**CGRA 151 Project Report**

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Name of game/artwork: Space Invaders

***Vision:***

The game that I’ve chosen is an all-time classic 2D game called Space Invaders. How it works is that the user has two control a ship which shoots out bullets and the player must kill an array of enemies which are slowly approaching the ship. If the player doesn’t kill all the array of enemies and if the ship is touched by the enemies, it’s game over. I’m planning to use either the mouse for the player to control the ship similarly to what we did in the 2nd programming assignment where I made a rectangle move based on the mouse’ movements and get ideas from that or let the player use the keyboard to move. What I was planning for the levels is that if the player kills the first array of enemies then the next level would be double the number of enemies or try to challenge myself and make the enemies move in random places in higher levels rather than in a fixed movement. Make the game look aesthetic and add a cool background, I can get experimental and add cool patterns, by making it run across the screen at a constant rate in the draw method. Colour scheme, I want to have a retro theme like in the 80s for example purple and other colours that blend well with it. The graphical style, all retro like the original.

***Achievement:***

I followed my plan very accordingly and got the main concept of the game to run, which was the focus of my plan. I got the basic operations done. By using a 2D array to spawn the enemies and used a mouse for the user to control and fire bullets out of the ship. Made a Game Over, Menu with instructions and Win screens. Also implemented a countdown before the user starts playing the game and added a scoring system. Added a retro background with beautiful colours spawning at random points. When the user kills the first wave of enemies there’s more levels and they get faster as you go further into the game. So, I implemented a levelling system into the game as well.

***Technical Challenges:***

I faced a lot of technical issues with my program. One major issue was my levelling, I only had 1 level working and I found it very difficult to spawn a second wave of enemies after the first wave. Another issue that I faced was the movement of my enemies. I didn’t want them to just go down a straight line, I wanted them to zigzag down however eventually I figured out a way to make them move by using time (seconds), if and Boolean statements. Collision detection was also difficult, colliding the ship’s bullet with the enemy. The issue that I faced on that one was that whenever the bullet touched an enemy, the whole array of enemies would disappear. So, I placed print statements everywhere in my program and tried to debug what was going on for most the challenges that I encountered. Also had a problem with my countdown, whenever I’m in the menu screen and stayed there for a certain amount of time, the countdown would’ve already happened which caused a lot of errors in my game.

***Reflection:***

My experience for this project was very fun and challenging at the same time. I met most of the conditions that I have set up in my project plan and I’m pleased with what I’ve accomplished with the limited time given. I had ups and downs while creating the game, there were some easy pretty parts like creating and moving the ship with mouse however some of the harder ones I encountered which required a lot more thinking were the enemies themselves; how they moved, spawned and its levelling system. I would love to implement more things into this game even after this project and add things to it that I couldn’t do like powerups for my ship, enemies firing back their own bullets etc. Overall though I learned a lot from creating this game.