ICG Midterm 1

Space Invaders

Team members are:

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- Anthony Karas (100784819)
- Suraaj Gill (100783848)

Responsibilities:

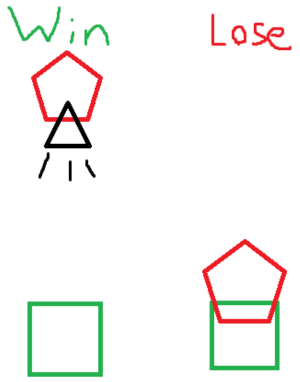
- Abdalla Mohamed - Programmer
- Anthony Karas - Artist
- Suraaj Gill - Artist

Repo:

https://github.com/IbeAbdulla-Start/ICGTEST

Which game:

We chose space invaders as our game. In space invaders the player controls a spaceship that moves horizontally and can shoot vertically towards the invaders. The main objective of the game is to destroy all the invaders as they approach you while dodging their shots back at you. You complete the level when all invaders are destroyed.



Even Odd or Prime:

10079512**0** + 10078481**9** + 10078384**8** = **17 - prime**

Explanation of concepts:

Limitations of not Using the Programmable Stages of the Graphics Pipeline

Modern graphics cards allow for a freely programmable graphics pipeline, giving developers direct access to each of the processing steps. Developers are able to change vertex shaders, geometry shaders, and more at will. By not utilizing this resource, developers miss out on the computing of shapes, colors, and more with fragment shaders, along with the positioning and placement of vertex shaders.

Using a closed graphics pipeline without any programming, developers remove options for optimization. Part of the reason that GPU's started being programmable was due to the increased demands and stress that developers were putting them under. By removing this flexibility, optimization becomes much harder on the graphics portion of the game.

How the Phong Lighting Model Allows us to Create a Glass Feel for Objects

Using the phong shader on glass gives the developer the ability to create a highlight on it similar to glare when a light or the sun would hit it. For example when light hits a monitor, there would be a bright spot where the light is catching and reflecting off similar to how the phong model creates a bright reflection spot based on the reflection from the specular shading.

What Approach Allows us to Create a Horror Feel Using Shaders

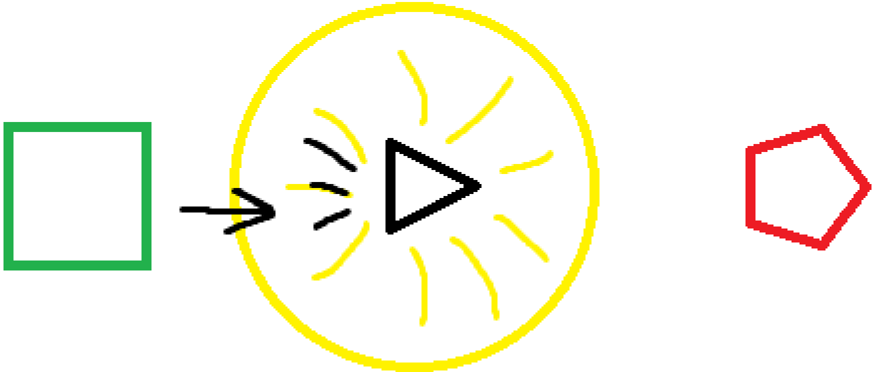
To create a horror approach, a good shader to use would be a fog shader. Creating a reduced visibility is an easy way to create a scary atmosphere. To create a fog shader you would need to use depth and distance from the camera to create fog. Where the fog is small fragments scattered about catching and reflecting light. Using this as well as a darker environment the, the horror feel would be amplified as the players would be constantly unaware of their surroundings.

Explanation of Implementations:

How we Make Scene Elements Emit Light Upon Interactions

To make light emit, we use the light.h and light.cpp files from week 6. When we shoot the bullet, an isEnabled function runs which toggles the light emission for the bullet. This then causes the bullet to emit light for the duration of its lifespan, as we then toggle the isEnabled again to disable it.

The light tracks to the bullet, causing the area around it to light up as it travels towards the alien.



How the Shaders Were Implemented

We used a space skybox shader to create the feel that the player is in space. Using this we surrounded the player in a space environment. Because the game takes place in space as you defend the earth we thought that the skybox would fit the theme. The skybox was created using a generator, and then the vertex shaders and fragment shaders were created alongside it, causing the scene skybox to properly change.