

21031 – Space Invaders

David Scott

21/05/2021

Tuesday 20th April ~11:30am:

Today I played multiple versions of Space invaders online to work out the defining rules of the game. I did this to make a list of requirements and gain inspiration as to what to change.

Here is the list of requirements my game of space invaders must include:

1. Player must only be able to move along the horizontal axis underneath the bunkers.
2. The bunkers are temporary and can be destroyed by the aliens and the player. It takes roughly 4 shots to destroy one pixel of the bunker. (potential for change)
3. The player can shoot at the aliens as much as they want while the aliens can only shoot every so often and its one alien at a time.
4. The player has only 3 lives and if the aliens shoot the player, they lose a life.
5. If all the lives are extinguished, the aliens reach the ground, or all the bunkers are destroyed its game over.
6. The aliens move in a pattern across the screen and down towards the player very slowly.
7. 10 points for the first two rows, 20 points for the second two rows and 30 points for the last row. For the UFO that flies randomly it grants the player either 50, 100 or 150 points

Changes:

1. A boss fight could occur after the first wave of enemies has been killed.
2. Power ups to enhance the players lethality.
3. Different theme instead of the classic space invaders e.g., Star Wars, Fantasy, Real world

Thursday 22nd April 8pm:

Goals for today:

Begin Fundamental construction for the game. This includes creating sprites, basic code and assembling into the room.

I have decided to follow a Star Wars theme and initially I would like to add some different power ups into the game like extra shields, rapid fire or a bomb that does Area of Effect damage to the enemies.

Outcome from today:

The game now features player movement along the horizontal axis but it for some reason only stops on the left-hand side of the screen and goes through the wall on the right-hand side. I have implemented basic shooting and powerup collection and ustulation. These power ups include a minigun like effect when the item is picked up and a bomb can be shot but does not do anything yet. So far, the enemies can only take damage and deactivate when hit with no other coding attached to them. The sprites I have chosen are canonical to Star Wars with the player being the Millennium Falcon and the enemies are tie-fighters. Sprites were taken from the internet with links in the bibliography.

To work on next:

Enemy movement, bomb coding, fix player movement, basic UI.

Saturday 24th April 3pm:

Goals for today:

Get enemy to move and shoot, fix player screen bounds detection, make powerups more usable, balanced, and realistic.

Outcome of today:

I only spent an hour or so today, but I worked on the power ups getting them working and balanced. The boxes that the player collided with were made in the room, but they are only spawned at the start right beside the player. I would like to make these boxes drop from the ceiling at random intervals for the player to collect. However, I did not do that today. The Minigun originally from Thursday once picked up applied the buff until the game ended. This effect makes the delay between shooting go from 60 frames to 1 frame causing mass destruction to the enemy. However, this is very unbalanced, so I coded that when the player collided with the power up an alarm ran for 3 seconds allowing the player access to the minigun. The bomb can be collected from the power up box and held onto until shot once allowing for the player to collect the bomb and not be able to use it infinitely.

To work on next:

Enemy Movement/Shooting, Bomb, UI, fix player movement.

Thursday 29th April 11:45am:

Goals for today:

Fix player movement, basic UI, point collection.

Outcome:

I could not figure out why the player would not stop on the right-hand side barrier, so I decided to change the functionality of the movement. I made the player wrap so that when they went to the right, they were wrapped to the left-hand side. I made tweaks to the fire rate of the player dropping it from 60 frames to 35 frames and raise the minigun fire rate from 1 to 5. I felt the normal shooting was too slow and that even though it was only for 3 seconds having the player shoot for 1 frame each felt to fast. Setting the fire rate to 5 helps keep the bullets somewhat separate allowing for enemies to slip through. I created a system to help count the points collected by shooting the enemies and was able to display that in the top right of the screen. Each enemy type will be granted different point values like in the real space invaders but as I only have one enemy type now, I only count 10 points per enemy.

May 3rd – 9th was our holiday, and I did not work on the project.

Tuesday 11th May 9:30am:

After realizing I was a bit behind after taking such a long break, I jumped back into my code only to realize how messy the code was. All the foundations for enemy AI would take ages to fix and bring to being efficient code.

So, I scrapped the project saving the lines of code that I wanted personally in my project. I then started a new project and made it an exact replica of the original space invaders using a YouTube tutorial changing the code to fit my specifications and to make it my own work.

I would spend the week working on this fixing code and writing new stuff.

Thursday 13th May 11:45am:

In class today I started transferring the code in the new project I had made into my original project. This resulted in a half functioning game with my sprites and specifications.

Things I have added:

A title screen. In which a start button has been placed if hovered over by the mouse the sprite will change and once the button is pushed the room will change to the game room.

A loss screen. This will show once the player loses all their lives or barricades and will display their total score and a play again and quit button whose sprites also change when they have the mouse hover over them.

There are 3 types of enemies that are placed in the scene and are not spawned in by code yet. These enemies move at a pace of 24 frames and once they reach the screen bounds, they drop down on the y axis by 16 and go the opposite way. The enemies also shoot back at the player, damage barricades and cause the player to lose lives. This is randomized and restricts the number of bullets to be shot to 5. This was to balance the enemies as it was too hard to peak the enemies when more than 5 of them were shooting at once. I also made the top row of enemies have faster bullets than the rest.

A UFO is spawned and generates a random selection of points from the ones provided. This was done with a choose method allowing for points of 100, 150, 200 or 250. I think I am going to change this to be on the players team instead of the enemies. Ill implement features later.

Barricades are placed in the scene above the player and are formed in the same shape as original space invaders. Each pixel has 4 hit points of health and receives damage from both the player and the enemies. The top row of enemies does 2 damage to the barricades instead of 1 like the rest of the enemies.

For now, the sprites for the barricades are just green like in the original SI but, the enemies take the form of my original and new sprites. The bottom 2 rows of enemies are normal tie-fighters, the middle 2 rows are tie-reapers, and the top row are Imperial Star Destroyers.

To work on:

Life counter UI, new sprites for barricades, different ufo functionality, progressive difficulty, enemy spawner.

Saturday 15th May 1pm:

Goals for today:

Change Barricade sprites, new functionality for UFO.

Outcome:

I changed the barricade sprites to grey instead of green but when they take damage, they become bluer and pinker like the play/quit buttons. It creates a cool effect when they loose health.

The Ufo has joined the players team but I have only changed it that when the player hits the UFO, they lose the points instead of gain points. This creates an obstacle to try not hit.

Thursday 20th May 8pm:

Goals for today:

UI updates, difficulty, enemy spawner

Outcome:

I fully finished the UI. The front screen now has a list of point values and warns the player not to hit the UFO, of which I made the sprite a Rebel X-Wing. Once the game starts the score counter and life counter is visible and updates in real time.

I used a for loop to spawn the enemies in their rows and columns. It spawns a single row of bottom enemies, two rows of middle enemies and one row of top enemies. The loop is triggered when the number of enemies equals 0. This also triggers adaptive difficulty. Every time the player clears a wave the system changes the time it takes for the enemies to move. It will gradually remove 2 frames from the original 24 until it reaches 0 then the player is sent to a win screen which I have not created yet.

To finish:

Minigun Power Up, code efficiency, polish game play.

Friday 21st May 8:30am (DEADLINE DAY AAAAAHH):

To start I changed the y axis the ufo drives on to below the enemies and above the barricades so its more of a target to miss. This was to make the player hit the ufo on accident more.

I copy and pasted the code I created for the minigun on my original code into this system and changed specifications to fit my current game. I used features of my ufo code to create the spawner for the power up and made it drop from the ceiling at 10 second intervals. In testing it seems like the code does not follow these 10 seconds, but I could not find a fix.

After Play testing from fellow classmates, they informed me I needed more “Juice.”

From a previous lecture we learnt that a game becomes more visually pleasing with sound, colour, particles, effects and more. Given that today is submission day I decided to add sounds.

I used a program called chiptone to create all the different sounds. After some playing around, I finally got good sounds that help the game feel more interesting.

Bibliography

French, S. (2016, February 12). Retrieved from Google Drive :

<https://drive.google.com/file/d/0B72oOb2ps8p9MTZvQ1MwVGNsUUk/view>

French, S. (2018, December 5). *YouTube*. Retrieved from

<https://www.youtube.com/playlist?list=PLdbWgbYZl1wgZj5iHcuwgneEuZ2yc69x4>

onecase. (2019, March 10). *EuroBricks*. Retrieved from

<https://www.eurobricks.com/forum/index.php?/forums/topic/170657-mocinstruction-isd-monarch/>

SFB-Games. (n.d.). *ChipTone*. Retrieved from <https://sfbgames.itch.io/chiptone>

u/Fliscuits. (2014). *Reddit*. Retrieved from

https://www.reddit.com/r/PixelArt/comments/1zw0mx/occcnewbie_millennium_falcon_star_wars/

Unknown. (2018). *Pixel Art Maker*. Retrieved from <http://pixelartmaker.com/art/f1233c59361e1db>

Unknown. (2019, July 20). *TopPng*. Retrieved from https://toppng.com/tiefighter-tie-fighter-pixel-art-PNG-free-PNG-Images_282268