

My goal with this project is to make a geometric styled top down shooter in which the player traverses a maze like environment and defeat enemies. The environment in the game will consist of a series of random rooms filled with various enemies that the player must defeat. At the end of each floor will be a boss that the player must defeat before they can advance to the next floor. Through this project I will explore the basics of the unity game engine, c# and procedural generation, all subjects I have no experience with at all. I am proposing to make a game with the following features:

1.A player that can

1. fire at least two distinct projectile types.
 - a. Possible Projectile types include:
 - i. medium speed bullets fired rapidly. ~5
 - ii. a beam weapon that can penetrate enemies. ~10
 1. it will extend to the length of the room. ~3
 2. there is a delay before firing during which time the player is not able to move. ~3
 3. perhaps taking enough damage will prevent the laser from firing, and unparalyze the player early.
2. When the player takes damage they will be made invincible for a short time, maybe half a second during this time they will be invincible.

section total ~21

2. An overlay will display information about the player including at a minimum

1. the players health. ~3

section total ~3

3. At least X distinct enemies with different combinations of movement and shooting patterns.
 1. possible enemies include:
 - a. A Stationary turret that shoots: ~3
 - i. bullets in a random direction.
 - ii. bullets at the player.
 - iii. 4 bullets, one in each of the cardinal directions.
 - iv. 4 bullets, one in each of the primary intercardinal directions.
 - v. 8 bullets, one in each of the cardinal directions and one in the primary intercardinal directions.
 - vi. 8 bullets, one in each of the secondary intercardinal directions.
 - vii. 16 bullets, one in each direction.
 - viii. in the fashion of any turret listed above, but also rotates.
 - ix. in the fashion of any turret listed above, but instead fires a beam weapon.
 - b. A mobile enemy that moves directly towards the player: ~3
 - i. and shoots bullets.
 - ii. and shoots bullets but also moves to strafe the player once close enough.
 - iii. doesn't shoot, and detonates on impact with the player dealing high damage.
 - iv. and detonates on impact with the player dealing high damage.
 - v. and shoots bullets, and has a front facing shield that blocks a limited number of bullets.
 - c. A mobile enemy that moves in a zig-zag towards the player moving at 45 degrees relative to the player and alternates every second or two: ~3
 - i. and does anything the enemy above does.
 - ii. does not face the player but has an indestructible shield.
 - d. an enemy that teleports every x seconds: ~3
 - i. relative to the player at a fixed distance
 - ii. Randomly
 1. To a random place in the room
 2. To a random rotation around the player at a fixed distance.
 - iii. or at a fixed rotation and distance. ie always teleports behind the player.
 - e. at least one boss with at least 2 phases that a player can face at the end of a floor. ~5

Section total ~17

5. A main menu that you can exit to the desktop from or start a game.

Section total ~3

6. A pickup system that lets the player improve their character.

1. Possible pickups include: ~3 (one for each)

- a. Increasing character health.
- b. Increasing beam Damage.
- c. Increasing bullet Damage.
- d. Increasing bullet fire rate.
- e. Increasing player movement speed.
- f. Increasing beam weapon diameter.
- g. Increasing bullet size.
- h. increasing bullet movement speed.
- i. increasing bullet range. (time before despawn)
- j. Decreasing the delay before player can fire their beam weapon.
- k. Decreasing player size (making it easier to dodge).
- l. Pull back camera to make it easier to see.

2. All pickups will have caps so that the players stats do not become too high. This is not just a balance issue as something like too high a movement speed could make the game very unfun. ~2

3. Which pickups the player will encounter will be determined by the random seed.

4. Pickups will be given as a reward ~2

- a. at the end of every room.
- or

- b. as a reward at the end of every floor.

5. Enemies will also have a small chance of generating a health pickup on death. ~3

Section total ~10

7. A dungeon based on procedural generation that generates rooms with destructible walls that connect together and eventually lead to a boss room.

1. The dungeon will consist of multiple rooms of random size. ~10
 - a. Each room will consist of many cube walls that will be destructible with the exception of the last layer of wall, which will be indestructible. ~10
 - b. the distribution of these wall cubes will be determined by a cellular automata algorithm.
2. Room generation will be multi threaded ~20
 - a. The walls and door placement will be done first with a single thread.
 - b. Once the rooms placement has been determined, the contents of each room can be generated with multiple threads.
 - c. the first room is pre generated the others will be generated once entering an adjacent room.
or
 - d. The entire floor is generated once starting a game, the next floor is generated when going to the next floor --I think this
or
 - e. Room generation is done before the game starts.
3. Rooms:
 - a. Their will be one or more door out of each room.
 - b. The doors in each room will be connected: ~10
 - i. with an anti-aliasing algorithm.
 1. The lines will go from all doors the center of the room ensuring that getting to any door is possible.
Or
 2. The lines will go from all doors a random point in the room ensuring that getting to any door is possible.
Or
 3. The lines will go from all doors to all other doors in the room ensuring that getting to any door is possible.
or
 - ii. I find a more clever way to do this.
 - c. If two rooms are adjacent they will share a door.
 - d. Each room's door can only be opened once the room's enemies have been defeated.

Section total ~50

Total ~

Level generation: 50

Player mechanics: 21

Pickup system: 10

UI: 3

Enemies and bosses: 16

A = 90 or above

B = 80 or above

C = 70 or above