# STARFIGHTER

**Design Document**

## Introduction:

Starfighter is a simple shoot ‘em up where the player is a lone spaceship traversing through a field of meteors in an attempt to stop an oncoming enemy fleet. A simple, but challenging game where the player must be quick and nimble to beat the enemy ships and finally destroy the mothership.

## Design:

The goal of the game is to destroy the mothership that is threatening the player. The spaceship (player) has a health bar in the upper left corner that indicates the number of hits that could be taken before being destroyed. The ship is equipped with a gun that shoots bullets in a straight line damaging anything it hits. In addition, the player will have 3 attempts (lives) displayed in the top right corner to complete the mission.

Meteors of different sizes will be generated, threatening the player as well as obstructing shots of the player. Furthermore, multiple different ships will spawn at different times to stop the player from reaching their boss. Each type of ship has a different attack pattern. Enemy fighters shoot in a single line and will occasionally dive towards the player. UFOs shoot a spread of bullets and move vertically. Gunships fire two lines of bullets and move horizontally. Each enemy spawns at random locations above the player. Finally, the boss will appear with an arsenal of different weapons. The boss has two side guns and main guns that shoot in a straight line. The torpedoes are slow moving large bullets that are spread from the center of the boss ship. The rotary gun slowly fires two bullets towards the player.

The player loses a life when the health bar is fully depleted causing the player to explode and respawn seconds later. When the player has exhausted all three lives, the game is over. On the other hand, if the player makes it to the final boss and destroys it, the player has won the game. The player is expected to know how to maneuver the ship to dodge incoming meteors and bullets. In addition, the player must have the knowledge to prioritize certain enemies over others.

The game controls are as follows:
W is to move upwards, S is to move downwards, A is to move left and D is to move right. The spacebar is the key used to fire bullets from the spaceship.

Destroying an enemy generates points. These points are accumulated into the score shown in the top middle of the screen. Also, destroying enemies can sometimes produce a power-up which is used to assist the player in completing the mission. The lightning bolt increases the number of bullets the player shoots (max of 3) for a short period of time. The shield increases the health bar of the player but does not go over the maximum health the player starts with. When the game ends, the total number of points the player has obtained will be displayed on the screen.

## **Software Architecture Detail:**

The game itself is a single script that utilizes assets such as images and sounds from folders included with the script. The game has multiple defined functions to draw objects onto the screen.

There are two folders with assets to be used:

- images: contains the image assets used in the game
- sounds: contains the sound assets used in the game

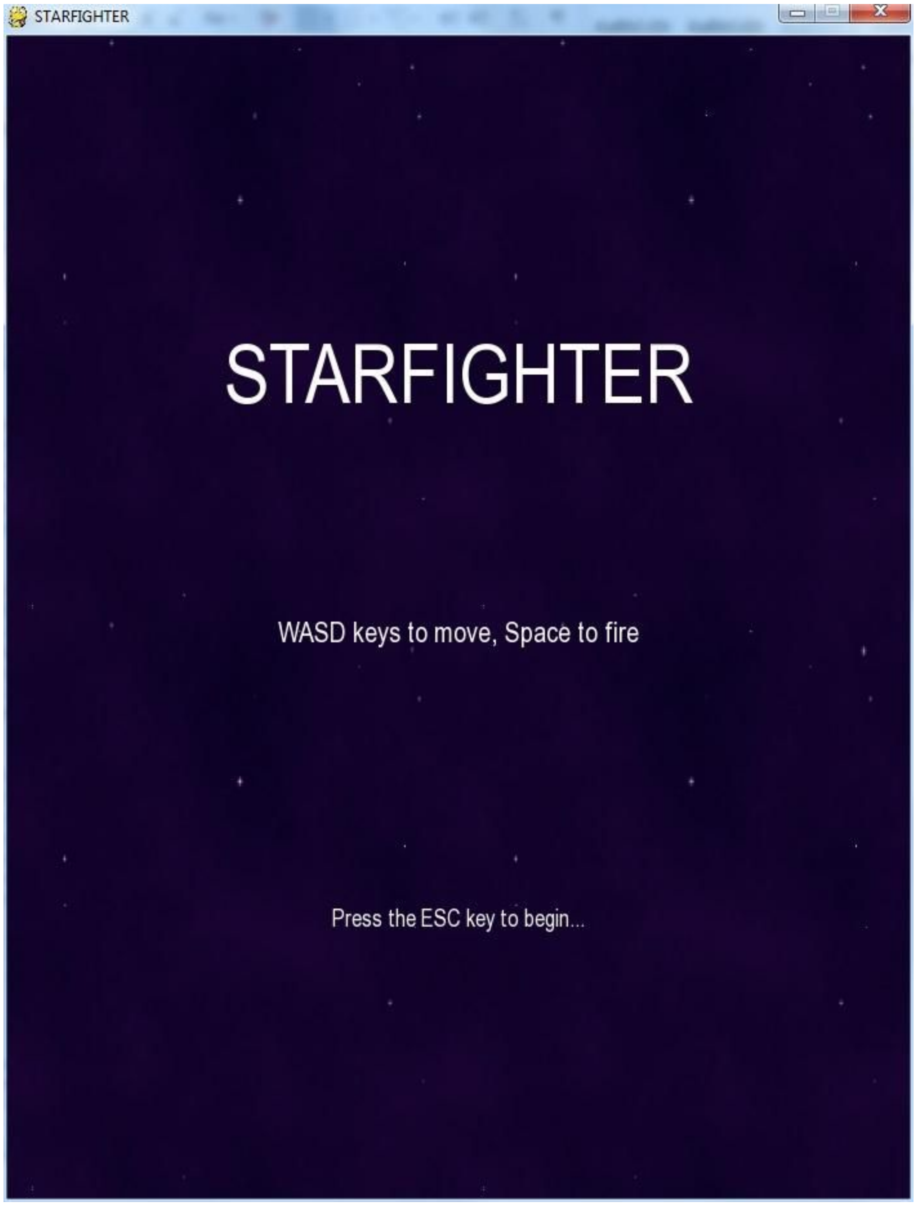
There are also multiple classes used within the script.

- The bullet class creates bullet images and is used by the other classes.
    - mainly used to generate the player bullet and enemy bullets.
- The explosion class creates explosion images and is implemented to happen after either an enemy, asteroid, or the player is destroyed.
- The powerups class generates random powerup dropped by the enemies.
- The player class is the player spaceship. It generates the object and methods of movement. It incorporates the powerup and bullet classes
- The Asteroids class creates the asteroid objects of different sizes, it also controls the speed and angles in which the asteroid comes.
- The enemyfigher creates the fighter objects. There are three different fighters and it controls what jobs the fighters do. It utilizes the bullet class as well.
- The UFO class generates the UFO objects that uses the bullet class. It controls the movements and bullet spread
- The Gunship class generates the gunship objects it controls the movement and controls the fire rate of the gunship
- The Boss class generates the boss object. Utilizing the bullet class, it has 4 different methods of attack, each defined by a method.

The game loop is generated within a while loop, calling outside functions and classes to draw images and activate sounds on certain events and frames. The intro screen is a simple function that is called within the while loop. Once the final boss is completed, a method is called to display the victory screen with the final score.

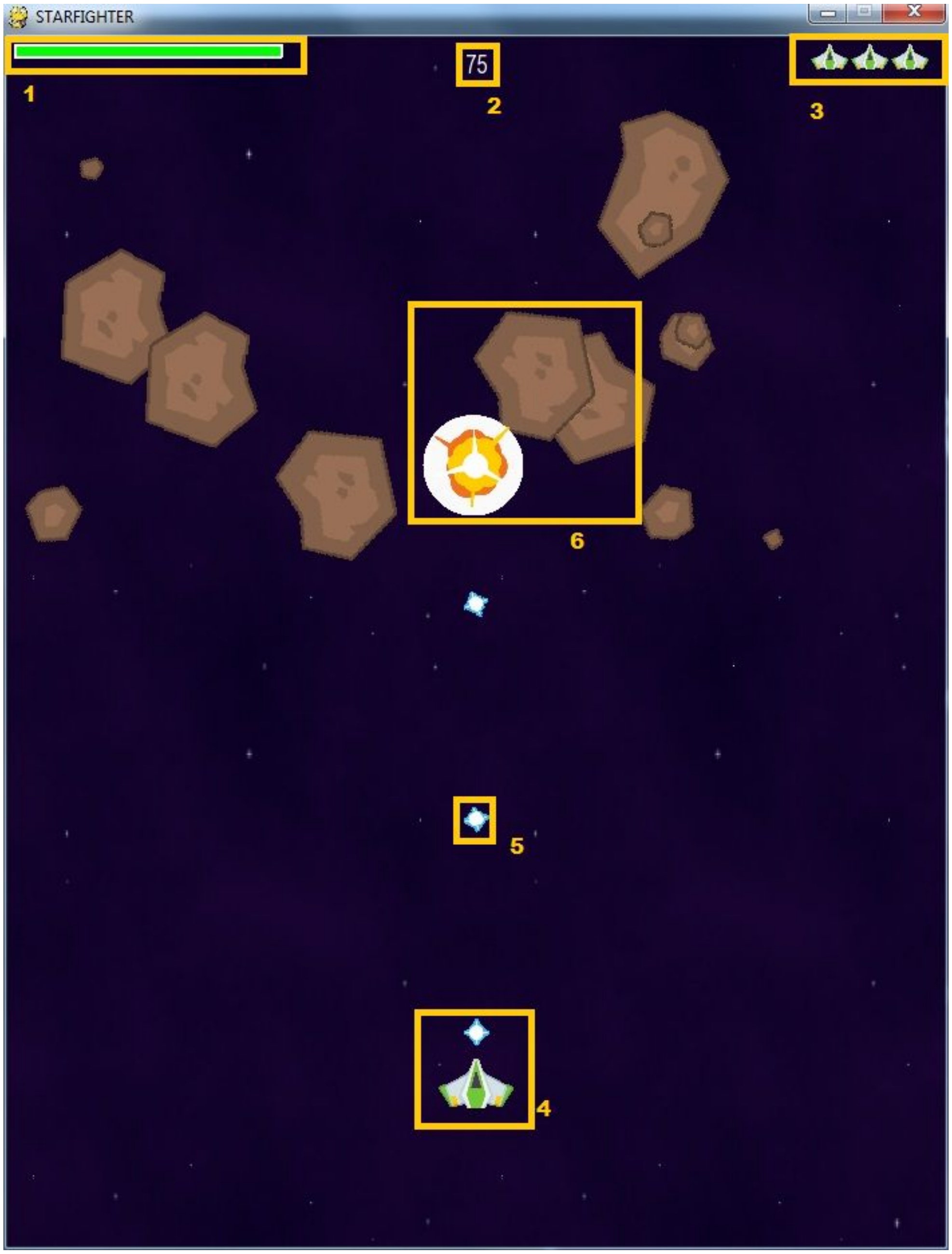
## **Game Demonstration:**

### 1. Starting Screen



STARFIGHTER
STARFIGHTER
WASD keys to move, Space to fire
Press the ESC key to begin...

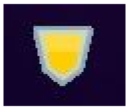
## 2. Gameplay



**[1] Health bar**
**[2] Score**
**[3] Number of Lives**
**[4] Player ship**
**[5] Player bullets**
**[6] Meteors (explosions)**

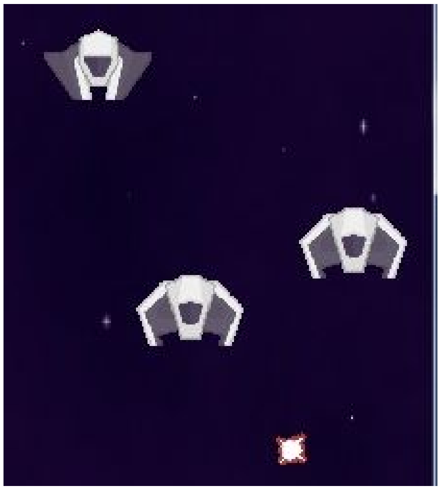
**Power Ups**:

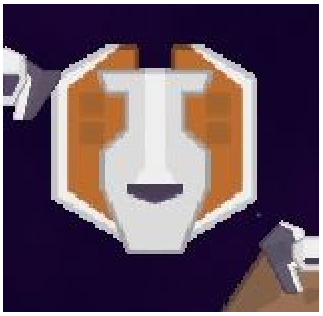
**Power Charge: Increases the number of bullets for a short while.**



**Shield Repair: Repairs the ship and restores missing health.**

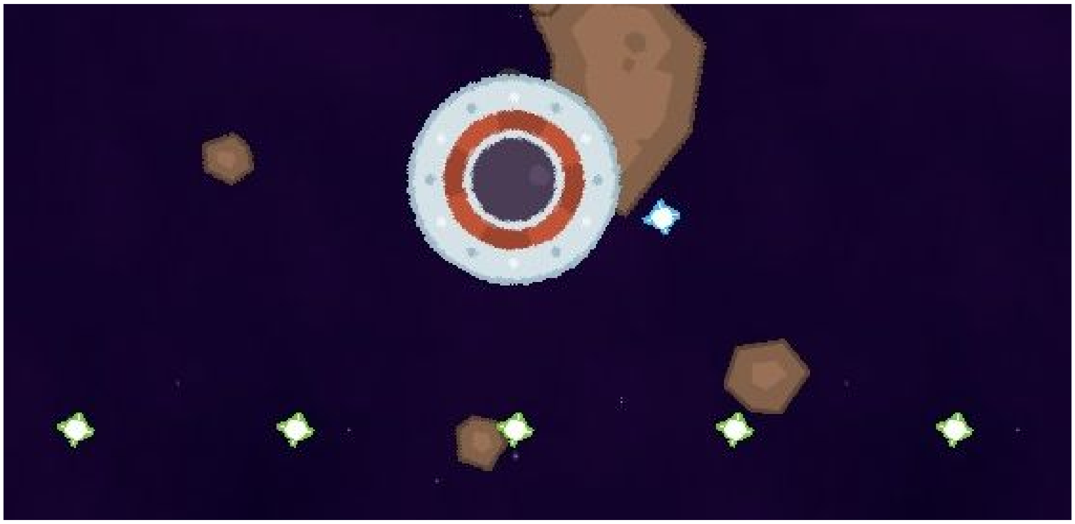
**Enemies**:



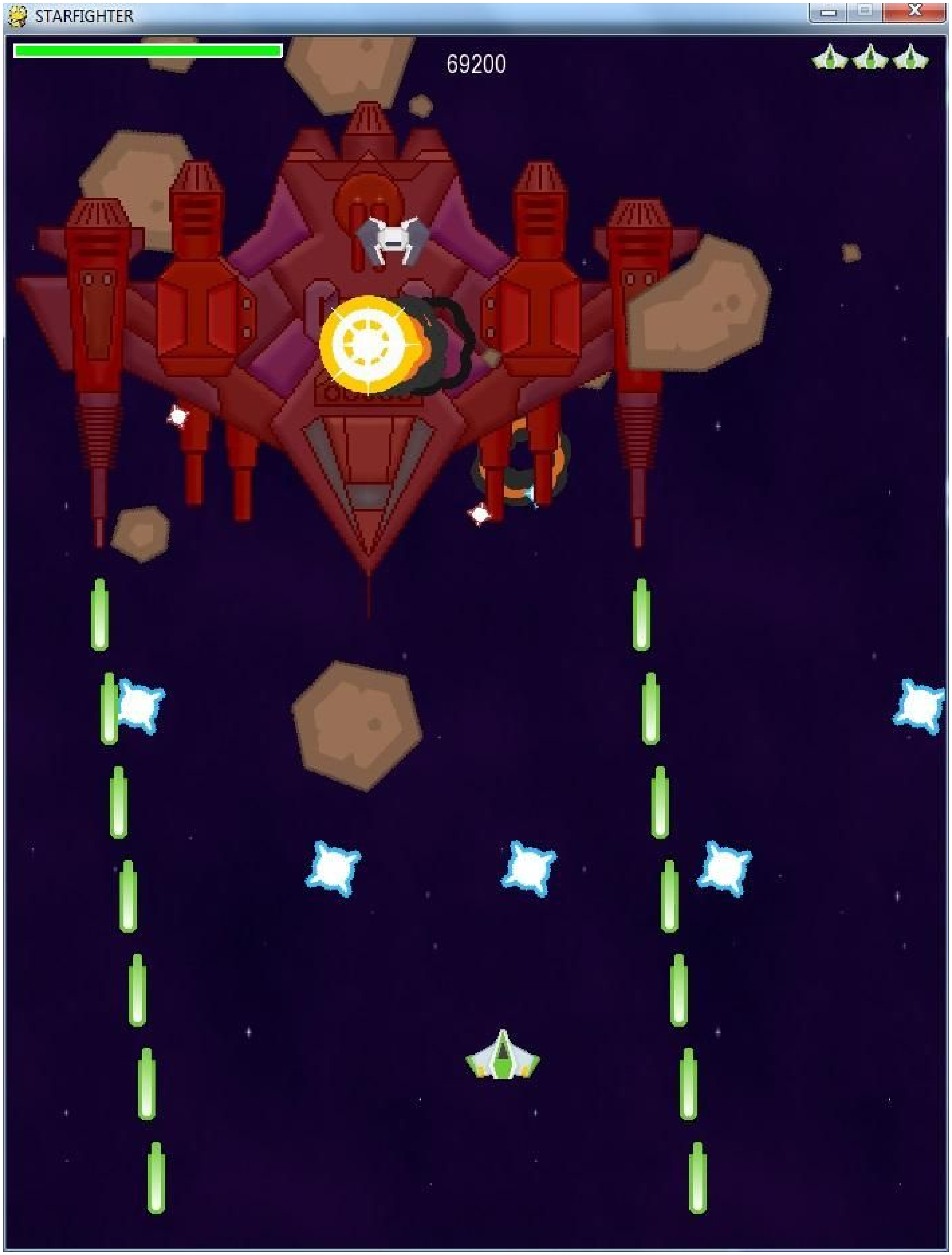


**Gunship**

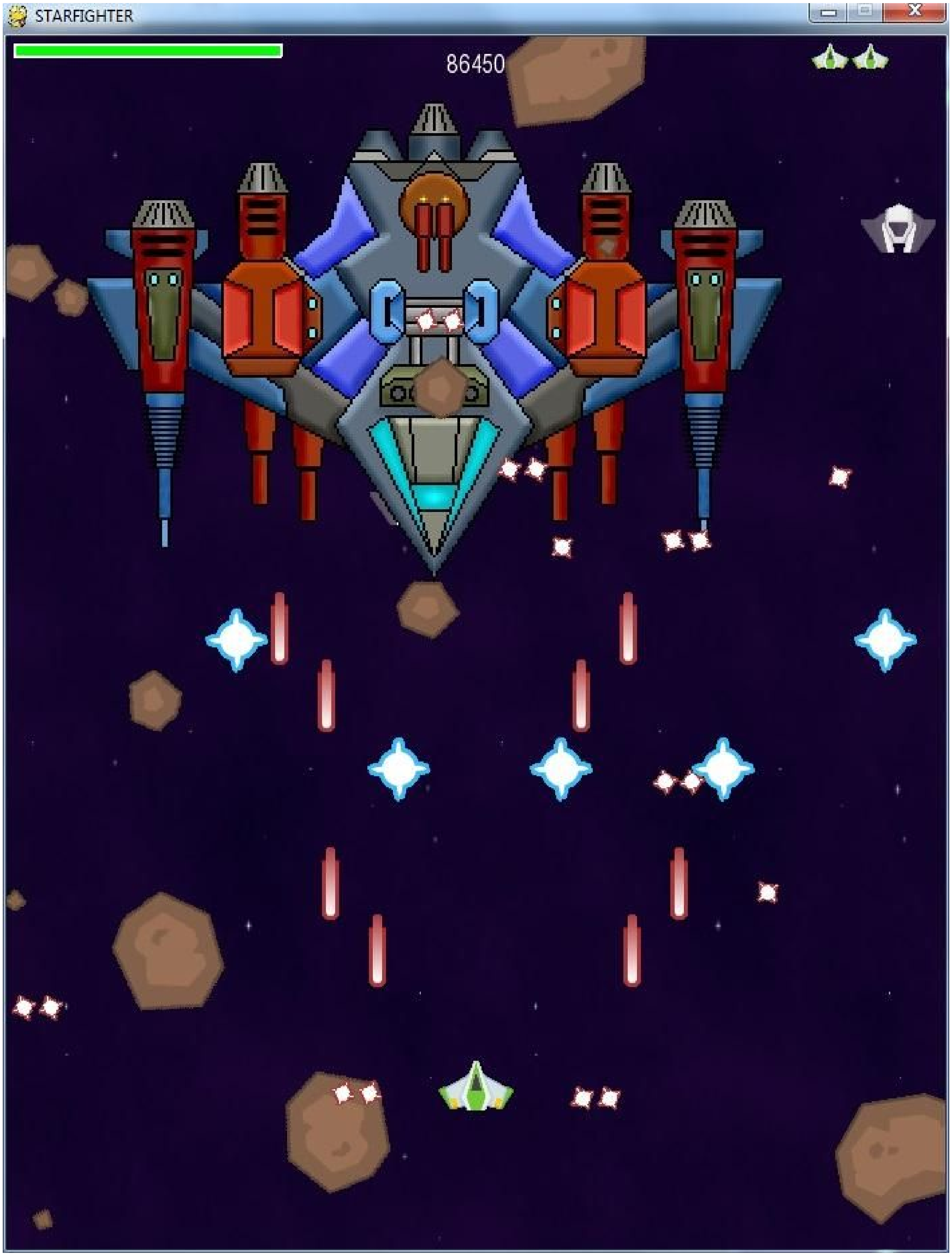
**Enemy Fighters**



### UFO

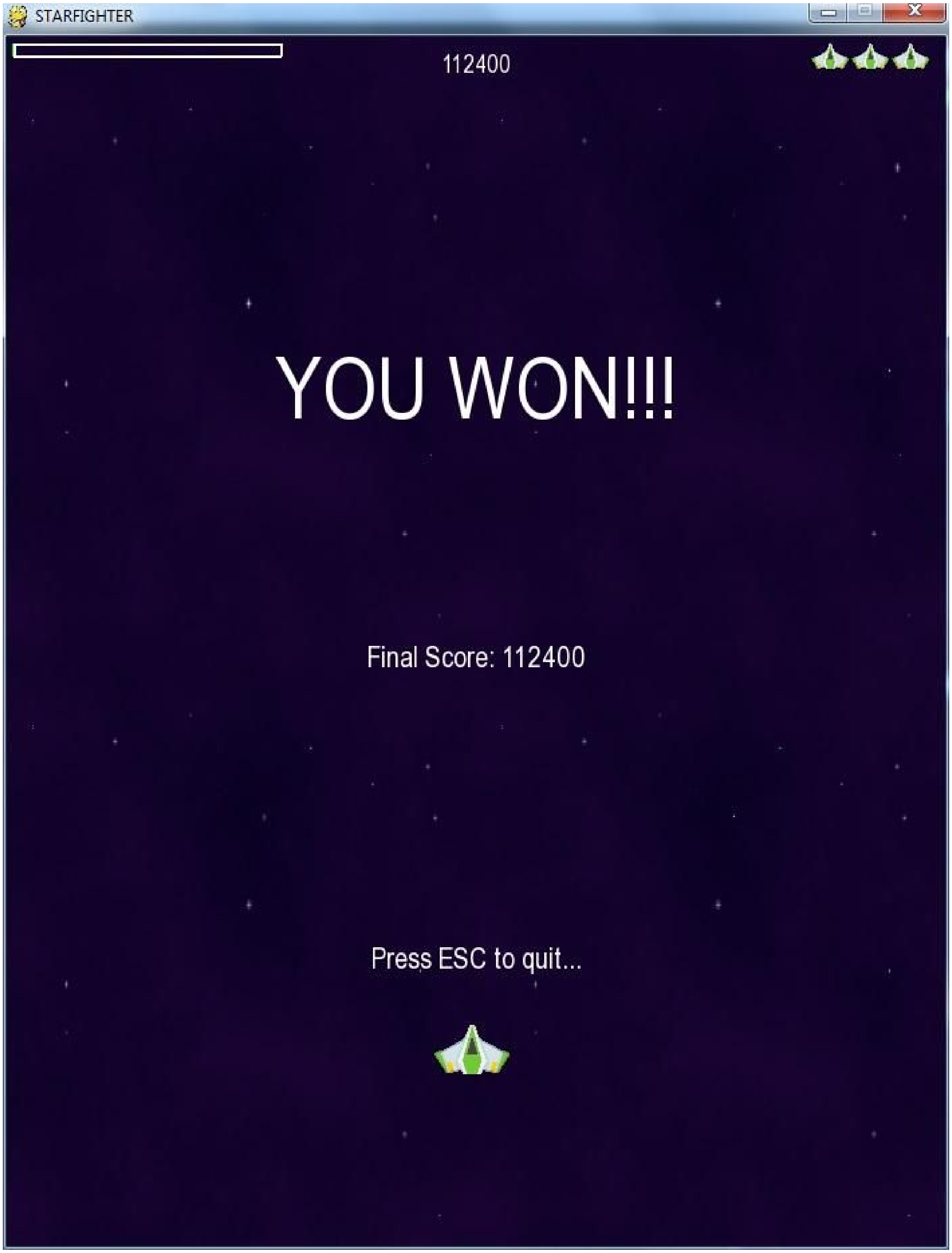


**Boss (damaged)  [Side guns (green)  Torpedoes (blue)]**



**Boss [AA guns (red lines)  Torpedoes (blue)  Rotary gun (small red dots)]**

## 3. Winning Screen



112400

YOU WON!!!

Final Score: 112400

Press ESC to quit...

Game Project Roles:

Earl Martin Momongan - In charge of coding the game as well as gathering assets. Produced a majority of the code and worked on bugfixes and balancing for the game. Assisted in certain areas of the documentation.

Peter Vu - In charge of the documentation and README file. Assisted in testing the game. Helped create the UFO class.

Bibliography/Credits

Note: filenames may have been renamed.

Images:

Found on www.opengameart.org:

- boss.png = esbxp
- Remaining images belong to Kenney.nl / www.kenney.nl

Sounds:

Found on www.opengameart.org:

- battle.ogg = Pant0don
- battle dirty.ogg = Pant0don
- CPU_Showdown.mp3 = Pugly
- victory.mp3 = Snabisch

Created on bfxr.net:

- Enemy_Shoot.wav
- Explosion1.wav
- Explosion2.wav
- Explosion3.wav
- Gunship_Shoot.wav
- laser_power.wav
- Laser_Shoot.wav
- shield_power.wav

Under public domain for free use:

- RedAlert.wav