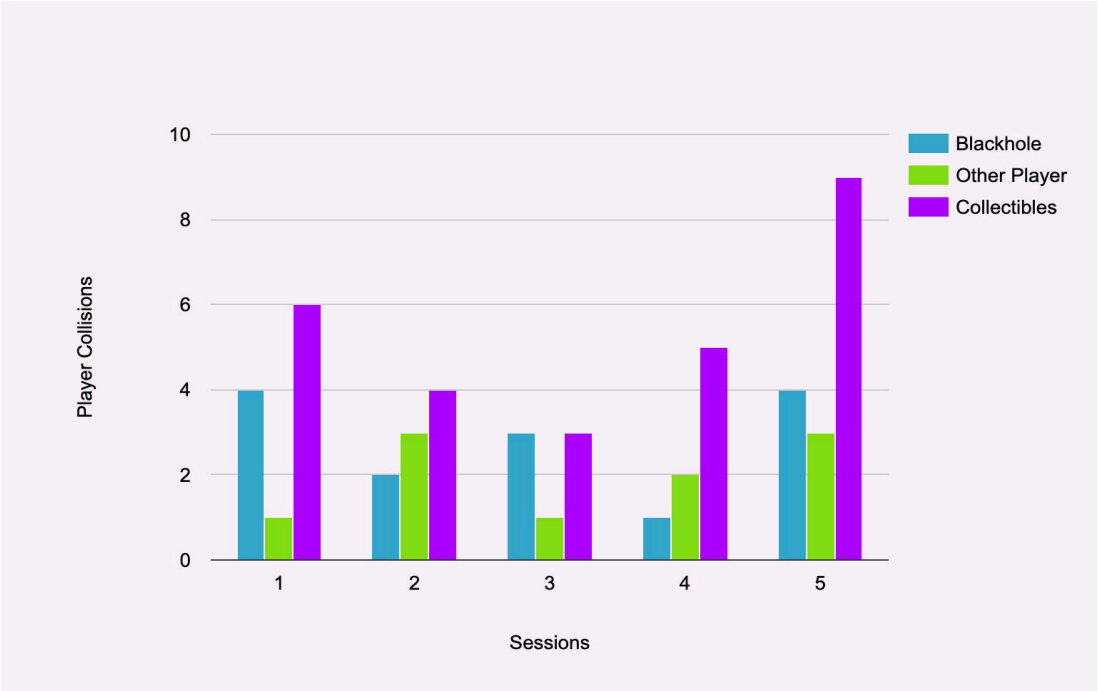
Observation: It became evident that players struggled to recover or extend their gameplay with just one good collectible available. Most other collectibles negatively impacted their health, leading to shorter game durations (around 40-50 seconds) even when players were eager to continue.

Solution: To enhance player engagement and extend the average game time, we have introduced a universal health-boosting power-up. This power-up rapidly replenishes the player's health compared to the standard good collectible. As a result, players have improved odds of defeating their opponents and prolonging their gameplay, contributing to an overall increase in the average game duration.

Metric #2: Analysis of Player Kills and Game End Conditions

Description: Mapping the number of times a player is killed by either a blackhole, another player, or a bad collectible in different game sessions.

Post-Mid Term Graph:



Initial Analysis: Initially, the primary cause of player deaths and health reduction in the game was the presence of overpowering black holes. This issue was addressed based on player feedback and data analysis, resulting in a reduction in the black hole's strength. However, bad collectibles continued to be a significant factor in reducing player health, while player-to-player collisions were the least common cause of health reduction.

Observation: Upon careful examination of player data and feedback, it became apparent that players needed more awareness of the player-to-player collision mechanism. The absence of clear instructions or visual cues in the tutorial or the game itself contributed to this lack of understanding.

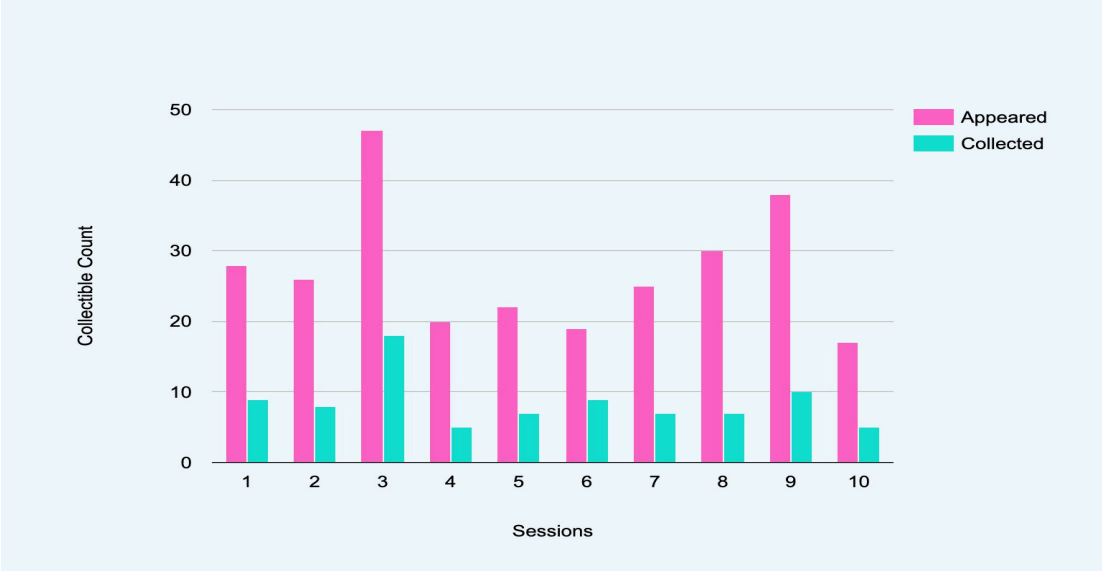
Solution: To rectify this, we have introduced a dedicated tutorial section that educates players about the player-to-player collision mechanism. By doing so, we aim to empower players with the knowledge and skills needed to use player-to-player collisions during gameplay effectively. This enhancement is expected to balance health reduction across

black holes, bad collectibles, and player-to-player collisions, resulting in a more engaging and fair gaming experience.

Metric #3: Analysis of Collectibles Appearances and Collections

Description: Mapping the number of collectibles that appeared in each game session and the number of collectibles that the players collected.

Post-Mid Term Graph:



Initial Analysis: Initially, the game exhibited a significant disparity between the percentage of collectibles that appeared in the game arena and the percentage actually collected by players. This disparity was striking, with less than 20% of the collectibles being collected. Efforts to address this issue initially focused on slowing down the rate at which collectibles disappeared, resulting in only a marginal increase in the collection rate.

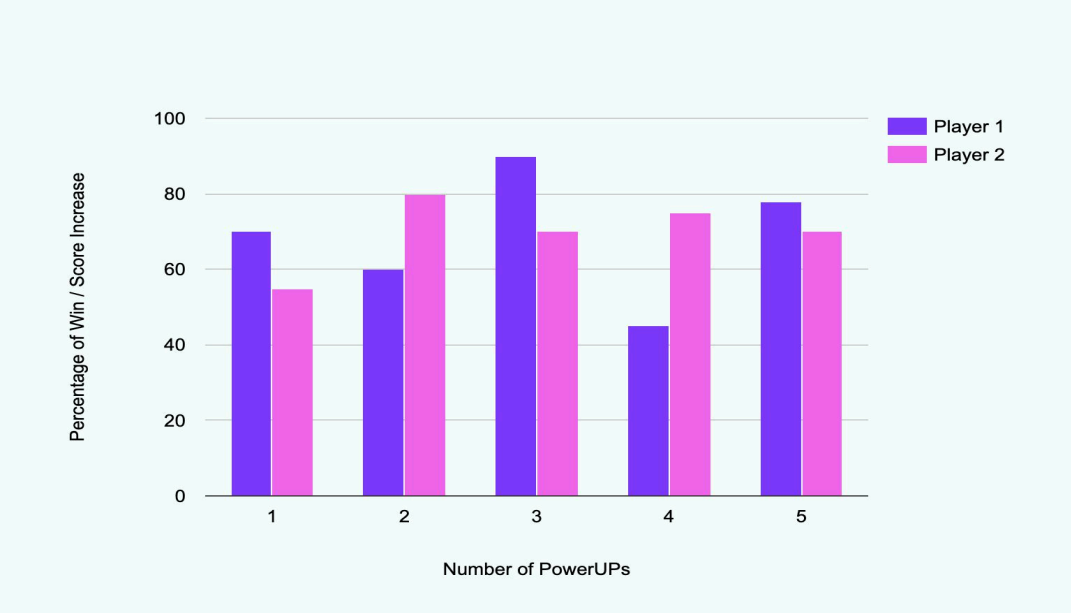
Observation: A key observation from player behavior was that they failed to perceive any immediate impact on their health when collecting these items. This absence of feedback left players unmotivated to pursue collectibles actively. Furthermore, the game lacked clear visual cues to illustrate the health effects of collectibles in real time.

Solution: To rectify this situation, we have implemented a two-fold solution. First, we've introduced visual animations to depict how collectibles affect a player's health clearly. Second, we've integrated tutorials that educate players on how collectibles influence

their health. This dual approach is expected to significantly increase the collectible collection rate and enhance player engagement with this game aspect.

Metric #4: Analysis of Powerup Balance and Win Rate Variability

Description: Mapping the number of powerups that players collected in each gameplay and how it affected their win condition for the player.



Initial Analysis: In the game's initial release, it was evident that power-up usage and balance had a direct influence on player win rates. Players often collected power-ups without a full understanding of their strategic advantages. Additionally, a notable disparity in win rates existed between novice and skilled players.

Observation: We noticed that addressing the balance of power ups could directly impact win rates. Players had preferences for specific power ups, resulting in uneven utilization rates. Novice players experienced lower win rates compared to their more skilled counterparts, potentially leading to discouragement.

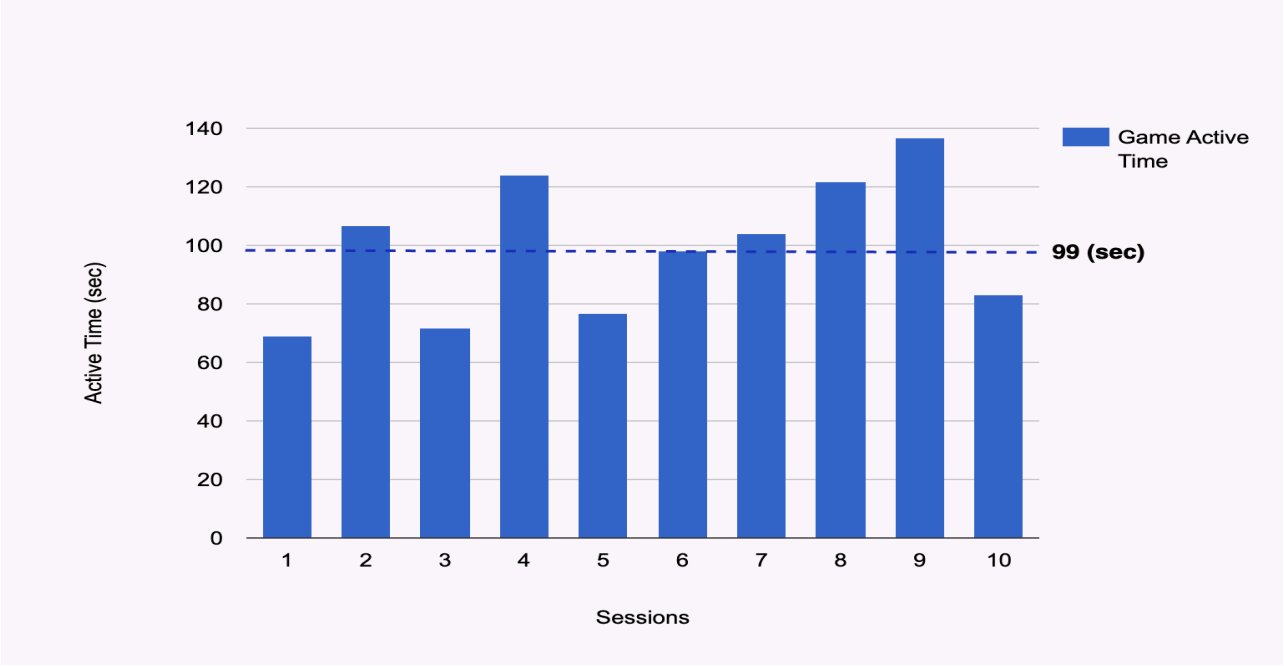
Solution: To address this, we aimed to educate players on the strategic significance of powerups, emphasizing how these items could significantly enhance their in-game abilities and improve their chances of victory. These changes are expected to create a more balanced and engaging gaming experience. Players will better understand the powerups, leading to more strategic and satisfying gameplay.

POST Beta Metrics and Graphs

Metric #1: Analysis of Average Game Time

Description: Mapping the amount of time players spend in one game session before they die and calculating the average game engagement from it.

Post-Beta Graph:



Observation: Following the implementation of changes derived from feedback and playtests, there was a notable improvement in the game's active time, reaching 99 seconds compared to the initial 45 seconds before the beta build. However, this still falls short of our target game active time of approximately 120 seconds.

Further Analysis: Through survey feedback and analytics data, specific challenges were identified where players struggled, leading to a decrease in their health and subsequently shorter game active times. Addressing these issues became crucial for achieving our desired target.

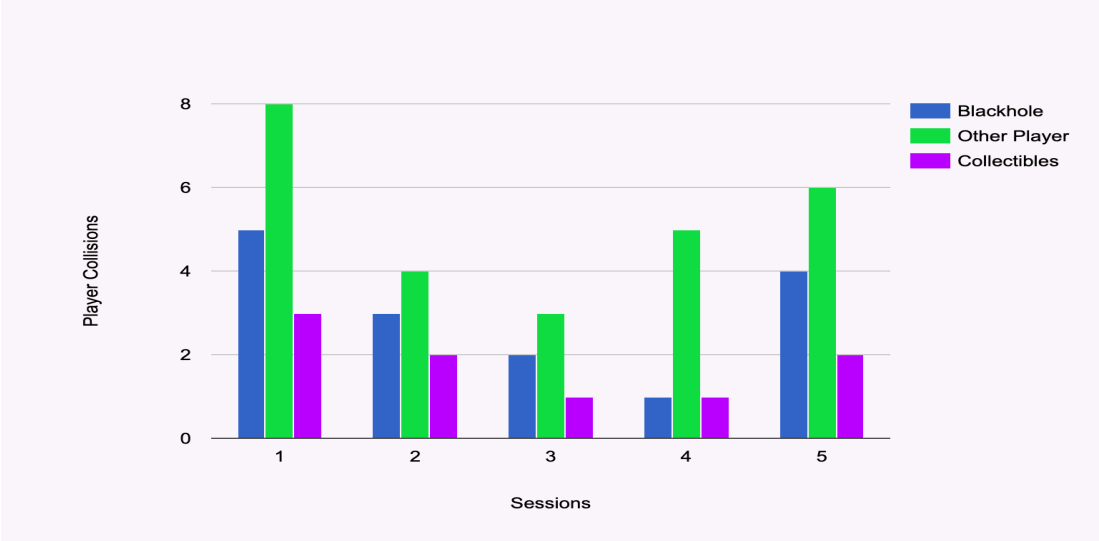
Enhanced Solution: To further enhance the game experience, several specific areas were identified and addressed. Solutions included rectifying issues such as collectibles spawning on top of each other, refining tutorials and UI elements, and introducing a

health increase mechanism upon collecting power-ups, in addition to collectibles. These refinements aim to address player struggles and contribute to achieving our target game active time of around 120 seconds.

Metric #2: Analysis of Player Kills and Game End Conditions

Description: Mapping the number of times a player is killed by either a blackhole, another player, or a bad collectible in different game sessions.

Post-Beta Graph:



Observation: Our initial analysis highlighted a lack of understanding among players regarding player-player collisions, leading to an imbalance in the game dynamics. To address this, a tutorial section was introduced, resulting in a significant increase in player-player collisions.

Further Analysis: Subsequent data analysis revealed a decline in the number of bad collectible kills. Survey feedback and analytics data indicated that the reduction in the appearance of bad collectibles contributed to this decrease.

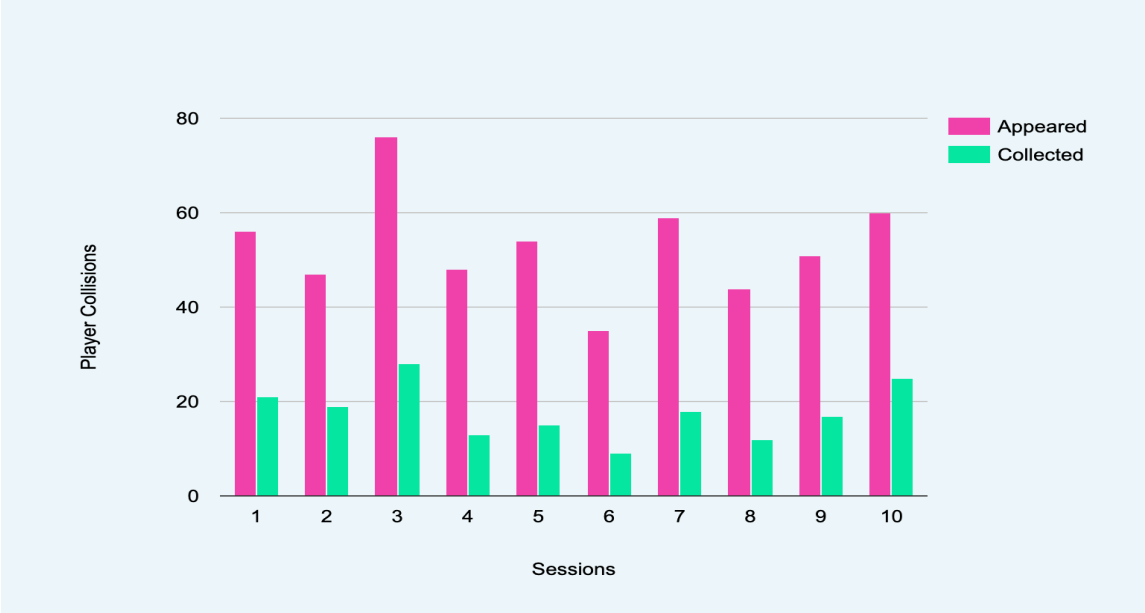
Enhanced Solution: To restore equilibrium among all collision elements in the game, particularly player-player collisions and bad collectible interactions, we opted to enhance the game dynamics. This involved increasing the percentage of bad collectibles spawned in the game arena. This adjustment aims to balance the occurrence of various collisions, fostering a more engaging and dynamic gaming

experience.

Metric #3: Analysis of Collectibles Appearances and Collections

Description: Mapping the number of collectibles that appeared in each game session and the number of collectibles that the players collected.

Post-Beta Graph:



Observation: Following the resolution of problems related to the scarcity of collectibles, there was a noticeable improvement in the overall number of collectibles collected. However, the percentage of collected collectibles still fell below the targeted expectation.

Further Analysis: A deeper analysis, incorporating survey feedback and analytics data, revealed persistent issues such as collectibles spawning over each other, complexities in player movement, and a less intuitive UI, all contributing to a lower-than-desired collectible collection rate.

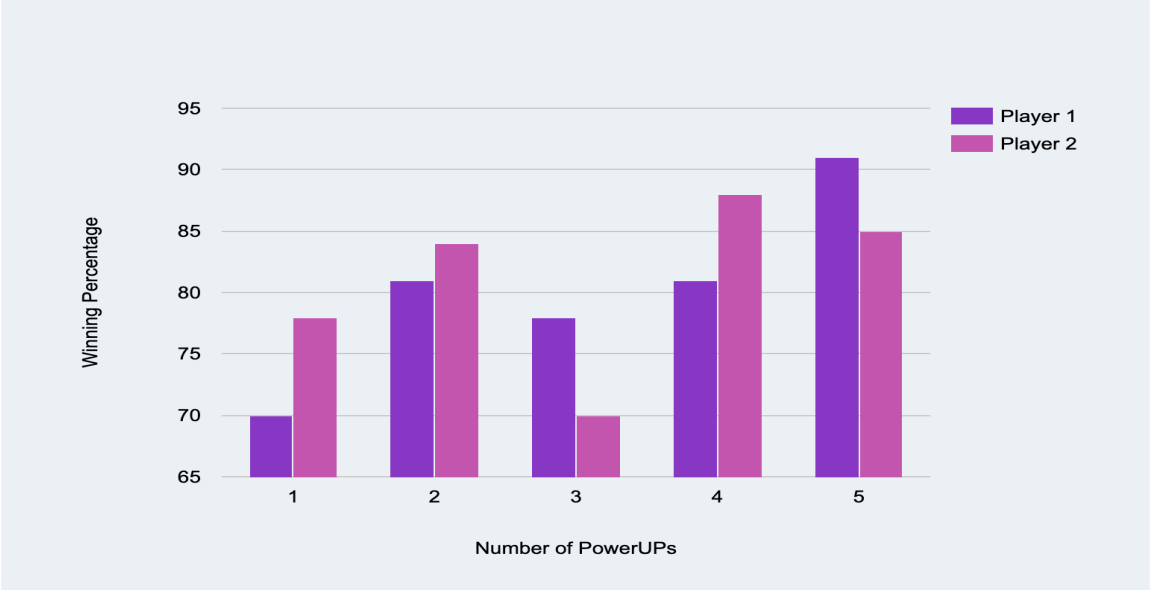
Enhanced Solution: In response to these identified challenges, a multifaceted solution was implemented. The issue of collectibles spawning over each other was rectified, player movement underwent enhancements for smoother gameplay, and both the UI and tutorial sections were refined for better player understanding. These collective

changes aim to streamline the collectible collection process, making it more accessible for players and ultimately leading to a higher percentage of collectibles collected.

Metric #4: Analysis of Powerup Balance and Win Rate Variability

Description: Mapping the number of powerups that players collected in each gameplay and how it affected their win condition for the player.

Post-Beta Graph:



Observation: In the initial game release, the impact of power-up usage and balance on player win rates was evident. Players frequently acquired power-ups without a comprehensive understanding of their strategic advantages.

Further Analysis: Analyzing our analytics data revealed a notable imbalance, with the freeze power-up exerting a disproportionate influence on game outcomes. Higher collection of freeze power-ups correlated strongly with increased win percentages, creating a significant imbalance in the overall game dynamics.

Enhanced Solution: To address this imbalance, we implemented several strategic adjustments. First, we reduced both the frequency and duration of the freeze power-up to diminish its overwhelming influence. Additionally, we introduced new gameplay mechanics, such as the slicer and missile, to add variability and enhance overall game balance. These changes aim to create a more diverse and fair gaming experience.

Hypothesized Issues

Issue #1: Player Movement is difficult (Implemented)

Related Feedback: Players express confusion and difficulty in controlling their characters effectively.

Cited Analytics: Feedback received from the survey and less number of collectibles collected and game elements interactions in our analytics data.

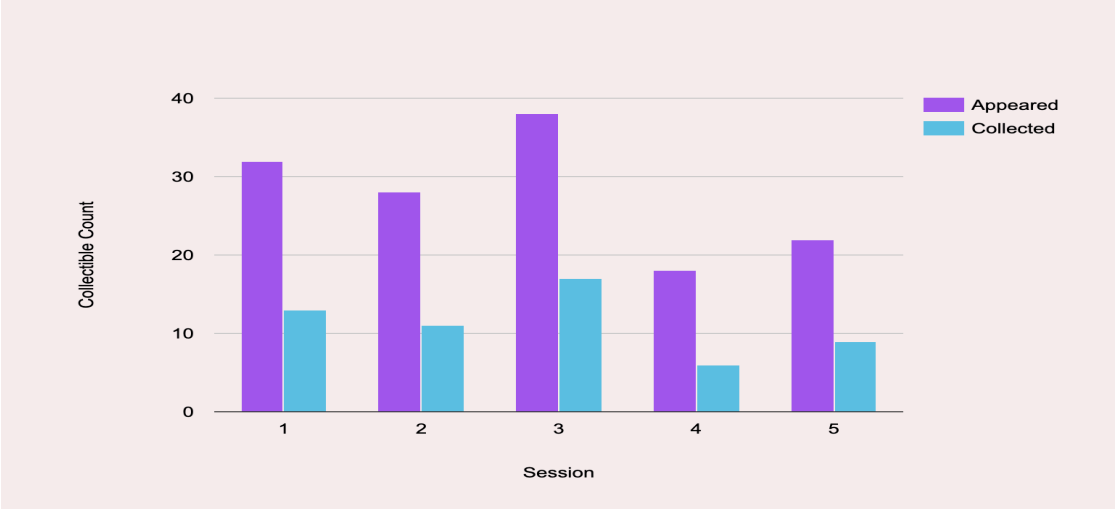
Description: Players have reported that the current control scheme is not intuitive, leading to challenges in maneuvering their characters. This issue impacts overall gameplay satisfaction and player engagement.

Potential Solutions:

1. Clear Instructions/Tutorial: Provide instructions or implement a tutorial explaining the controls to enhance player understanding.
2. Customizable Controls: Players can customize their control preferences to cater to individual comfort and play styles.

Github Solution Commit:
https://github.com/aviralgoel/CSCI526TeamProject/commit/a0d8eb9e32d4405fd68ef35ef96964459eb1b672

Contributor: Kang Pin Chan Aviral Goel



Issue #2: Game Time Discrepancy (Implemented)

Related Feedback: Players felt issues with overall game time due to lagging issues and speed of players.

Cited Analytics: Received less average game active time in our analytics data and feedback in the survey.

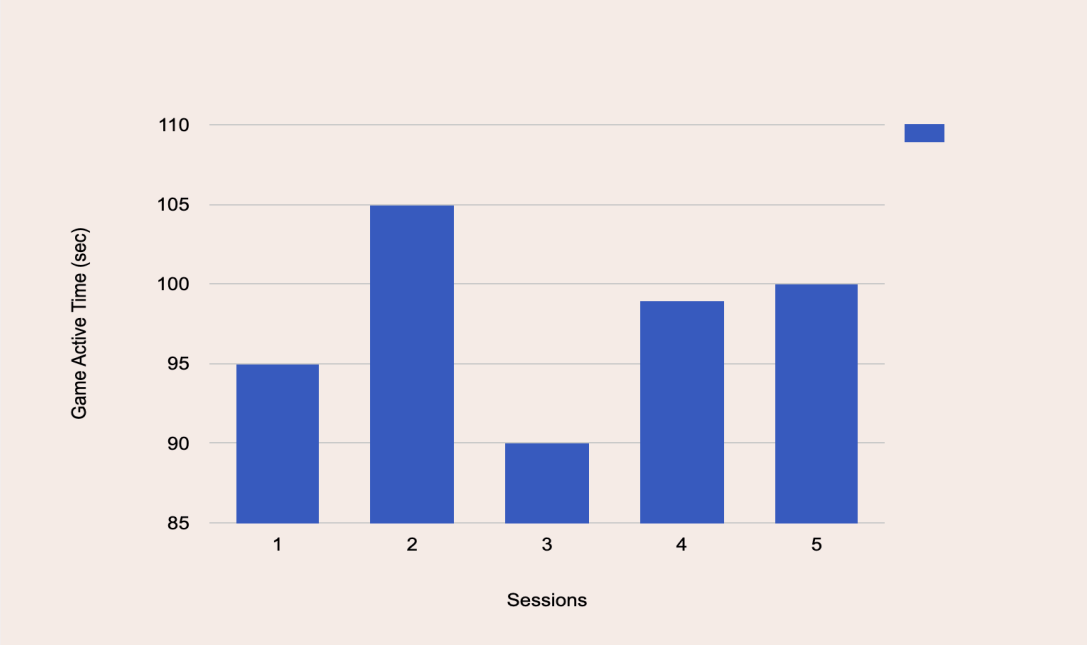
Description: The disparity in-game time suggests a need to investigate and address pacing elements that might be affecting player engagement.

Potential Solutions:

1. Adjust Spawn Rates: Modify the spawn rate of collectibles and power-ups to influence the game's overall pace.
2. Introduce Time-Based Events: Implement in-game events or challenges tied to a timer to extend the duration and enhance player engagement.

Github Commit Link:
https://github.com/aviralgoel/CSCI526TeamProject/commit/f15991112f23f8a550efcc7ec3e15841f3279739

Contributor: Kang Pin Chan



Issue #3: Collectibles spawning on top of each other (Implemented)

Related Feedback: Players have reported instances where collectibles spawn in the same location, making them challenging to distinguish and collect.

Cited Analytics: Feedback received from the survey and less number of collectibles collected in our analytics data.

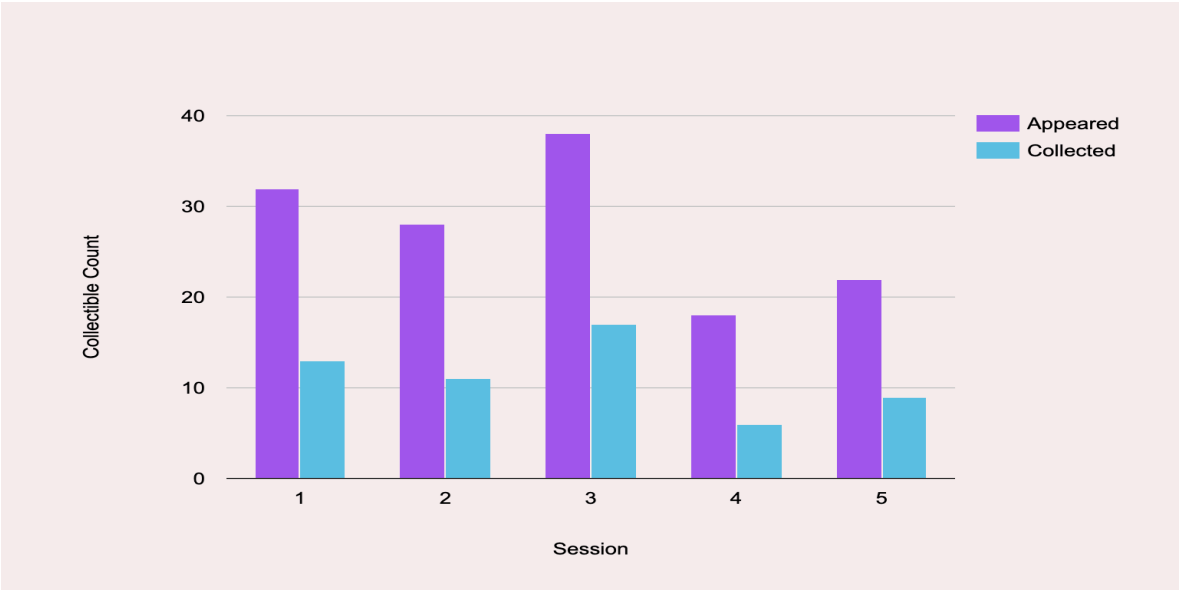
Description: The issue involves collectibles appearing at identical coordinates, causing overlap. This negatively impacts gameplay as players find it difficult to discern individual collectibles, affecting their ability to strategize and gather points effectively.

Potential Solutions:

1. Adjust Spawn Area: Increase the spawn area for collectibles to ensure a wider distribution across the game environment.
2. Collision Check: Implement a system to detect nearby collectibles upon spawn. If overlap is detected, reposition the newly spawned collectible to avoid stacking.

Github Solution Commit:
https://github.com/aviralgoel/CSCI526TeamProject/commit/e438f5e858b107ac7871ad39bde6ca39c25b5597

Contributor: Niranjanaa Mohanbabu



Issue #4: Absence of Winning Condition Screen (Implemented)

Related Feedback: Players express dissatisfaction due to needing a clear conclusion or summary after gameplay.

Cited Analytics: Feedbacks received on the absence of a conclusive screen causing confusion for the players.

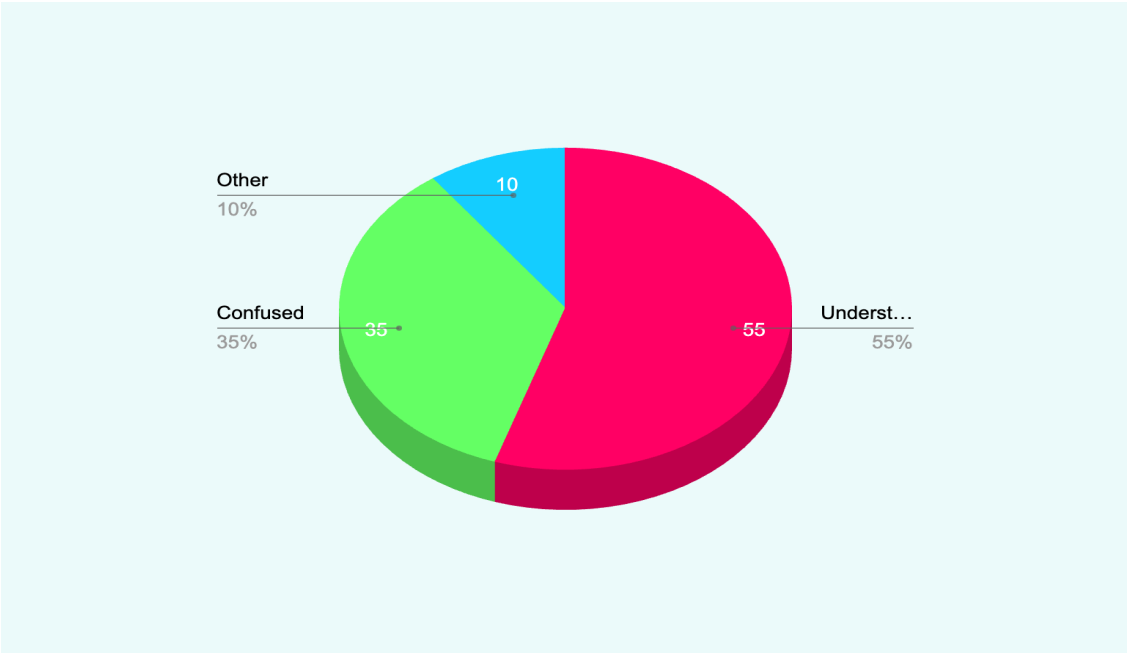
Description: The absence of a winning condition screen might contribute to player dissatisfaction as they lack a clear indication of their performance or victory/defeat status.

Potential Solutions:

1. Victory/Defeat Screen: Implement a dedicated victory/defeat screen with scores and celebratory visuals to provide a clear conclusion to the game.
2. Post-Game Summary: Introduce a post-game summary displaying key statistics and achievements to enhance player satisfaction.

Github Solution Commit:
https://github.com/aviralgoel/CSCI526TeamProject/commit/462b9e594e036d0d80b2d77097528299c3f5a755

Contributor: Sharan Murli Shweta Kumari -



Issue #5: Lack of Understanding of Power-Up Effects (Implemented)

Related Feedback: Players exhibit confusion regarding the effects and functionalities of power-ups.

Cited Analytics: Player interactions with power-ups is less as per analytics data and confusion regarding effects of power-ups in the survey feedback

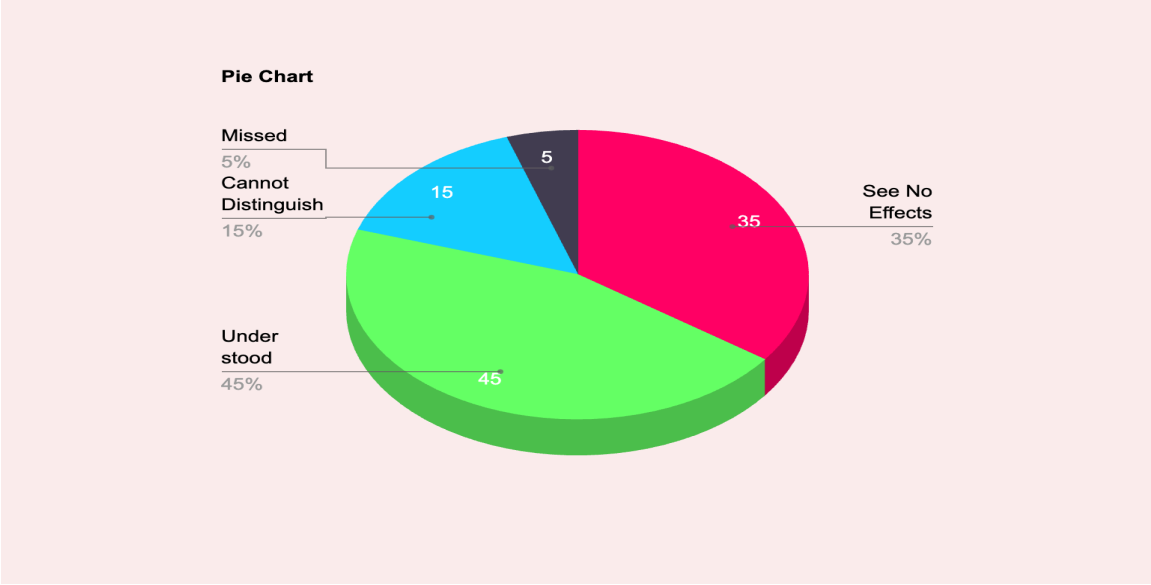
Description: Players have conveyed a lack of understanding regarding the effects of power-ups, impacting their strategic use during gameplay. This hinders the gaming experience and diminishes the potential enjoyment of power-ups.

Potential Solutions:

1. On-Screen Notifications/Animations: Implement on-screen notifications or animations that clearly explain the effects of each power-up, aiding player comprehension.
2. In-Game Tutorial/Tips: Introduce a brief in-game tutorial or provide tips during gameplay to educate players about power-up functionalities.

Github Solution Commit:
https://github.com/aviralgoel/CSCI526TeamProject/commit/0995d0c669ba29fd66048f766cd80d8087acfc9e

Contributor: Sharan Murli Aviral Goel



Issue #6: UI Elements Helpfulness (Implemented)

Related Feedback: Players struggle to understand or benefit from certain UI elements.

Cited Analytics: Player interactions with UI elements in the analytics data and survey feedback on the UI design.

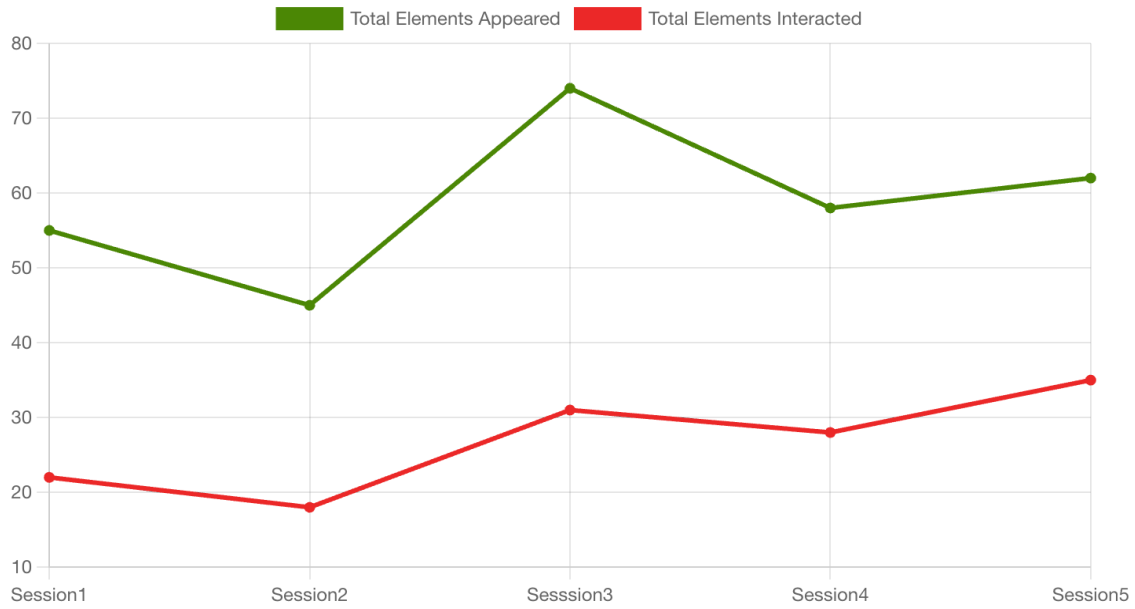
Description: There are indications that the current UI design may be unclear or overwhelming for players, leading to difficulties in extracting relevant information. This potentially detracts from the overall user experience.

Potential Solutions:

1. Simplify UI Design: Streamline the UI design, emphasizing essential information to reduce complexity.
2. Tooltips/Information Pop-ups: Integrate tooltips or information pop-ups for UI elements to provide clarity and guidance to players.

Github Solution Commit:
https://github.com/aviralgoel/CSCI526TeamProject/commit/0995d0c669ba29fd66048f766cd80d8087acfc9e

Contributor: Aviral Goel Rahul Aggarwal



Issue #7: Player 1 Dominance in Testing

Related Feedback: Testing primarily conducted with a single player has led to potential bias in-game balance, favoring Player 1.

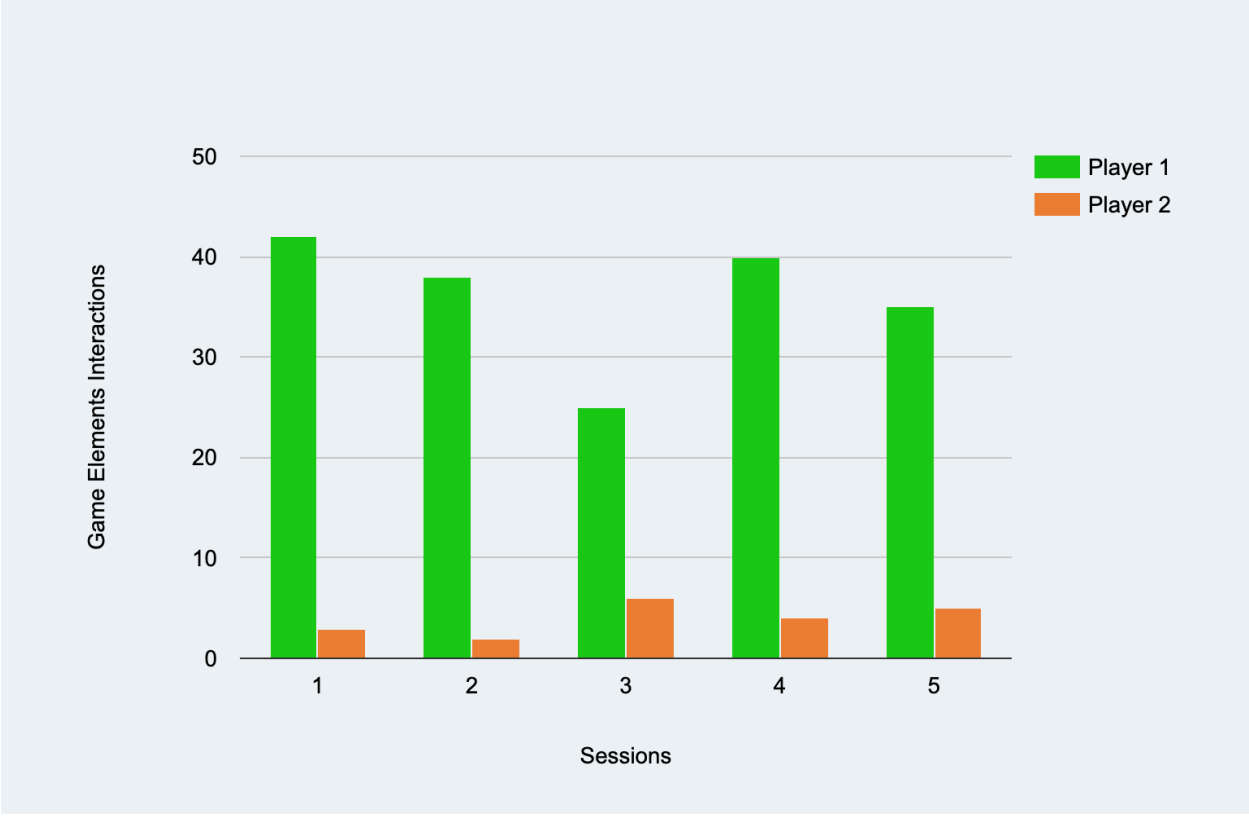
Cited Analytics: Received only single player data in the analytics with zero to minimal interaction of player2.

Description: The dominance of Player 1 i.e players playing with only one player in testing suggests a potential imbalance in-game dynamics, affecting the overall player experience.

Potential Solutions:

1. Multiplayer Playtests: Conduct playtests with multiple players to ensure a more comprehensive understanding of game balance for both players.
2. Introduce AI Opponent: Implement an AI opponent for solo players to maintain balance and simulate a multiplayer experience.

Contributor: Niranjanaa Mohanbabu Rahul Aggarwal Shweta Kumari -



Issue #8: Freeze Power-Up Overpowered (Implemented)

Related Feedback: Players have expressed concerns about the freeze power-up being too dominant in the game.

Cited Analytics: Players with higher freeze powerup collection had higher winning chance as per our analytics data.

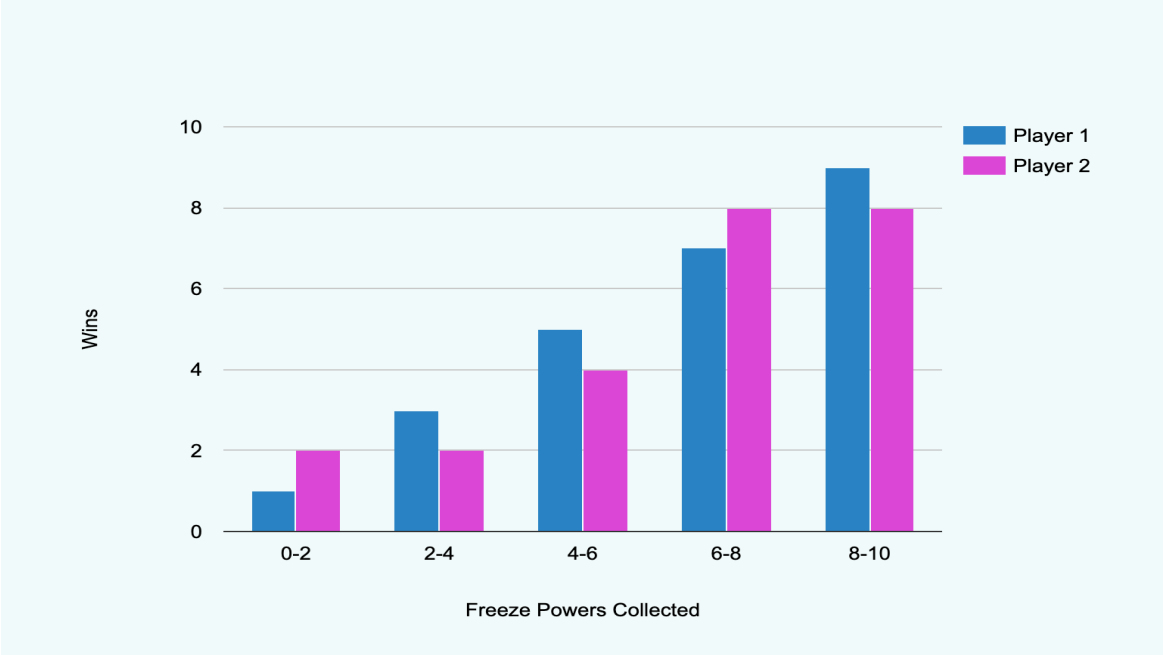
Description: The perceived overpowered nature of the freeze power-up warrants an investigation into its duration or effectiveness.

Potential Solutions:

1. Decrease Freeze Duration/Effectiveness: Adjust the freeze power-up's duration or impact to align it with other game elements.
2. Introduce Cooldown Period: Implement a cooldown period for the freeze power-up to prevent frequent and overwhelming use.

Github Commit Link:
https://github.com/aviralgoel/CSCI526TeamProject/commit/f15991112f23f8a550efcc7ec3e15841f3279739

Contributor: Niranjanaa Mohanbabu Aviral Goel



Issue #9: Difficulty in Escaping Player Kills

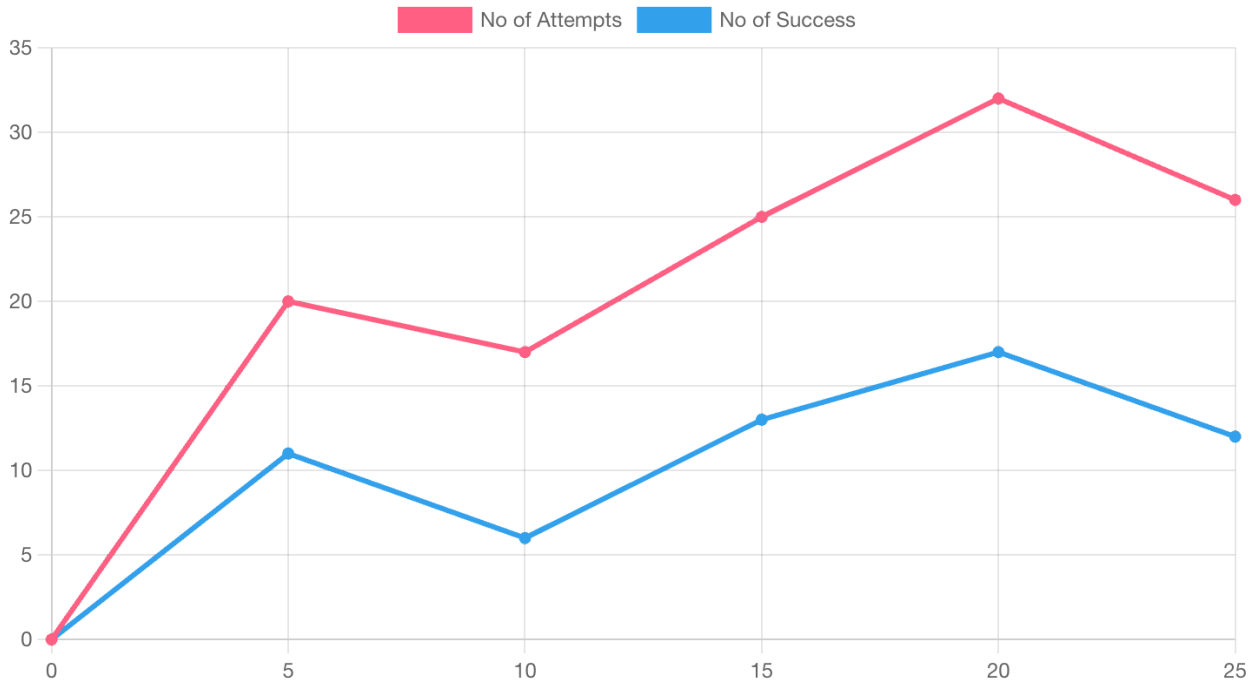
Related Feedback: Players have reported difficulties escaping after being killed by opponents.

Cited Analytics: An analysis of player deaths indicates challenges in post-respawn escape scenarios.

Description: The current escape mechanics may be insufficient or unclear, contributing to player frustration.

Potential Solutions:

1. Add Invincibility Period: Implement a short invincibility period for players after respawning to facilitate a safer recovery.
2. Introduce Dash/Speed Boost Ability: Enhance escape options by introducing a dash or speed boost ability to help players quickly evade threats.



Issue #10: Low Rate of Bad Collectible Collection (Implemented)

Related Feedback: Players are consistently avoiding bad collectibles, affecting game dynamics.

Cited Analytics: Analysis reveals a low interaction rate with bad collectibles, impacting overall game balance.

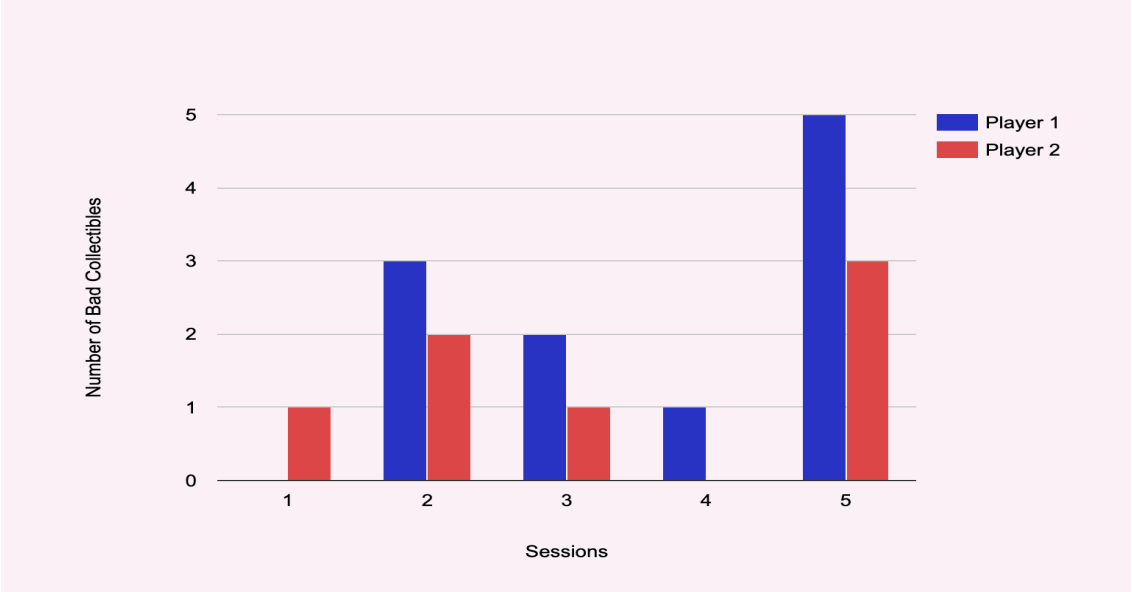
Description: Players might intentionally avoid bad collectibles, disrupting the intended gameplay experience.

Potential Solutions:

1. Gradually Increase Frequency: Adjust the spawn rate of bad collectibles, gradually increasing their frequency to maintain a balanced challenge.
2. Negative Consequence: Introduce a negative consequence for avoiding bad collectibles, incentivizing players to engage with these elements.

Github Commit Link:
https://github.com/aviralgoel/CSCI526TeamProject/commit/f15991112f23f8a550efcc7ec3e15841f3279739

Contributor: Niranjanaa Mohanbabu



Review Notes

Notes/feedback that you receive from the teaching team and during playtests and the improvements you made based on that

11/17/2023 Notes: Final Playtest

Playtest1:

1. Understands the key press, understanding player orbiting, blackhole attracting. Sometimes works as expected but not always
2. Understood collectibles collection
3. Understands health increase on player hitting, difficult to control player and cause player hit.
4. Understood collectibles and powerups
5. Understanding health constant decrease
6. Understood avoiding blackhole, movement is tricky
7. Understood slice mechanic objective, doesn't understand rotation, finds confusing
8. Enjoyed the elements in the game, would play again

Playtest2:

1. Difficult to understand turn, not able to turn
2. Not able to control the player movement, finds confusing
3. Find killing players interesting, finds latency in the game after sometime.
4. Finds overall movement a bit confusing
5. Teach player how to press and release the key at appropriate time
6. Need to spend some time to learn the game and then eventually finds it interesting
7. Did not notice any change in the health increase or any change happening since too focused on the graphics

Playtest3:

1. Finds delay in the game
2. Follows the tutorial instructions to understand the game
3. Able to control the player movements
4. Delay in player movement when pressing the keys
5. Add game end condition after game ends
6. Enjoys slice mechanic
7. After changing the direction attracted to walls and not the blackhole

8. Confusing to look at the elements and at the health constantly
9. Health term is confusing, can be fuel
10. Increase the difficulty by health depletion faster after some time
11. One level with increasing difficulty is more fun than more levels

Combined Solutions for Playtest1,Playtest2 and Playtest3

1. Enhance the visual cues for orbiting and black hole attraction. Consider adding visual indicators or prompts to guide the player.
2. Adjust the controls for better responsiveness. Provide clearer instructions or a tutorial on controlling the player effectively.
3. Introduce a more explicit tutorial or visual guide specifically focusing on the rotation aspect of the slice mechanic. Ensure that this tutorial is easily accessible.
4. Include an in-game prompt or tutorial specifically addressing the turning mechanics. Reinforce this information through visual cues.
5. Refine controls based on feedback. Implement a clearer tutorial explaining movement controls, possibly with interactive elements to practice.
6. Optimize game performance to reduce latency. Check for memory leaks or other issues that might contribute to performance degradation over time.
7. Implement visual or audio feedback for health changes. Ensure that players can easily recognize when health increases or other significant events occur.
8. Address input lag and optimize controls to provide immediate response to player actions.
9. Simplify visual elements and consider changing health terminology to something more intuitive, such as "fuel." Provide an option to toggle between simplified and detailed HUD displays.
10. Adjust game mechanics to ensure that the player is consistently attracted to the black hole. Evaluate collision detection and gravitational forces.
11. Clarify the objective of the game and the consequences of health depletion. Provide clear feedback on how to maintain health or acquire fuel.
12. Consider restructuring the game to focus on a single, dynamically evolving level with increasing difficulty. Ensure that the progression is challenging but enjoyable.

10/27/2023 Notes: Alpha Playtest

ISSUES:

1. Movement mechanics are unclear, and the player is unsure how they work.
2. Lack of clarity about the tutorial's purpose and instructions for the player.
3. The volume of the in-game music is too loud and disruptive.

4. Player experiences confusion about winning rounds and not understanding why.
5. The freezing mechanic feels too long and unbalanced.
6. Difficulty in collecting health points as they seem to respawn on one side..
7. Lack of understanding regarding the function of the Red Skull in the game.

Solutions for the Issues :

1. Tutorials with clear instructions are set up. Player has to play tutorial first and then get into the game in order to understand the player movement and black hole
2. Newer sounds have been added but we have lowered the starting volume.
3. Background sound has been removed to keep a soothing game experience.
4. Once tutorial is played, players will understand the winning goal of the game
5. Freeze Mechanic will activate when a player 1 collects and player 2 will only freeze for 5 seconds and not 15 seconds anymore.
6. Frequency of good health collectibles has been increased compared to bad ones so they spawn more often.
7. Similarly we have kept a specified duration for the powerups to spawn so that the players can utilize the resources well.
8. Red Skull/ Black Hole has been explained in the tutorial as well. A basic idea is put forward in the tutorial scene which explains to the player that they need to avoid going near the blackhole.

10/20/2023 Notes:

ISSUES:

1. Lack of clarity on how to play the game, game objectives, and goals.
2. Confusion regarding how to win and who won.
3. Misused colors in the game's design.
4. Inadequate communication of gameplay objectives, as no tutorial was provided.
5. The lack of clear strategy for players suggests adding more player agency and strategic elements.
6. Lack of demonstrated features, particularly the ability to kill opponents.
7. Emphasize that the presentation should focus more on what has been implemented and demonstrate them.

Solutions for the Issues :

1. Provided clear and concise in-game instructions and tutorial level to explain how to play the game and its objectives.

2. Reevaluated the use of colors in the game design and ensured they are effectively used for communication, such as Red for danger, green for good, and images for PowerUps
3. Clearly stated the game's goals and how to achieve them in the tutorial.
4. Introduced more strategic elements such as Firewalls and Freeze to the gameplay to increase the strategic approach of the game
5. The future features, such as PowerUps, are actually functional and demonstrated in the presentation to avoid unfulfilled promises.
6. If the ability to kill opponents is intended, it highlights what has been implemented for each player.

10/13/2023 PlayTest Notes:

Playtest 1 (2-player):

1. Figures control but dies immediately.
2. Respawning is not happening.
3. Figures red is bad, and green is good.
4. Doesn't understand the black hole and dies immediately.
5. Find the game boring after a few minutes.
6. Lives go to -1, and the score also goes to -1.
7. Found the game too slow.

Playtest 2 (2-player):

1. Find the speed of the player needs to be faster.
2. Figure out how to join.
3. Find the game boring.
4. Doesn't respawn.
5. Related the game to snake.io and expected the player to increase size.
6. Recommended that players should die if they touch the border as the border and black hole are of the same color.

Playtest 3 (Single Player):

1. The objective of the game needs to be clarified.
2. Didn't understand the black hole.
3. Scoring is slow.
4. Number of lives, and the score goes to -1, and the game doesn't end there.
5. No winning condition

Common Solutions for Playtests 1, 2, and 3:

1. Enhanced the visual effects of the black hole to convey its danger clearly.

2. Added clearer instructions on the screen so players understand the game.
3. Increased the player's speed as the game progresses.
4. Player respawns after being clashed by the opponent

Specific Solution for Playtest 2:

1. For the issue where a black hole results in losing one life only, expected black hole to be losing one life and not game over, it was changed to work that way.
2. Added a Danger Icon on the black hole to detect that it is dangerous.

Potential Solutions:

1. It will make a player lose their life when clashing with red borders
2. Programming Bug for Lives and Score that go to -1, yet to be fixed due to array issues
3. Will update collectibles with power ups so it is clear which is a good power and bad powerup.
4. Adding levels with power ups for collectibles will decrease the boredom of the game, even for a single-player and 2-player mode.
5. Increase the penalty of the black hole.
6. Will add a high score for a single player.

10/06/2023 Notes taken

Issues:

1. Trying to figure out what's happening
2. Takes time to see what WASD keys do
3. Figures out gravitational pull
4. Doesn't know what to do but understands the mechanics
5. Doesn't understand if he is missing something or if it's the end of the game
6. Figures out the black hole but cannot figure out the game's goal.
7. Does not have validation or UI does not explain what the player has to do
8. Time metric has to be analyzed
9. Player 1 and Player 2 number of times each is getting killed.
10. Number of times the player dies by going to the black hole

Potential Solution:

1. Added instructions for the Player at the start of the game.
2. Added clear objectives and a sense of progression.
3. Improved validation and provided player instructions via UI.
4. Implemented time metric analysis for better gameplay pacing.

5. Display the number of times each player gets killed using the lives variable.
6. Tracked and displayed the number of times players die from the black hole.

Weekly Homework

1. Aviral Aviral Goel
    a. **Week 6:** Team Formation, Initial Design Discussion Meetings, GDD Preparation
    b. **Week 7:** Prototyping with player movement, trying out different movement styles and constraints to find the right feel for the game, setting up the basic level layout, some basic scripts, and more design discussions.
    c. **Week 8:** More Player movement experimentations, refining some aspects of movement that felt right, adding physics, leading design meetings, and setting up a vision for the game in design meetings. Some version control work.
    d. **Week 9:** Lots of version control, resolving merge conflicts, debugging teammates' code, setting up score management for the players and game manager for the two-player aspect of the game.
    e. **Week 10:** Took the lead on developing the "FireWalls" mechanic, adding fiery barriers to create strategic obstacles and tactical options in the game.
    f. **Week 11:** Fixed a lot of bugs with collectible spawning, fine tuned the ChargeUp mechanic, fixed collision issues, did code refactoring, improved the freeze mechanic, fine tuning all numbers in the game
    g. **Week 12:** Continuing the work on the charge up wheel mechanics. Making sure the wheel mechanic has suitable timers and effects.
    h. **Week 13:** Leading team discussions about analytics collected, developing hypotheses and working on the proposal for extra credit. Minor bug fixes in the game and merging the work of the team.
    i. **Week 14:** Working on known problems from the previous week playtests. Taking a short break for the Thanksgiving holidays.
    j. **Week 15:** Polishing the game and solving the programming bugs. Adding UI elements (Guiding arrows) to enhance the user experience for the movement. Version control and working with the team to finish the deliverables.

2. Shweta Shweta Kumari -
    a. **Week 6:** Team Formation, Initial Design Discussion Meetings, GDD Preparation
    b. **Week 7:** Explored different methods to collect data from the game, identifying areas where data can be collected in the game. Setting up a basic Google form and script to collect data. Finalized two-player collision and win condition. Completed GDD for an alpha prototype progress check.
    c. **Week 8:** Plotted initial graphs for various aspects of the game. Created scripts to collect data from several elements of the game. Analyzed data for improvements and improved the script to collect more refined data.
    d. **Week 9:** Plotted all graphs and mockup graphs. Modified the script to collect data from new elements in the game. Suggested improvements based on data and feedback. Worked on completion of GDD for Alpha prototype. Created and maintained WebGL builds on GitHub Pages for each week.
    e. **Week 10:** Collected and analyzed the data collected during midterm to draw new analyses and improvements in the game. Plotted respective graphs for each data and modified analytics script to accommodate new changes. Completed beta progress GDD and managed game builds.
    f. **Week 11:** Improved the overall script to collect analytics data to add more precise data and implemented all four analytics along with working on slice mechanics. Completed different elements of the GDD and managed game builds.
    g. **Week 12:** Worked on identifying areas in the game which can be improved and found certain bugs. Reviewed previous class and playtest feedbacks for game improvements.
    h. **Week 13:** Collated data received from survey and analytics to identify areas in the game which have potential issues and where players are struggling the most. Started working on hypotheses and issues based on the collected data.
    i. **Week 14:** Worked on identifying issues based on analytics and survey data and areas for improvement in the game. Plotted supporting graphs for all ten hypotheses and four analytics and suggested issues which need to be addressed on priority. Improved slice mechanic to adjust slice duration.
    j. **Week 15:** Identified minor bugs and completed the analytics and hypothesis section based on the feedback and analytics. Improved slice UI mechanic to adjust UI. Worked on completing the GDD, playtested the final game with different people and worked on managing the webGL builds.

3. Niranjanaa Niranjanaa Mohanbabu
    a. **Week 6:** Team Formation, Initial Design Discussion Meetings, GDD Preparation
    b. **Week 7:** Working on spawning the collectible objects and setting up a basic collectible spawner manager that handles spawning and destroying the collectibles after an interval of time. Taking the lead on conducting the playtest of the game.
    c. **Week 8:** Figuring out bugs and areas of improvement in collectible spawning, making sure collectibles spawn within a limited area and have a triggering mechanism to affect the state of the game (score, lives, etc) when colliding with the player.
    d. **Week 9:** Conducting external and internal playtests and preparing the playtest report, debugging collectibles, design discussion on collectibles, scoring, and future of collectibles.
    e. **Week 10:** Focused on creating Freeze powerup, creating obstacles such as spike, enhancing collectibles, and refining scoring.
    f. **Week 11:** Fixed Bugs related to collectibles such as they spawn after game starts and stop spawning once game ends. Made the 3 minute game play video required for week 11.
    g. **Week 12:** Addressed bugs in PowerUp spanner and Spawner code, enhancing stability. Achieved optimization in Score Manager for both players. The refined code ensures smoother gameplay and improved overall performance.
    h. **Week 13:** Continuing development on collectibles, I've implemented a spawning mechanism at specific locations. The powerups code ensures they don't appear atop the player or other collectibles, enhancing gameplay dynamics and preventing potential overlaps for a more polished and engaging user experience.
    i. **Week 14:**Managed collisions between players resulting in self-inflicted damage upon direct impact. Implementing a slider mechanism for respawned players to enhance control and mitigate collisions, ensuring smoother gameplay dynamics and player experience.
    j. **Week 15:** Successfully produced a 5-minute video detailing the Gold Level Project, featuring implemented time sliders for both players after respawning. Demonstrated proficiency in hypothesis formulation and conducted playtests to refine the project, showcasing technical prowess in video creation and interactive elements.

4. Rahul Rahul Aggarwal
    a. **Week 6:** Team Formation, Initial Design Discussion Meetings, GDD Preparation
    b. **Week 7:** Worked on sound ideas for the overall game. Listed down sound ideas for other components in the game. Looked for free sound assets in the Unity store. Ideation of powerups and overall game design.
    c. **Week 8:** Worked on collectible destruction code where collectibles disappear after a few seconds. Worked on integration of background sound.
    d. **Week 9:** Completed background sound integration. Refined collectibles, destroying code and checking any existing bugs in the game. Completed GDD proofreading.
    e. **Week 10:** Worked on the tutorial scene for the game to introduce players to its mechanics and features. Also added the powerup spawner code, which makes powerups appear randomly on the screen in a timely manner. GDD proofreading.
    f. **Week 11:** Added all the sound effects required for the game which includes the Button sounds, the Points sounds, Powerups, Player Death, Respawns and the Game Over sounds. Playtested the game to identify bugs, so that we could note it down and fix it. Worked on the Tutorial Scenes to teach the end goal of the game. Added 3 sketches to teach the significance of the blackhole mechanic.
    g. **Week 12:** Refined the sound manager script and added additional sounds to make the game more interactive. Polished the Tutorial scene for making it more intuitive and easy to understand. Discussed the idea of adding a unique level to the game to increase the difficulty level. Completed the playtesting for 15 games and provided feedback.
    h. **Week 13:** Integrated sounds in all the game elements. Added sounds for the Homing missile powerup. Worked on refinement of tutorial scenes. Modified Tutorial Scene4 to show player kill and made some minor changes. Play tested the game to check for bugs. Noted the minor issues in the game.
    i. **Week 14:** Completed all sound implementation for the game. Refined the sound manager code and checked for any bugs. Fine tuned the blackhole mechanic to make the attraction smooth. Playtested the game in order to find out other issues in the game.
    j. **Week 15:** Polishing the tutorial scene and enhancing the blackhole mechanic implementation to make it smooth and free of bugs. Reverified

the sound implementation to check whether everything is in sync. Worked on final playtesting and noted feedback to fix small issues in the game.

5. Sharan Sharan Murli
    a. **Week 6:** Team Formation, Initial Design Discussion Meetings, GDD Preparation
    b. **Week 7:** Explored UI ideas for the game along with the theme. Searched for assets that suit our overall game design. Added background images and buttons for start and end scenes. Added animations to button hover and background using C#.
    c. **Week 8:** Added particle system to the player to show a unique trail using C# script. Added dynamic score and no. of live updates in the game scene. Worked on game manager and scene manager scripts to reference all the values. Updated the GDD to add the mechanics, design, and gameplay loop.
    d. **Week 9:** Added a restart button to restart the game. Worked on overall scene management for the start scene, game scene, and end scene. Maintaining and updating the Game Design Document (GDD) and ensuring it remains up-to-date and accurate. Refactoring the overall UI scene codes.
    e. **Week 10:** Continue enhancing the UI, creating tutorial scenes, and refining the game's tutorial to ensure players have a smooth and informative introduction to the gameplay. Worked on the GDD as well to refine the mechanics and add weekly work updates.
    f. **Week 11:** Enhanced the tutorial scenes to help the player understand the game in an intuitive manner. Worked on individual scenes for the players to understand the game better with joining the game, Player Movement, Collecting the green health collectibles to increase their health and how to kill your opponent. Worked on the GDD to add more game elements, design, mechanics, feedback notes/solutions and weekly progress. Added 3 sketches to teach the player about the fire wall mechanic. Refactored the tutorial scene code and checked for any bugs.
    g. **Week 12:** Refined the Tutorialization/Scaffolding code and fixed minor bugs. Worked on the UI design to come up with new ideas and elements. Worked on adding a settings panel to restart, resume the game. Discussed the idea of adding a level to the game with an illusion effect. Completed the weekly GDD requirements. Playtestested 15 games and gave feedback for each game. Started work on the proposal for extra credit.
    h. **Week 13:** Analyzed the beta playtesting data and came up with 10 hypotheses collectively as a team. Improved the overall User Interface of

the game. Refined the overall tutorial scene codes and ensured that there are no bugs. Worked on the GDD to add the hypothesis.

i. **Week 14:** Added the game end scene to indicate which player wins in a sequential manner. Worked on the overall refinement of the tutorial scene codes along with the UI. Brainstormed better ideas to showcase the playground in a unique manner. Worked on the hypothesis issues based on the beta playtesting feedback. Worked on the GDD to add more significant details required for gold presentation.
j. **Week 15:** Established a robust game end condition, refining and implementing criteria for when the game concludes, contributing to a more structured and satisfying gameplay flow. Designed, modified and upgraded the user interface (UI) elements, focusing on visual clarity and responsiveness to enhance overall user experience and accessibility. Applied design principles to refine and polish various game elements, incorporating player feedback and ensuring a cohesive and engaging gaming experience. Worked on the GDD as per the gold rubrics and added all the required points. Refined the tutorial scenes and removed all the existing bugs.

6. Kang Pin Kang Pin Chan
    a. **Week 6**: Team Formation, Initial Design Discussion Meetings, GDD Preparation
    b. **Week 7**: Try to figure out the correct movement of the player. Try different speeds and angles to find the best for the gameplay. Pitched in with design discussion.
    c. **Week 8**: Make movement to let the player attack another player so that the multiplayer gameplay is workable.
    d. **Week 9**: Finish the player respawn mechanism so that when the player is attacked by another player, it can be respawned at its original position.
    e. **Week 10:** Pivoted the game's scoring system to a dynamic health bar, where players must continuously collect green collectibles to maintain their health and stay alive in the game, and made scores decrease in the firewall situation. In addition, I made a popup text to show damage & heal in the game.
    f. **Week 11:** worked on implementing a new mechanic called Homing Missile. There are still some bugs, so at this time, missiles will only be a collectible with no effect.
    g. **Week 12:** Fulfill the mechanism of the Homing missile. Now, it can track the position of the player.

h. **Week 13:** Make Homing missile as a collectible, so when a player hits the homing missile collectible it can be triggered to hit another player.
i. **Week 14:** Added health bar in the tutorial scene to make new players realize the game mechanism. Made the homing missile be destroyed after 7 seconds, making the player be able to escape from it.
j. **Week 15:** Fine tuning the attribute of the missile and other prefabs.

References

Link to any references (assets, etc) from other sources used in your game here. Explicitly state how they are used.

Name	Link	Usage
TypeOut animated text	https://assetstore.unity.com/packages/tools/gui/typeout-animated-text-20144	Used as a text font style for the start scene and the end scene to give a unique look to our game UI.
Buttons set	https://assetstore.unity.com/packages/2d/gui/buttons-set-211824	This asset is used for the Play. Quit and Play Again buttons in our game UI. 1. Play Button: This button is present in our start-scene which can be clicked to start the game. We have also added a unique hover effect that changes the button component when a player hovers over it. 2. Quit Button: This button takes you to the end scene
Free Galaxy Background	https://assetstore.unity.com/packages/2d/free-galaxy-background-206059	Used as a background for the start and end scene.
Simple Button Set	https://assetstore.unity.com/packages/2d/gui/icons/simple-button-set-02-184903	Restart Icon used for showing a restart button in the game so that the player can restart the game if

		required.
Absolute Space and Sci-fi Music	https://assetstore.unity.com/packages/audio/music/absolute-space-sci-fi-music-free-sample-103274	BackGround Music for the game to give a
2D Icons	https://game-icons.net/1x1/lorc/death-zone.html	For the blackhole icon
Tick Mark	https://www.google.com/imgres?imgurl=https%3A%2F%2Fupload.wikimedia.org%2Fwikipedia%2Fcommons%2Fthumb%2F7%2F73%2FFlat_tick_icon.svg%2F768px-Flat_tick_icon.svg.png&tbnid=hzxZHJV29mK8NM&vet=12ahUKEwja--em0ZWCAxXfNkQIHb0uBIwQMygJegUIARCLAQ..i&imgrefurl=https%3A%2F%2Fen.m.wikipedia.org%2Fwiki%2FFile%3AFlat_tick_icon.svg&docid=DZaf8B8o_WVxKM&w=768&h=768&q=tick%20image&ved=2ahUKEwja--em0ZWCAxXfNkQIHb0uBIwQMygJegUIARCLAQ	For the collectibles tutorial scene we added this tick mark to give the player an idea that they need to collect the green collectibles to gain health.
Cross Mark	https://static-00.iconduck.com/assets.00/cross-mark-emoji-512x512-yxj8c2ho.png	For the collectibles tutorial scene we added the cross mark to indicate that we need to avoid the red collectibles.
Green Collectible Health	https://www.iconfinder.com/icons/3321378/energy_game_health_power_icon	It helps the player to gain health
Red Collectible explosive	https://www.iconfinder.com/icons/5202202/bomb_detonation_dynamite_explosive_fuse_timer_weapons_icon	It gives an indication to the player that he needs to avoid coming in contact with them.
Freeze Mechanic	https://www.istockphoto.com/vector/cartoon-ice-cube-gm1325166691-410271070?phrase=ice+cube&searchscope=image%2Cfilm	It freezes the player for a short duration making him inactive and restricting his movement in the game. It makes the player movement slow for that small duration.

Firewall Mechanic	https://pngtree.com/freepng/flat-icon---firewall-network-privacy-lock-vector_10791044.html	This is a powerup in which the exterior walls of the playground cave in and can harm the player if he collides with it resulting in a loss of health.
Freeze Particle Effect	https://assetstore.unity.com/packages/vfx/particles/cartoon-fx-remaster-free-109565	On collecting freeze this particle effect plays on the affected player

Appendix

Individual Contributions for Alpha progress Check

10/06/2023 : Alpha Progress Check

1. **Aviral:**

Aviral takes on a dual role in the development process. As the Game Manager, they oversee the overall functioning and coordination of the game components. Additionally, Aviral works on player movement and documents the game's database structure, ensuring efficient data management and gameplay dynamics.

2. **Shweta:**

Shweta leads the effort in leveraging Unity Analytics to gather valuable insights into player behavior and preferences. She explores and implements strategies to collect pertinent game data, enabling informed decisions for optimizing the gameplay experience. Additionally, she is responsible for creating and maintaining Game Design Documents (GDD), taking notes from announcements, and facilitating effective communication

3. **Niranjanaa:**

Niranjanaa is responsible for the creation and functionality of collectibles in the game. These collectibles appear randomly, disappear upon contact, affect the player's score, have slow hovering movement, and include power-ups. Their dynamic presence adds an element of challenge and strategy to the gameplay.

4. **Sharan:**

Sharan is responsible for designing the basic user interface (UI) elements. This includes displaying the player's score, their name or player identifier, and implementing particle effects to enhance the visual and interactive aspects of the game. These UI elements are crucial in providing feedback and engagement to the player.

5. **Kang Pin:**

Kang Pin's contribution involves programming the player movement, specifically focusing on a two-player management system. This means implementing controls and mechanisms that allow smooth movement and interaction for players in a multiplayer setting, enhancing the gaming experience for multiple participants.

6. **Rahul:**

Rahul handles the game's audio aspects, determining the number of sounds required for a captivating auditory experience. They are tasked with sourcing or creating the necessary sounds and implementing them in the game. Rahul is also responsible for the Sound Manager, enhancing immersion through auditory elements.