**Product Visions/Product Goals**

To create an engaging ,dynamic and adaptively challenging FPS game that provides a unique gaming experience.

**High Level Product Plan**

*Sprint 1 & 2*

Implement the first base layer of the game which includes movement, shooting, enemies and layout.

*Sprint 3*

Implement the second base layer of the game which includes collectible items, UI, theme and music.

*Sprint 4*

Implement the core aspects of the game, DDA and PCG.

*Sprint 5*

Backend API, Continuous Integration, Continuous Deployment, Global Leaderboard and miscellaneous development.

**Product Backlog**

1. As a player I want there to be a basic level so that I can get a feel for how the game and mechanics will work.
2. As a player, I want to be able to move and change the view of my character so that I can navigate the game environment.
3. As a player, I want enemies to spawn in random locations, so the enemies are spread out through the game environment.
4. As a player, I want enemies to move around randomly until they see me and then chase me to make the game more immersive.
5. As a player, I want to be able to fire my gun to destroy enemies, so that I can stop them from attacking me.
6. As a player, I want to be able to keep track of my score/kill count, so that I know how well I am performing.
7. As a player, I want the game to feature animations for the enemies movement to make the game look more realistic.
8. As a player I want a gun to be visible on the screen and a gunshot sound to be made when I press the shoot button to give the game an additional degree of realism.
9. As a player I want there to be a blood splatter effect when the enemies are hit to make the game more realistic and immersive.
10. As a player, I want to be able to have a visible health bar so that I am able to know how well I am performing.
11. As a player, I want the enemies to be able to attack me, lowering my health bar to make it more realistic.
12. As a player, I want to be able to restart the game once the game is over.
13. As a player, I want to be able to lose the game after losing all of my health so that I know when the game is over
14. As a player, I want to be able to interact with health pickups, so that I can regenerate my health throughout the game.
15. As a player, I want to be able to be able to see my current ammo count to add more realism to the game
16. As a player, I want to be able to interact with ammo pickups, so that I can add to my current ammo count.
17. As a developer, I want to create a larger level that is more immersive to provide that player with a bigger game environment to explore.
18. As a player, I want to be immersed in a dimly lit and dark game environment to add suspense to the game.
19. As a player, I want to be able to open and close doors so that I can change the game environment.
20. As a player, I would like to have background music and sound effects so that the game is more immersive.
21. As a player I would be able to pause the game when I press the escape button, so I stop playing temporarily if I need to.
22. As a player, I would like to be able to adjust audio settings when the game is paused, so that I can tailor the sound settings, including sound effects and background music to my preference.
23. As a player I want there to be a game main menu where I run the game from.
24. As a developer I would like to refactor my door system so that the doors and buttons are not so tightly coupled, this means I could add additional uses for the button down the line if I wish to.
25. As a developer, I would like to develop tests to the collectible items script as it makes it more robust to changes.
26. As a developer, I would like to develop the A \* search algorithm for the enemies pathfinding so that the difficulty of the game could be tweaked in future stages.
27. As a player, I want a randomly spawned pickup which permanently increases my damage.
28. As a player, I want pickups to randomly spawn whenever I kill an enemy.
29. As a player, I want an increasing amount of enemies over time, so that the difficulty increases as the game goes on.
30. As a developer, I want the randomized item drops to be a variable property that can be adjusted over time which allows for more flexibility.
31. As a developer, I want real-time statistics of how the player is performing so that I am able to gauge the capabilities of the player.
32. As a developer, I want to create a DDA for my game which allows it to tweak various aspects of the game’s difficulty depending on the capabilities of the player.
33. As a developer I want the first level to be a randomly generated maze that the player must escape from before they are killed by an enemy. This will face the player with a challenge each time they play.
34. As a player I would like to have the option to play mazes generated by different algorithms so that I can change the characteristics of the maze with each play.
35. As a player I would like to have a puzzle in the maze, so that I am faced with an additional challenge whilst also trying to escape.
36. As a player, I want to progress from Stage 1 (Maze) to Stage 2 (Shooter), so that the game automatically progresses once I've completed the first stage.
37. As a player I want the enemies to only be able to damage me when I am in front of them so that I can dodge their attacks easier.
38. As a player I want to be able to save my final score on a global leaderboard, so that I can share my score and compete with other players.
39. As a player I want to be able to view the leaderboard from the start screen so that I can see how I compare with other players globally.
40. As a player I want the game to track my overall throughout the game so that I know how well I am doing.
41. As a developer, I want my code to be continuously deployed via Github Actions,, so that we can easily test and play the production level code.

**Sprint Planning**

Sprint 1 Goal: To develop the MVP

| Backlog ID | Acceptance Criteria | Priority | Days Estimate | Sprint Cycle | Status | Assigned To |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | The map will feature two complete rooms with a ground and four walls adjoined by two corridors. When the player character is created he will be able to navigate this space without passing through the walls or the floor. | High | 1/2 | 1 | Done | James |
| 2 | Player character moves up when the up key/control is used, down for down, left for left, and right for right. The character should not move outside the game environment boundaries. | High | 1/2 | 1 | Done | James |
| Player character is able to use the mouse move the camera view omnidirectionally | High | 1/2 | 1 | Done | James |
| 3 | Enemies should be able to spawn in random locations around the environment. | High | 1/2 | 1 | Done | James |
| 4 | When the player moves in front of the enemies, the enemies begin to chase the player. | Medium | 1/4 | 1 | Done | James |
| 5 | Enemies should have fixed amount of health | Medium | 1/4 | 1 | Done | James |
| Enemies disappear after losing its fixed amount of health | Low | 1/4 | 1 | Done | James |
| 6 | When an enemy is killed the score is incremented by one. | Low | 1/8 | 1 | Done | James |
| 7 | When the the enemy moves a walking animation is played | Low | 1/8 | 1 | Done | James |
| When the enemy gets close to the player an attacking animation is played | Low | 1/8 | 1 | Done | James |
| When an enemy is killed a dying animation is played | Low | 1/8 | 1 | Done | James |
| 8 | Gun is visible in the lower corner of the screen pointing to the center. | Low | 1/8 | 1 | Done | James |
| When the player shoots a gunshot sound is made | Low | 1/8 | 1 | Done | James |
| 9 | When the enemies are hit, a blood splatter animation appears. | Low | 1/8 | 1 | Done | James |

Sprint 2 Goal: To develop the second layer of the base game

| Backlog ID | Acceptance Criteria | Priority | Days Estimate | Sprint Cycle | Status | Assigned To |
| --- | --- | --- | --- | --- | --- | --- |
| 10 | The player will have a visible health bar | High | 1/2 | 2 | Done | Sheng |
| 11 | After being physically hit by enemies, health bar is lowered | High | 1/2 | 2 | Done | Sheng |
| 13 | When the health bar reaches 0, the game ends | High | 1/2 | 2 | Done | Sheng |
| 15 | The player has a visible view of its current ammo count | High | 1/2 | 2 | Done | Sheng |
| 12 | Health pickups has a chance to spawn after killing an enemy | Medium | 1 | 2 | Done | Sheng |
| Health pickups regenerate a portion of the player’s health bar | Medium | 1/2 | 2 | Done | Sheng |
| 14 | A restart button appears on the screen after death allowing the restart of a game | Medium | 1/2 | 2 | Done | Sheng |
| 16 | Ammo pickups has a chance to spawn after killing an enemy | Medium | 1 | 2 | Done | Sheng |
| Ammo pickups add to the player’s current ammo count | Medium | 1/2 | 2 | Done | Sheng |
| 17 | Detailed research on level design to provide justification on how the level will be laid out. This should be focused towards FPS shooter games. | High | 2 | 2 | Done | James |
| Level should be completed and justified by the review of the literature. As stated the game should have an eerie, horror-like feel to it and the level needs to reflect this. | High | 2 | 2 | Done | James |
| 18 | Lighting needs to fit the description, thus the player should not be able to see too far in front of him. Point lights should be spread out enough to provide a playable visibility with no overall directional light. | High | 1/2 | 2 | Done | James |
| 19 | The player should be able to interact with buttons on the wall, which should open and close doors correctly. | Medium | 1/2 | 2 | Done | James |
| 20 | Upon the game being played, background music should be heard by the player. | Low | 1/8 | 2 | Done | James |

Sprint 3 Goal: To develop additional base functionality. To make the changes easier for 4th Sprint which includes elements of PCG and DDA

| Backlog ID | Acceptance Criteria | Priority | Days Estimate | Sprint Cycle | Status | Assigned To |
| --- | --- | --- | --- | --- | --- | --- |
| 21 | When the player presses the escape button, the game pauses and a settings menu appears. | High | 1 | 3 | Done | James |
| 22 | When the audio settings are adjusted, the game reflects those changes in settings. | High | 1 | 3 | Done | James |
| 23 | When the game is launched a main menu appears and from here the player has an option to launch the game. | High | 1 | 3 | Done | James |
| 24 | The button script must not require a door as a field. | High | 1/2 | 3 | Done | James |
| 25 | Develop test script for collectible items. | Low | 1/2 | 3 | Waitlisted | Sheng |
| 26 | Refactoring the base AI state and implementing AI enemy dodging bullets.. | High | 3 | 3 | Done | Sheng |
| 27 | Develop a randomly spawned pickup that permanently increases damage. | High | 1/2 | 3 | Done | Sheng |
| 28 | As a player, I want pickups to randomly spawn whenever I kill an enemy. | Medium | 1/2 | 3 | Done | Sheng |

Sprint 4 Goal: To develop the main aspects of the game such as DDA and PCG.

| Backlog ID | Acceptance Criteria | Priority | Days Estimate | Sprint Cycle | Status | Assigned To |
| --- | --- | --- | --- | --- | --- | --- |
| 29 | Gradually Increase the amount of enemies over time. | High | 2 | 4 | Done | Sheng |
| 30 | Make the randomized item drop a variable array which allows it to be dynamically adjusted over time. | Medium | 1/2 | 4 | Done | Sheng |
| 31 | Real-time statistics of how the player is performing (hit/miss ratio & APM) so that I am able to gauge the capabilities of the player. | High | 2 | 4 | Done | Sheng |
| 32 | Develop a DDA for which tweaks the various aspects of the game’s difficulty (pickups, amount of enemies) depending on the capabilities of the player (APM & hit/miss ratio). | High | 7 | 4 | Done | Sheng |
| 33 | When a new game is started, the player is spawned in a procedurally generated maze. | High | 6 | 4 | Done | James |
| 34 | The maze can be selected from startup. Once the game is launched the selected maze algorithm is used. | Medium | 3 | 4 | Done | James |
| 35 | A puzzle is spawned into the maze, if the correct code is entered, they players score should be displayed and | Medium | 3 | 4 | Done | James |
| 36 | When the maze is completed, the player is taken to the main level | High | 2 | 4 | Done | James |

Sprint 5 Goal: Backend API, Continuous Integration, Continuous Deployment, Global Leaderboard and miscellaneous development.

| Backlog ID | Acceptance Criteria | Priority | Days Estimate | Sprint Cycle | Status | Assigned To |
| --- | --- | --- | --- | --- | --- | --- |
| 37 | Player will not take damage if he moves around the enemy while the enemy is in its attacking state. | Medium | 1 | 5 | Done | James |
| 38 | When a player finishes the game and saves their score, we should be able to view the save game in Postman. | High | 2 | 5 | Done | James |
| 39 | When I click a button marked leaderboard from the start screen, a popup will appear and the top 10 leaderboard score will appear. We can confirm they displayed scores are correct from Postman. | High | 2 | 5 | Done | James |
| 40 | Track the statistics of player’s performance so that the data can be analyzed. | Medium | 1 | 5 | Done | Sheng |
| 41 | Continuously deploy the game onto a website using Github Actions | High | 1 | 5 | Done | Sheng |