CS354R Final Project Report – Team Falco (Seth Parsons)

Not exactly sure what I need to put for this final report, so I'll just sorta spitball - I'm really happy with how things turned out! I got everything I wanted out of the project basically done while still leaving it up to a ton of future improvements if I want to keep iterating on my game in the future. I put in a *ton* of work for the alpha, so all I basically had to do since then was implement the procedural generation, which went smoothly.

The procedural generation works with six sets of game objects I created - enemies and terrain, each with easy, medium, and hard difficulties. When a timer node in the level scene goes off every 1.25ish seconds, a function on_timeout() is called, which generates a random number and uses it to spawn an object based on how much time has passed. Here a snippet of that function -

```
74  // When timer pops, decide what enemy or terrain thing to spawn
75  void Level::_on_timeout() {
76      if (Object::cast_to<Player::Player>(Node::get_node("/root/Level/Player"))->game_ended) {
77          return;
78      }
79
80      // Get a random number between 0 and 100
81      int random = rand() % 100;
82
83      // Get time in minutes
84      int minutes = (time / 60);
85
86      // Decide what to spawn based on random number and time passed
87      // Start game
88      if (minutes < 1) {
89          if (random <= 40) {
90              return;
91          } else if (random <= 70) {
92              spawn_easy_terrain();
93          } else if (random <= 100) {
94              spawn_easy_enemy();
95          }
96      // Early game
97      } else if (minutes < 2) {
98          if (random <= 20) {
99              return;
100         } else if (random <= 50) {
101             spawn_easy_terrain();
102         } else if (random <= 80) {
103             spawn_easy_enemy();
104         } else if (random <= 90) {
105             spawn_medium_terrain();
106         } else if (random <= 100) {
107             spawn_medium_enemy();
108         }
109     // Mid game
110     } else if (minutes < 4) {
111         if (random <= 10) {
112             return;
113         } else if (random <= 25) {
114             spawn_easy_terrain();
115         } else if (random <= 40) {
```

Once the game has been running for longer than 7 minutes, it enters “end game”, where there's a 90% chance to spawn hard enemies or terrain, and the chances for spawning specific things never change until the game is restarted/ended.

With everything I’ve got working right now, the game is completely functional and “complete” (in the sense that there are no placeholders and the game can be played from start to finish), which I’m really happy with. I’ve never gotten that far on a personal game project. Of course, there are more things I could ideally add -

First, medium and hard enemies are the same as easy enemies. To differentiate them, I could make the medium enemy be able to shoot you, and the hard enemy able to both move and shoot you. If I implement this, I would also implement barrel-rolling for the player, so there’s some way to defend against enemy lasers.

Next, it could be interesting to add bosses. I think these would work by either having a small chance for them to spawn at any time, or a 100% chance to spawn at some set time, where they work like a normal enemy except they follow the player and they stop everything else from spawning while they’re alive.

Finally, ally AI could be fun to add too. I would probably add Falco b/c he’s the most interesting ally from Star Fox (but my team name! How could I? haha). I think this could work not by having some ally AI around at all times in the game, but to have them show up by chance at random and take down an enemy or two for you. I also joked about adding Slippy, not so he could help you, but just so you could shoot him down as a joke, but maybe that could turn into shooting down a member of Star Wolf for extra points?

Anyway, to conclude, this was an awesome way to end the semester, and I’m very satisfied with how my project turned out. I made a complete game from start to finish by myself and implemented an interesting game engine technology, all while more or less fulfilling all of my original requirements for the game in a reasonable timeframe. Maybe on my own time I’ll add those extras I mentioned - could make a good little project for my resume!