Bilkent University

Department of Computer Engineering

CS 319 - Object-Oriented Software Engineering

CS319-2F-DE: Defender

Iteration 2 Analysis Report

Group Members

- Büşra Ünver

- Celal Bayraktar

- Javid Haji-zada

- Samir Süleymanlı

- Selen Uysal

Instructor: Eray Tüzün

Teaching Assistant: Alperen Çetin

Project Analysis Report

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1. Introduction

For the Object-Oriented Software Engineering (CS 319) course, as Group 2F DE, we have decided to design and implement a modern and more entertaining version of the arcade game Defender. Defender is a space game that has set on an unnamed planet where the player must defeat waves of invading aliens while protecting astronauts. 'Defender' was published in 1981 by Williams Electronics [1]. We have decided to design a more entertaining and fancier looking version of the original game by adding some new features. However, we preserve the core functions and features of the game.

In our initial design, we consider to include and add the following features:

- Single Player Story Mode

- Single Player Endless Mode

- Two Players Endless Mode

- Enable/ Disable Music and Sound Effects

- How to Play

- Ship and Background Store

- Highest Scores Table

- Health Bar

The structure of the game is based on moving a spaceship and shooting some space creatures coming towards you with a keyboard.

We have three game modes, Single-Player Story Mode, Single-Player Endless Mode, and Two-Players Endless Mode. At the beginning, Two Players Endless and Single Player Endless modes are locked for the sake of player because before you start single-player story mode, game provides a basic tutorial that introduces key bindings, different kinds of enemies and score distribution among the

enemies. When you finish the single-player story mode successfully, Single Player and Two Players Endless modes are unlocked and the game continues with Single Player Endless Mode with the score that you finish the classic mode.

In Single Player Endless Mode, you will fight against monsters until spaceship explode. Monsters will drop some coins once in a while that could be used for shopping in Ship and Background Store. When you score a new highest score, it will be recorded to highest scores table on the top. In this mode, unlike the Classic Mode, there are not any astronauts that waits to be rescued, it is only you and the space monsters.

In Two Players Endless Mode, there will be a split screen at the top and the bottom. It is similar to Single Player Endless Mode; when one of the players is dead, the game continues until the other player also die. Then, the scores are compared to determine which player wins the game.

In Ship and Background Store, you can buy a new type of ship or new background.

In the original game, you have three units of health and every attack from the monster that hit you cause losing of one unit of health, unlike this version we have decided to put a health bar and every monster's attack has different impact on the health and when health runs out spaceship explodes.

2. Overview

2.1. Game Background

Basic game background consists of game screen which represents space with shining stars. Bottom part of the screen represents the surface of an inhabited planet which we can take astronauts from. At the upper right of the screen there is a health bar which belongs to player (spaceship). At the upper left score is shown and there is also pause the game button. Background will expand to the left and right directions if the player goes in that direction.

2.2. Innovative Features

We added new features into original "Defender" game. We have two new game modes, Story Mode and Two Players Endless Mode, which are explained in Section 3 in detail. We also have an in-game shop where the player will be able to buy/equip different designs of the spaceship.

2.3. Main Menu

This is the screen where the player can choose the game mode, can access the game shop, highest scores, how to play and could cancel the background music and game effects with buttons. There is also a button to quit the game.

2.4. Spaceship

The player is represented with the spaceship in the game. The spaceship can move in the up, down, left, right directions. It has health assigned in the beginning of the game, with each damage health decreases depending on 3 types of active enemies and one passive enemies. Each enemy has its own damage rate which will be explained which will be explained in the part 2.4. type of alien makes the damage.

Through the game we have When the health runs out spaceship explodes and that marks the end of the game. The spaceship can heal itself by taking astronauts from the surface of the planet below. Spaceship starts the game with 100 units of health. For each astronaut spaceship saves, spaceship's gains 10 units health. The spaceship can shoot lasers to respond back to its enemies' assaults and defend itself. Laser is activated with key 'X' and it shoots in the same straight direction spaceship faces, starting from the shapeship's current location. The laser uses energy so it's a discrete beam, the player needs to press the key again to shoot another beam. As the player gains more scores, which will give them more coins, they can purchase different kinds of spaceships from the game shop. Spaceships in the shops varies in colors and other shooting styles.

2.5. Enemies

The game has enemies that will come into the game screen and start attacking the spaceship. The damage enemies cause varies from their types and difficulty of the game. They also have varying health status. There are two types of enemies:

2.5.1. Active Enemies

The active enemies consist of enemy spaceships. Enemy spaceships can attack the player with bullets going towards the location of the player. They will try to get closer to the player so they can shoot more accurately. We will have three different types of enemies:

2.5.1.1 Alien

Characteristics:

- Dies in a single shot

- Its bullet takes 20% health from the player's spaceship. (E.g if the player has 60% health left, after the bullet touches the player's spaceship, its health will drop to 40%)

- When collides with player's spaceship, takes 50% health from the player. (E.g. if the player has 60% health left, after collision it will drop to 10%)

- When the player kills Alien, he/she gains 100 points.

2.5.1.2 Queen

Characteristics:

- Dies in 3 shots and after death is splitted into 2 **Aliens.**

- Doesn't fire bullet itself, instead produces an **Alien** every 3 second.

- When collides with player's spaceship, takes 100% health from the player. (E.g. if the player has 60% health left, after collision it will drop to 0%)

- When the player kills Queen, he/she gains 300 points.

2.5.1.3 Darwin

Characteristics:

- Dies in 5 shots and after death is splitted into 2 **Queens.**

- Its bullet takes 50% health from the player's spaceship. (E.g if the player has 60% health left, after the bullet touches the player's spaceship, its health will drop to 10%)

- When collides with player's spaceship, takes 100% health from the player. (E.g. if the player has 60% health left, after collision it will drop to 0%)
- When the player kills Alien, he/she gains 900 points.

2.5.2. Passive Enemies

The passive enemies are big asteroids which can appear on the screen. They will stay put on their location. If the player runs into them, the spaceship will lose some of its health. Meteorites' health runs out with two shots from the player.

2.6. Astronauts

The astronauts are the helpers in the game. They will be dropped to the surface of the planet below. If the player decides to save them from ground, spaceship's will gain 10 units of health. They will appear at random times through the game.

2.7. Gameplay

Basic gameplay starts with the spaceship standing on the screen. Then, different kinds of enemies will appear on the screen and attack the spaceship in their respective ways and the spaceship will be trying to survive.

2.8. Game Modes
2.8.1. Single Player Story Mode

This is the basic game mode which will consist of finite waves aiming to show the features of the game. As the player completes each wave, new enemy types will appear. Player needs to defeat all enemies that appear to pass through the level.

After passing all levels the player wins this mode. This mode is a must to play to be able to open other game modes.

2.8.2. Two Players Endless Mode

There will be a split-screen and two spaceships will be controlled by two different players. Each player will fight with the enemies which will appear in their part of the screen. Game will continue until both players get defeated by the enemies. The player with the highest score will be the winner.

2.8.3. Single Player Endless Mode

This mode's aim is to go on as far as you can while facing the enemies. Enemies will keep appearing as time goes on and the game's difficulty will increase. The game ends when the player is out of health. Players will gain coins based on their scores. The highest scores will be recorded in the game.

2.9. Highest Scores

This will be a page which could be accessed from the main menu. The highest 10 scores will be kept in a table. Scores are calculated in the following way: as we mentioned in section 2.4.1, game has three different enemy types; Alien, Queen, and Darwin. When player kills an Alien type enemy, player gains 100 points; when player kills a Queen type enemy, player gains 300 points, and finally when player kills a Darwin type enemy, player gains 900 points.

2.10. Shop

This screen can be accessed from the main menu. Players can purchase different styled spaceships with extra attacks from this screen, they can also purchase new backgrounds.

2.11. How to Play

This screen can be accessed from the main menu. It will show which keys perform which actions. It will also describe the game modes and the playing instructions briefly.

3. Functional Requirements

3.1. Game Modes

There will be a total of 3 different game modes. These will be: "Single Player Story Mode", "Single Player Endless Mode", "Two Players Endless Mode". A player will access these modes from the pop-up in the main screen using the "Game Modes" button. If the single-player story mode is not completed, the other two modes will be disabled.

3.1.1. Single Player Story Mode

A player will access this mode from the "Game Modes" pop-up menu by using "Single-Player Story Mode" button. There will be several chapters in this mode, and they will be in ascending difficulty order as the enemy types and the number of enemies will increase. In this mode, each chapter will have wave(s) of enemies coming onto "defender". Each chapter will include chapter-specific enemies. In wave 1, the player is introduced with the "alien" enemy type and there will be 5 of them. In wave 2, the player is introduced with the "queen" enemy type and there will be 10

enemies: 7 aliens that are introduced in wave 1 and 3 queens. In wave 3, there will be a total of 18 enemies consisting of 10 aliens, 5 queens and 3 new enemy type "asteroid". In wave 4, the player will encounter with 28 enemies which are 15 aliens, 5 queens, 5 asteroids and 3 new enemy type "astronaut". Lastly, wave 5 consists of 38 enemies. There will be 15 aliens, 5 queens, 10 asteroids, 5 astronauts, and 3 newly introduced enemy "darwin". The player can finish a chapter by killing the boss after wave(s). The last chapter will restart if the player's health drops to 0% as a result of enemy attacks.

3.1.2. Single Player Endless Mode

A player will access this mode from the "Game Modes" pop-up menu by using the "Single-Player Endless Mode" button. There will not be any restriction on the number or the type of enemies in this mode. The player will earn scores by killing enemies and saving astronauts. The player will lose if his/her health drops to 0%.

3.1.3. Two Players Endless Mode

A player will access this mode from the "Game Modes" pop-up menu by using the "Two-Players Endless Mode" button. There will not be any restriction on the difficulty level or the type of enemies in this mode. The players will earn points by killing enemies and saving astronauts. When both players die, the game will be finished and the player with the highest score will win the game.

3.2. How to Play

A player will access this screen from the home screen using the "How To Play" button. This option presents the rules and tips for all 3 modes of the game. Basic information about the following titles is provided by the use of different tabs:

- **Gameplay:** Animated and/or text instructions to show specific buttons to play the game.
- **Game Modes:** Definitions of three different game modes, similarities and differences.
- **Rules:** Win conditions of "Single Player Story Mode" and "Two Players Endless Mode", loss conditions of all modes, definitions, etc.

3.3. Highest Scores

A player will access this pop-up menu from the home screen using the "Highest Scores" button. This menu will be consisting of a list of highest 10 scores with score value and according to the player's name.

3.4. Shop

A player will access this screen from the home screen using the "Shop" button. This screen will contain the list of different spaceships for "defender". Here, the player will be able to buy and/or apply design on his spaceship. In order to buy something from the shop, player needs to afford enough amount of coin. To gain coin player needs to play either Single Player Endless Mode or Story Mode. %10 of final score that player gained in those modes will be converted to coin. For example, If a player gains 25000 points in single player endless mode, player earns 2500 coins from that game.

3.5. Settings

There will be two settings related button on the "Main Screen". One of them is used to mute/unmute music, another will mute/unmute effects sound of the game.

3.6. Credits

A player will access this screen from the home screen using "Credits" button. This screen will contain information about the developers of the game, their personal and contact information, as well as the GitHub link of the game.

4. Non-Functional Requirements

4.1. User-Friendly Interface

Quality of User Interface of any game is one of the most important factors which can affect players' first impressions about the game. Therefore, we have pointed out the most necessary UI/UX design:

- There will be several different objects such as spaceships, enemies, bullets, astronauts in the game. The size of objects must be at least 200x200 px.
- Main menu and navigation flow should be clear enough for users to understand and use it. To manage that we'll give simple and self explanatory titles to each feature and value usability over functionality.

4.2. Game Performance

"Defender" is an action game which means game performance is the most important requirement. As any other action game, we will mostly focus on letting players to get as high frame. The minimum frame rate must be 60 frames per second. Average frame rate must be 80 frames per second. We will also focus on

transition between screen in order to ensure players will not waste so much time while waiting game preparation.

4.3. Extendibility

4.3.1. Multiplayer Mode

We are going to present 3 different modes for the first version of our game. All these modes offer only playing on a single computer. Two Players Mode of our game can be extended into Multiplayer mode to give opportunity to play from different computers.

4.3.2. Artificial Intelligence

In all three game modes, every action of aliens will be based on a given pattern. These actions can be extended from a single pattern into a more logical and a variety of patterns by implementation of AI. This would increase the difficulty level of the game and make the game more competitive.

5. Constraints

5.1. Version Control

For version control, we have been assigned to use GitHub as a git tool.

6. System Models

6.1. Use Case Diagram
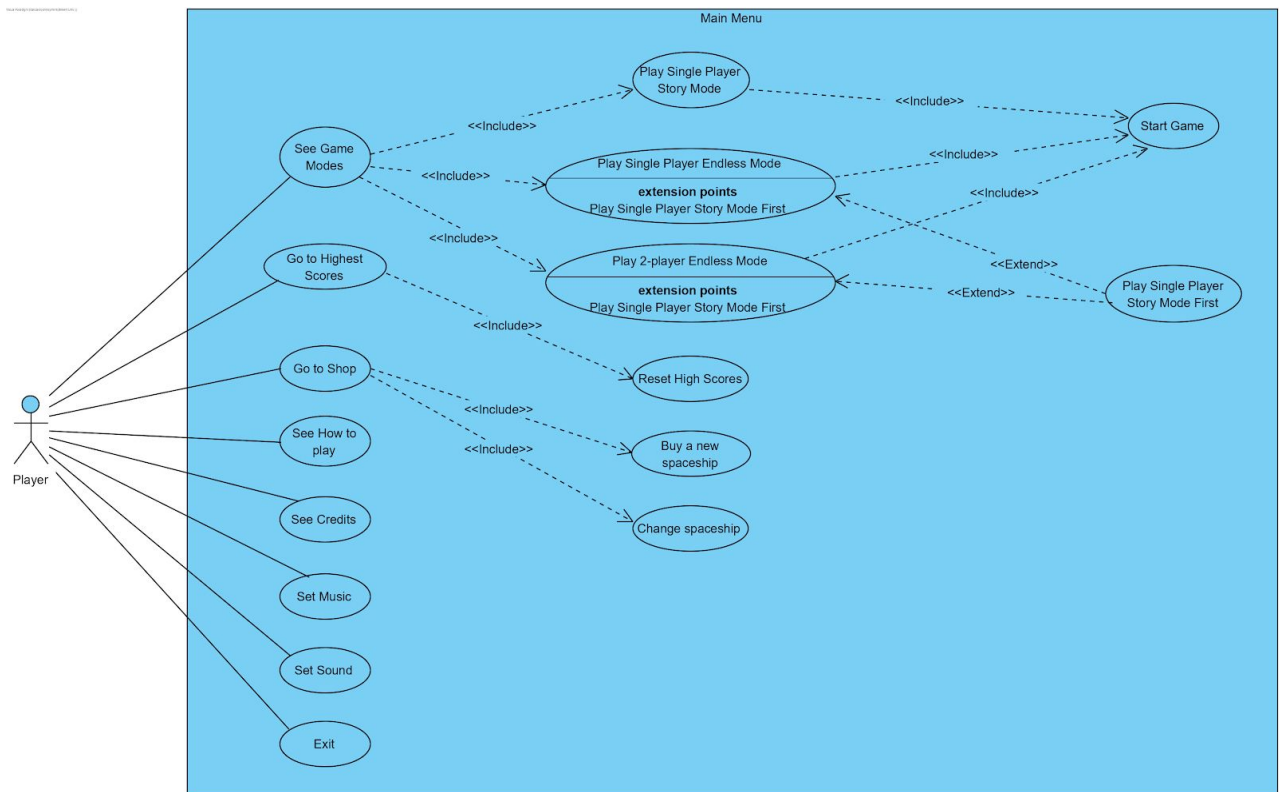
Figure 1 - Use case diagram for Main Menu
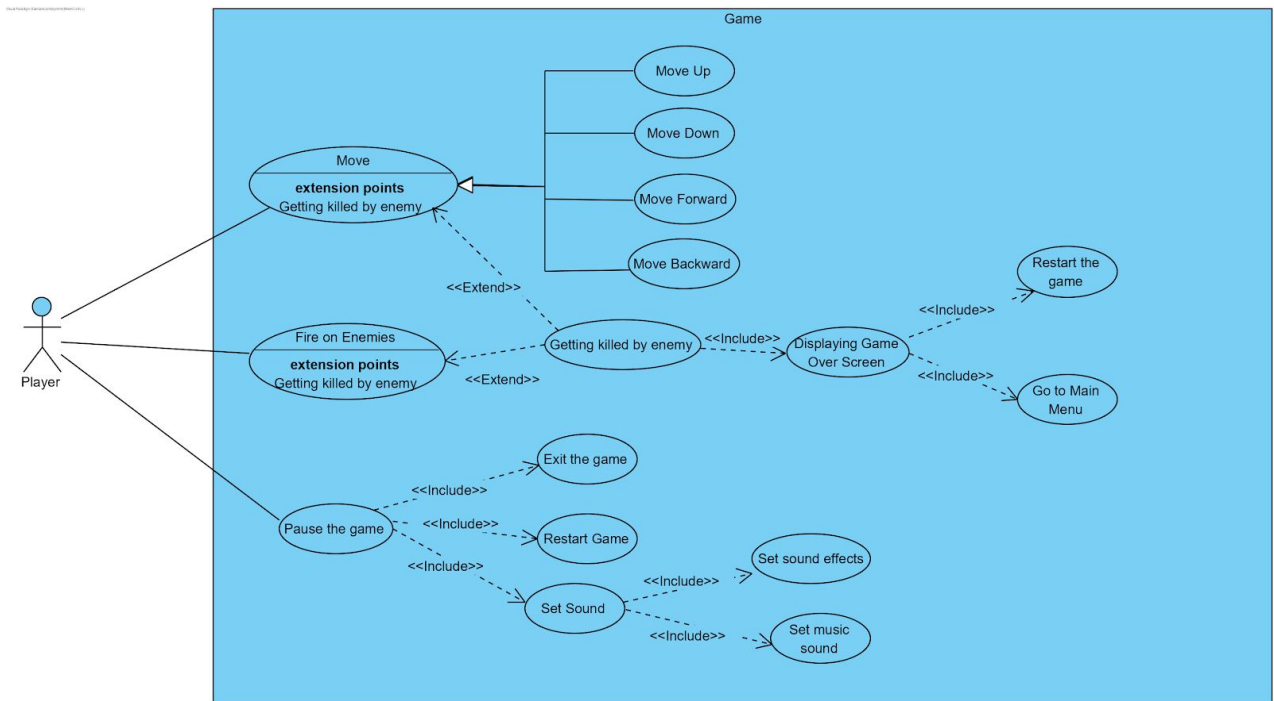
Figure 2 - Use case diagram for Game

Use Case #1

1. *Use Case:* Play Single-Player Story Mode

2. *Participating actor:* Player

3. *Entry Condition:* The player should be on the main menu.

4. *Exit Condition:* The player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows* :

1. Player chooses to display game modes.

2. Player chooses to play the single-player story mode.

3. Player plays the chosen mode.

4. Player wins the game.

5. Game displays the congratulations screen.

6. Player chooses to exit game.

7. Player returns to the main menu.

6. *Alternative Event Flows*:

1. If player loses the single-player story mode.

    1.1. Game displays game over screen.

    1.2. Player chooses to restart the game.

2. If player wants to return the main menu

    2.1. Players clicks pause button.

    2.2. Game displays a pop-up menu.

    2.3. Player chooses to exit the game.

    2.4. Player goes back to the main menu.

Use Case #2

1. *Use Case:* Play Single-Player Endless Mode

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows*:

1. Player chooses to display game modes.

2. Player chooses to play single-player endless mode.

3. Player plays chosen mode.

4. Player loses the game.

5. Game displays the game over screen.

6. Player chooses to exit game.

7. Player returns to the main menu.

6. *Alternative Event Flows* **:**

1. If player wants to restart single-player endless mode.

    1.1. Player clicks pause button.

    1.2. Game displays a pop-up menu.

    1.3. Player chooses to restart the game.

2. If player wants to return the main menu

    2.1. Players clicks pause button.

    2.2. Game displays a pop-up menu.

    2.3. Player chooses to exit the game.

    2.4. Player goes back to the main menu.

<u>**Use Case #3**</u>

1. *Use Case:* Play Two-Players Endless Mode

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows***:**

    1. Player chooses to display game modes.

    2. Player chooses to play the two-players endless mode.

    3. Two Players play the chosen mode.

    4. One player loses the game, the opponent wins the game.

    5. Game displays the game over screen for loser and congratulations screen for winner.

    6. Player chooses to exit game.

    7. Player returns to the main menu.

6. *Alternative Event Flows***:**

    1. If players want to restart the two-players endless mode.

        1.1. Player clicks pause button.

        1.2. Game displays a pop-up menu.

        1.3. Player chooses to restart the game.

    2. If player wants to return the main menu

        2.1. Players clicks pause button.

        2.2. Game displays pop up menu.

2.3. Player chooses to exit the game.

2.4. Player goes back to the main menu.

Use Case #4

1. *Use Case:* Go to the Highest Scores

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows* **:**

1. Player chooses to display the highest scores.

2. Game displays high scores.

3. Player chooses to go back to the main menu.

4. Player returns to the main menu.

6. *Alternative Event Flows* **:**

1. If players want to reset high scores.

1.1. Player chooses to display the highest scores.

1.2. Game displays high scores.

1.3. Player chooses to reset high scores.

1.4. Player confirms the selection and high scores reset.

1.5. Player chooses to go back to the main menu.

Use Case #5

1. *Use Case*: Go to the Shop

2. *Participating actor*: Player

3. *Entry Condition*: Player should be in the main menu.

4. *Exit Condition*: Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows*:

      1. Player chooses to go to the shop screen.

      2. Player changes the spaceship.

      3. Player chooses to return back to the main menu.

      4. Player returns to the main menu.

6. *Alternative Event Flows*:

      1. If players want to buy a new spaceship.

            1.1. Player chooses to go to the shop.

            1.2. Player buys a new spaceship.

            1.3. Player chooses the spaceship.

            1.4. Player chooses to go back to the main menu.

            1.5. Player returns to the main menu.

Use Case #6

1. *Use Case*: See How to Play

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows* :

   1. Player chooses to display how to play.

   2. Game displays gameplay buttons.

   3. Player chooses to go back to the main menu.

   4. Player returns to the main menu.

Use Case #7

1. *Use Case:* Display Credits

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows*:

   1. Player chooses to display credits.

   2. Game displays credits.

   3. Player sees names and email addresses of developers.

   4. Player chooses to go back to the main menu.

   5. Player returns to the main menu.

Use Case #8

1. *Use Case:* Set Sound

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player is always on the main menu.

5. *Success Scenario Event Flows* :

      1. Player mute/unmute sound effects.

Use Case #9

1. *Use Case:* Set Music

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player is always on the main menu.

5. *Success Scenario Event Flows* :

      2. Player mute/unmute music.

Use Case #10

1. *Use Case:* Move

2. *Participating actor:* Player

3. *Entry Condition:* Player should be playing one of the game modes.

4. *Exit Condition:* Player is killed by an enemy (Either by bullet or collision by an enemy).

5. *Success Scenario Event Flows* :

    1. Player moves.

    2. Player fires on enemies and kills them.

    3. Player gets killed by an enemy.

    4. Game displays game over pop-up.

    5. Player chooses to go back to the main menu.

    6. Player returns to the main menu.

6. *Alternative Event Flows*:

    1. Player wons the single-player story mode.

        1.1. Player moves.

        1.2. Player fires on enemies and kills them.

        1.3. Player wins the single-player story mode.

        1.4. Game displays congratulations pop-up.

        1.5. Player chooses to go back to the main menu.

        1.6. Player returns to the main menu.

Use Case #11

1. *Use Case:* Fire on enemies

2. *Participating actor:* Player

3. *Entry Condition:* Player should be playing one of the game modes.

4. *Exit Condition:* Player is killed by an enemy (Either by bullet or collision by an enemy).

5. *Success Scenario Event Flows :*

    1. Player moves.

    2. Player fires in enemies and kills them.

    3. Player gets killed by an enemy.

    4. Game shows game over pop-up.

    5. Player chooses to restart.

    6. Player plays chosen mode again.

    7. Player goes back to step 1.

6. *Alternative Event Flows:*

    1. Player wons the single-player story mode.

        1.1. Player moves.

        1.2. Player fires on enemies and kills them.

        1.3. Player wins the single-player story mode.

        1.4. Game displays congratulations pop-up.

        1.5. Player chooses to play the single-player story mode again.

1.6. Player plays single-player story mode again.

1.7. Player goes back to step 1.1.

Use Case #12

1. *Use Case:* Pause the game

2. *Participating actor:* Player

3. *Entry Condition:* Player should be playing one of the game modes.

4. *Exit Condition:* Player chooses to continue the game.

5. *Success Scenario Event Flows* :

1. Player moves.

2. Player fires in enemies and kills them.

3. Player pauses the game.

4. Game shows pause pop-up.

5. Player chooses to exit the game.

6. Player returns to the main menu.

Use Case #13

1. *Use Case:* Exit

2. *Participating actor:* Player

3. *Entry Condition:* Player should be in the main menu.

4. *Exit Condition:* Player cancels the selection and goes back to the main menu.

5. *Success Scenario Event Flows* **:**

    1. Player chooses to exit the game.

    2. Game displays confirmation pop-up.

    3. Player confirms the selection.

    4. Player exits the game.

6. *Alternative Event Flows***:**

    1. Player cancels the selection.

        1.1. Player chooses to exit the game.

        1.2. Game displays confirmation pop-up.

        1.3. Player confirms the selection.

        1.4. Player does not confirm the selection.

        1.5. Player goes back to the main menu.

6.2. Dynamic Models

6.2.1. Activity Diagram
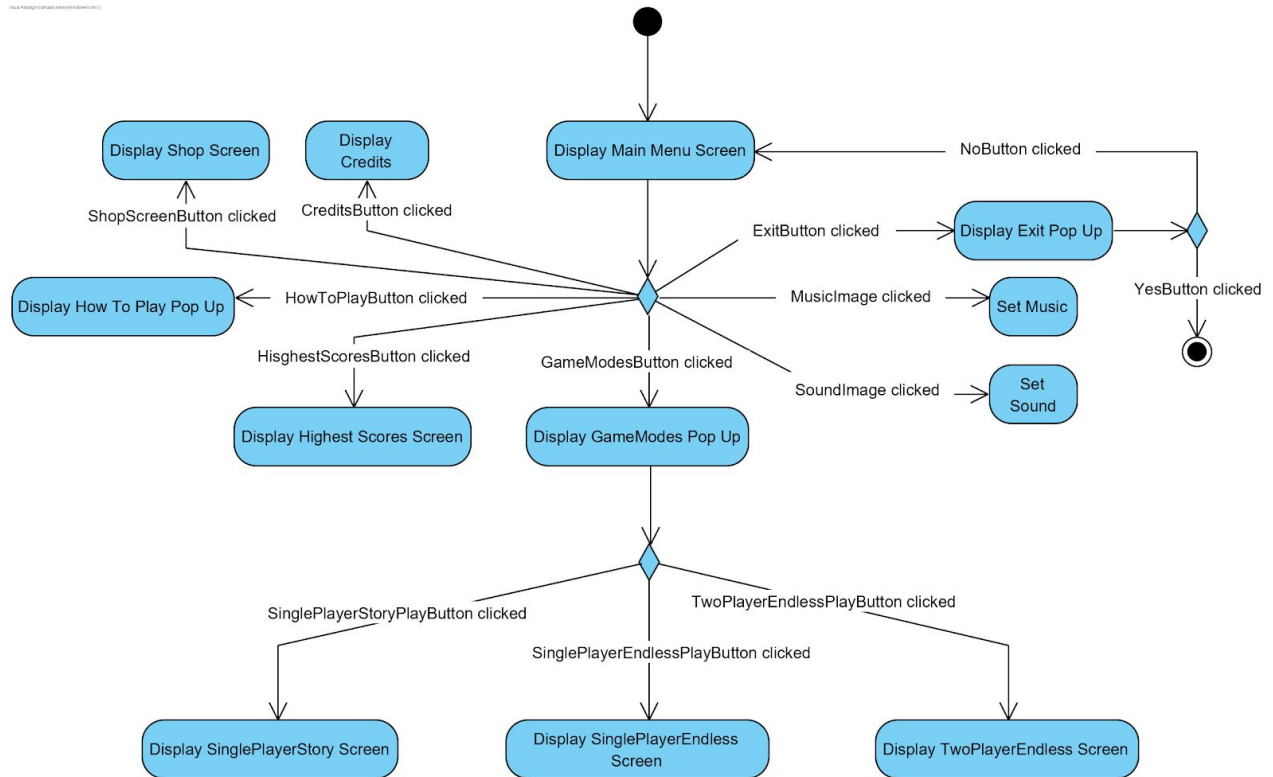
Figure 3 - Activity Diagram for the Main Menu

Figure 3 represents activity flow of the main menu. In the main menu there are 6 choices to choose. When user chooses "game modes", pop-up menu will show up and user can make choice of game mode. There are 3 different game modes and their activity diagrams are demonstrated in **Figure 4, Figure 5, Figure 6.**
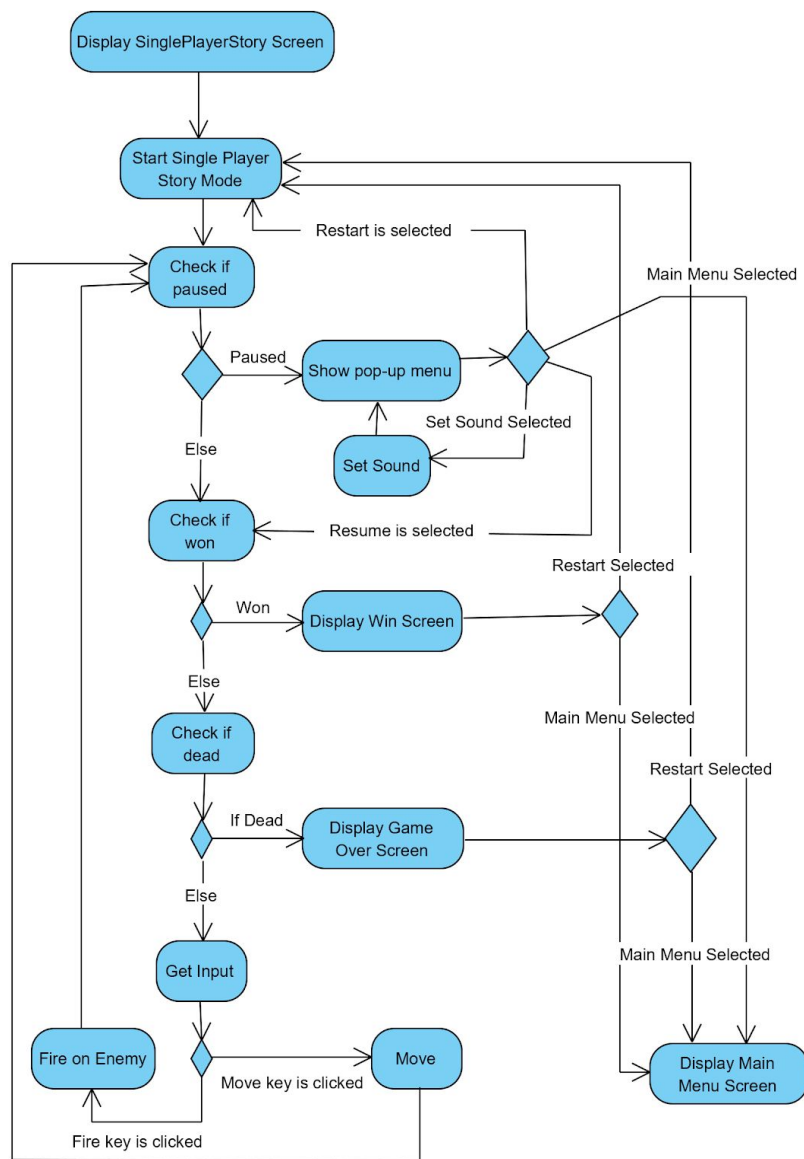
Figure 4 - Activity Diagram for the Single Player Story Mode

Figure 4 represents activity flow of Single Player Story Mode. In this mode user plays the game and when he/she wins, loses or pauses the game he/she can go back to the main menu.
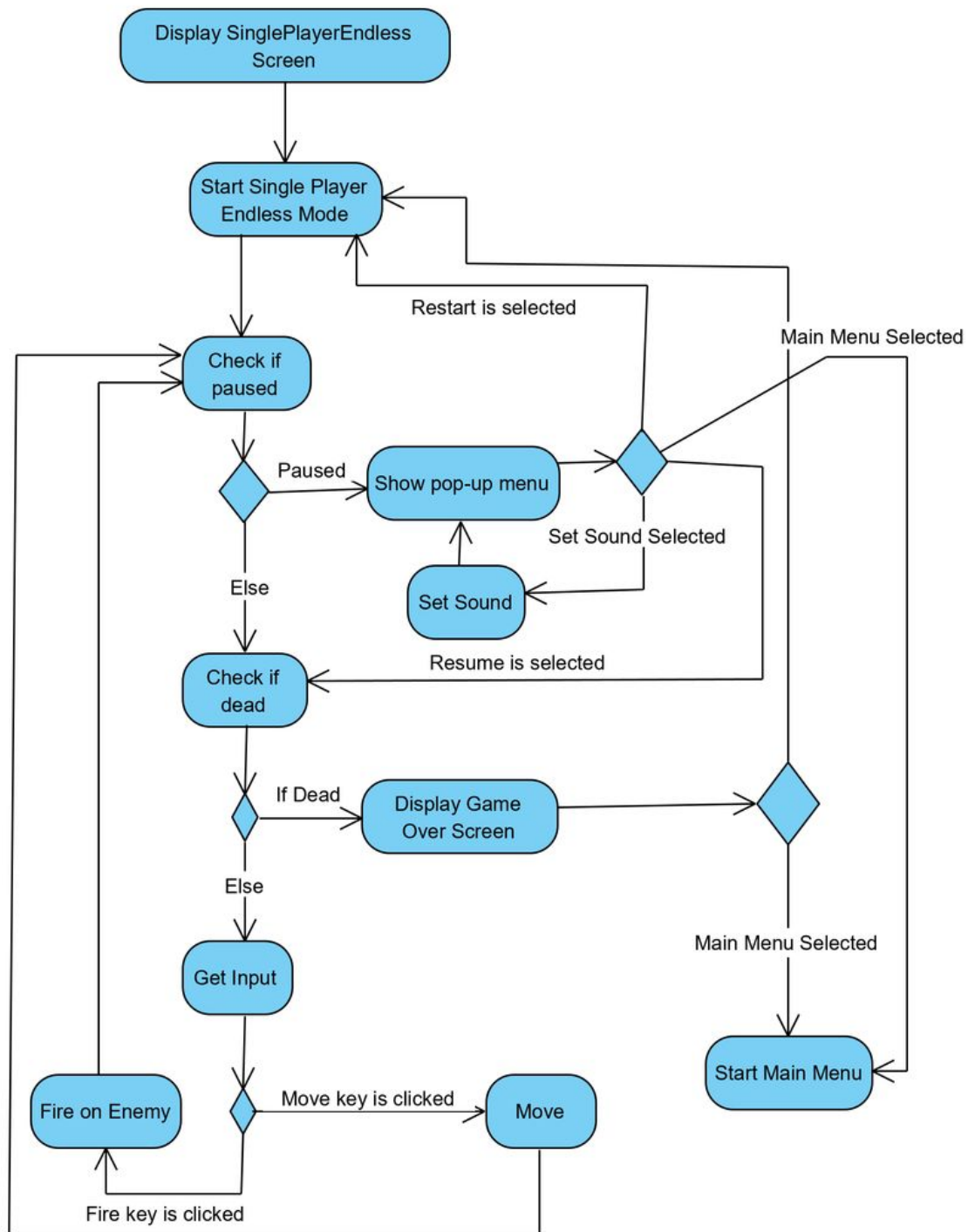
Figure 5 - Activity Diagram for the Single Player Endless Mode

Figure 5 represents activity flow of Single Player Endless Mode. In this mode user plays the game and when he/she loses or pauses the game he/she can go back to the main menu.
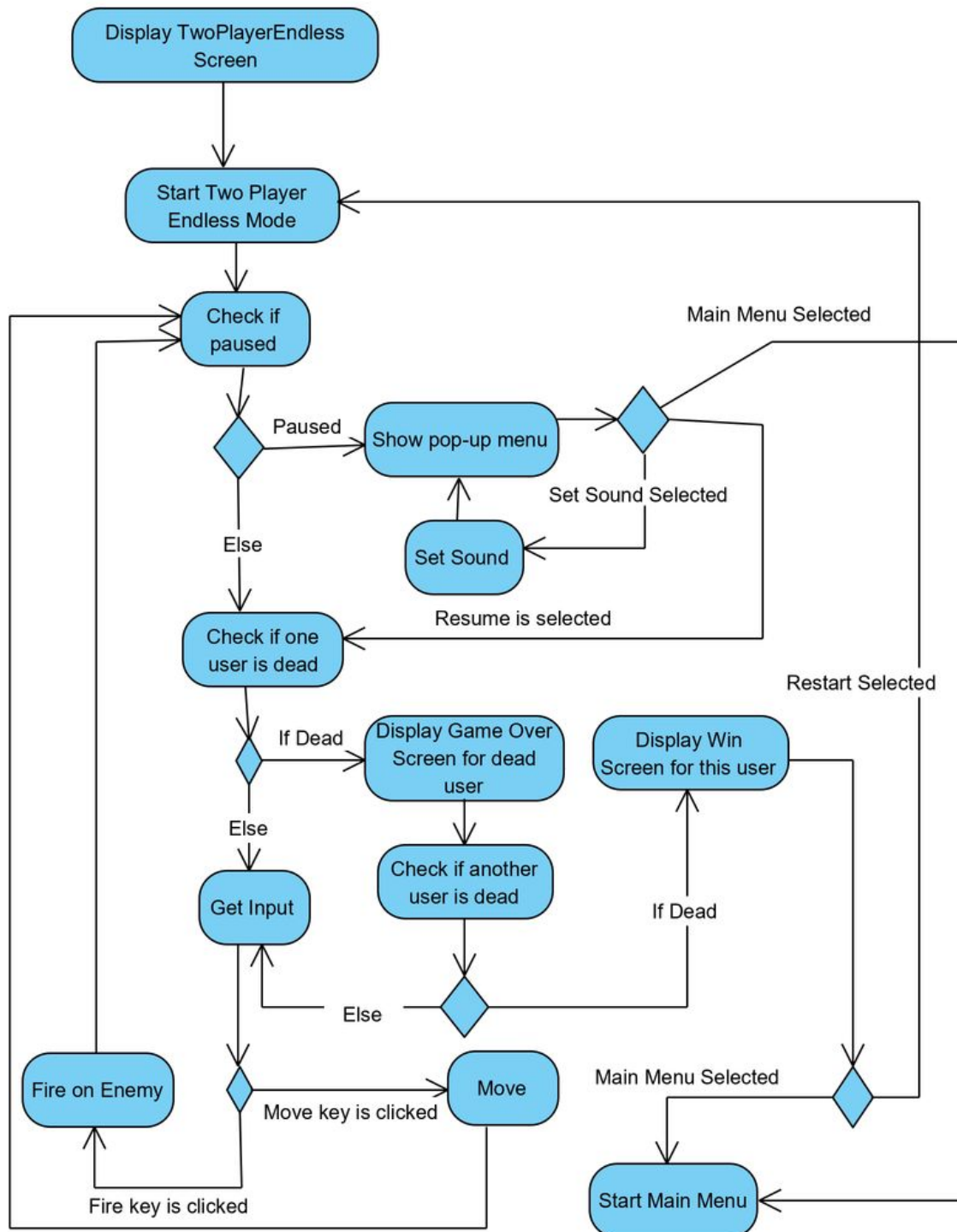
Figure 6 - Activity Diagram for the two players Endless Mode

Figure 6 represents activity flow of Single Player Endless Mode. In this mode user plays the game and when he/she loses or pauses the game he/she can go back to the main menu.

6.2.2. Sequence Diagram
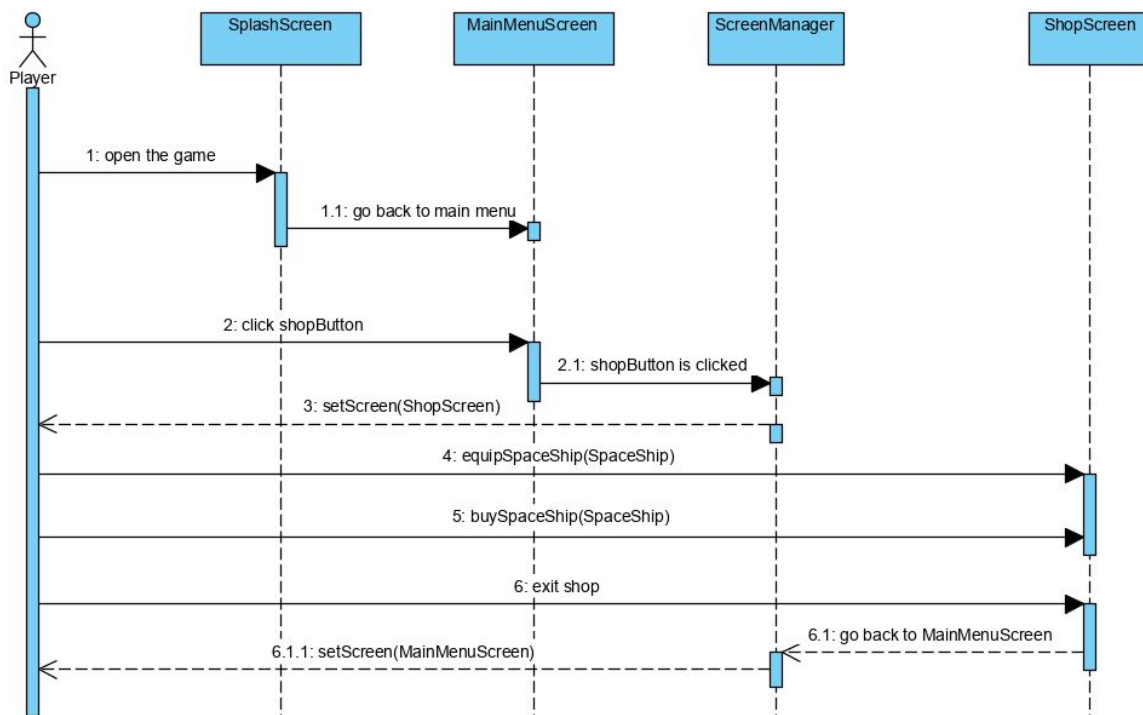
Figure 7 - Sequence Diagram of Opening Shop Screen

When the player opens the game, the player encounters with splash screen which will disappear after a while. Then, the main screen appears. In **Figure 7**, the player chooses the shop option displayed on the main menu. In this menu, the player can either equip spaceship or buy a new spaceship. The player, then, can go back to the main screen.
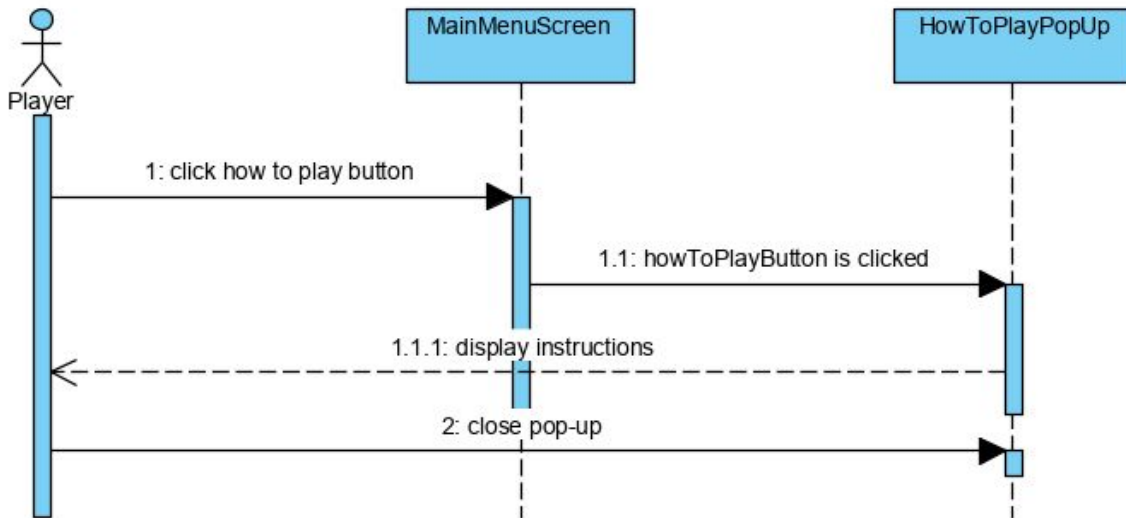
Figure 8 - Sequence Diagram of Opening How to Play Pop-up

In **Figure 8**, the player clicks the how to play button and the how to play pop-up appears. This pop up displays the instructions and the player can go back to the main menu.
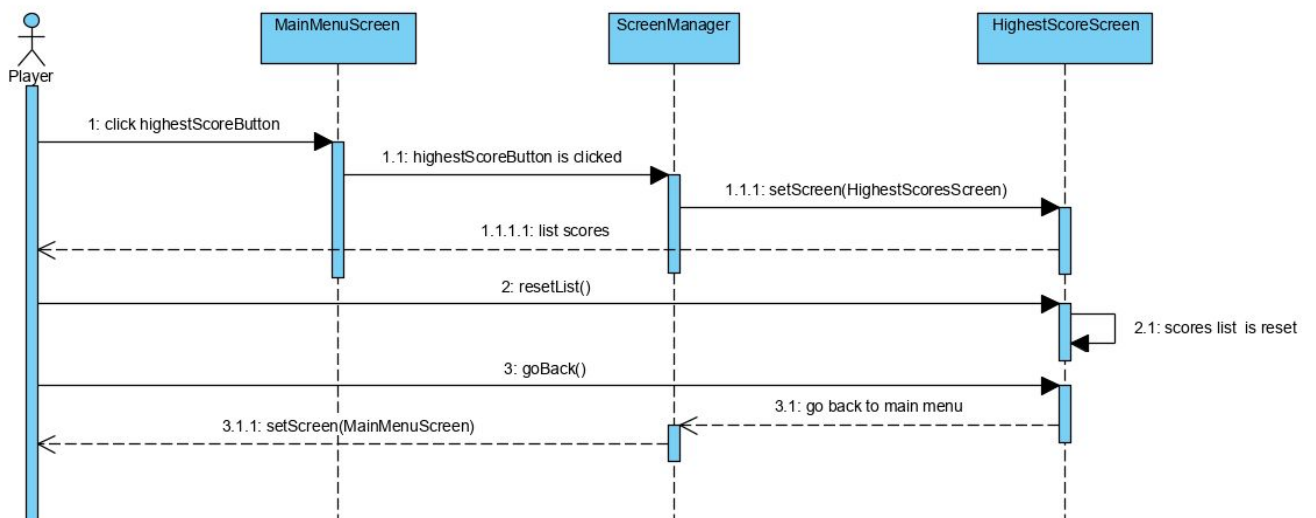
Figure 9 - Sequence Diagram of Opening Highest Scores Screen

In **Figure 9**, the player chooses the highest score button from the main menu. The screen containing the list of scores appears. The player can reset the list and go back to the main menu.
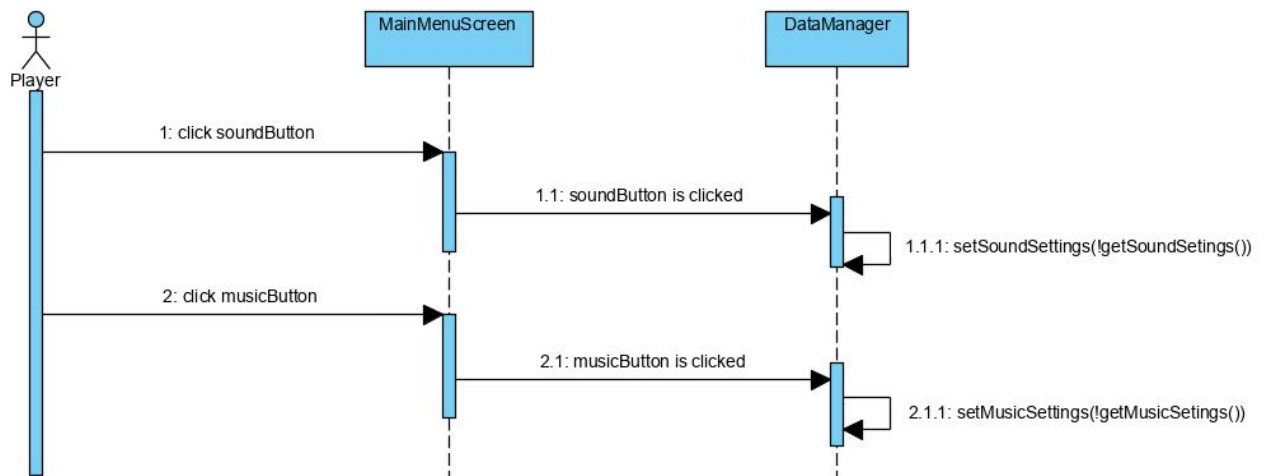
Figure 10 - Sequence Diagram of Changing Sound and Music Settings

In **Figure 10**, the player clicks the sound and music buttons displayed in the main menu and can mute or unmute sound/music.
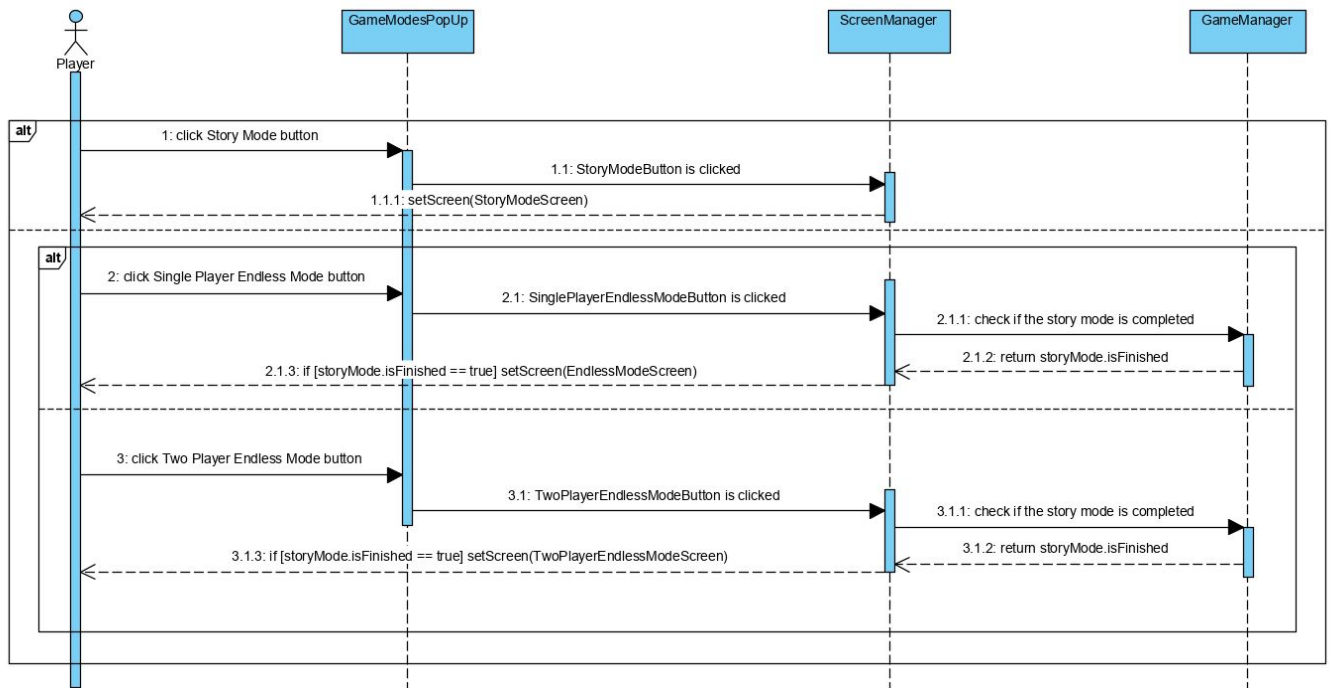
Figure 11 - Sequence Diagram of Opening Game Modes Pop-up

In **Figure 11**, the player clicks game modes displayed in the main menu. The player can display three game modes from the game modes pop-up and choose the mode he/she wants to play with. However, the player cannot choose multiplayer mode or endless mode before finishing the classic mode.
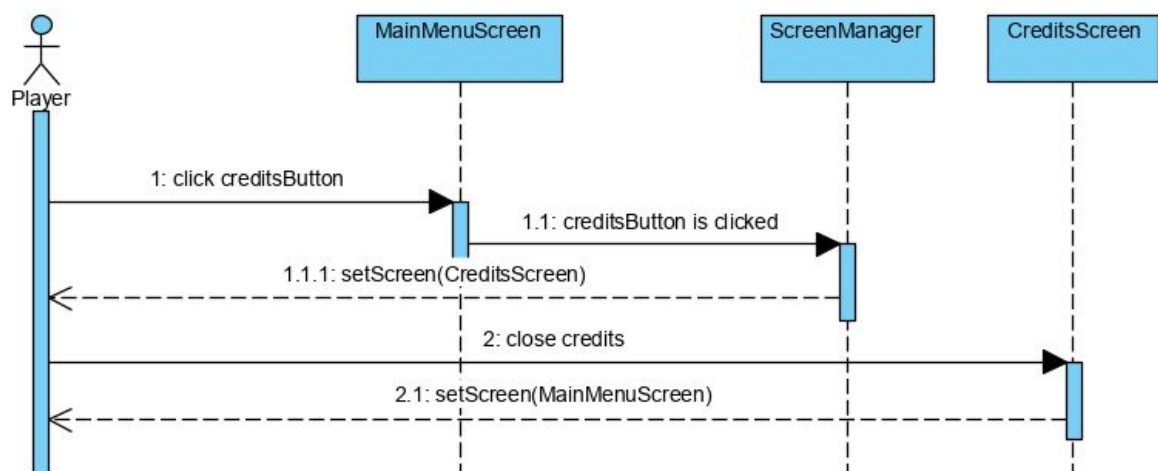
Figure 12 - Sequence Diagram of Opening Credits Screen

In **Figure 12**, the player views credits screen by clicking the credits from the main menu. He/she can also go back to the main menu.
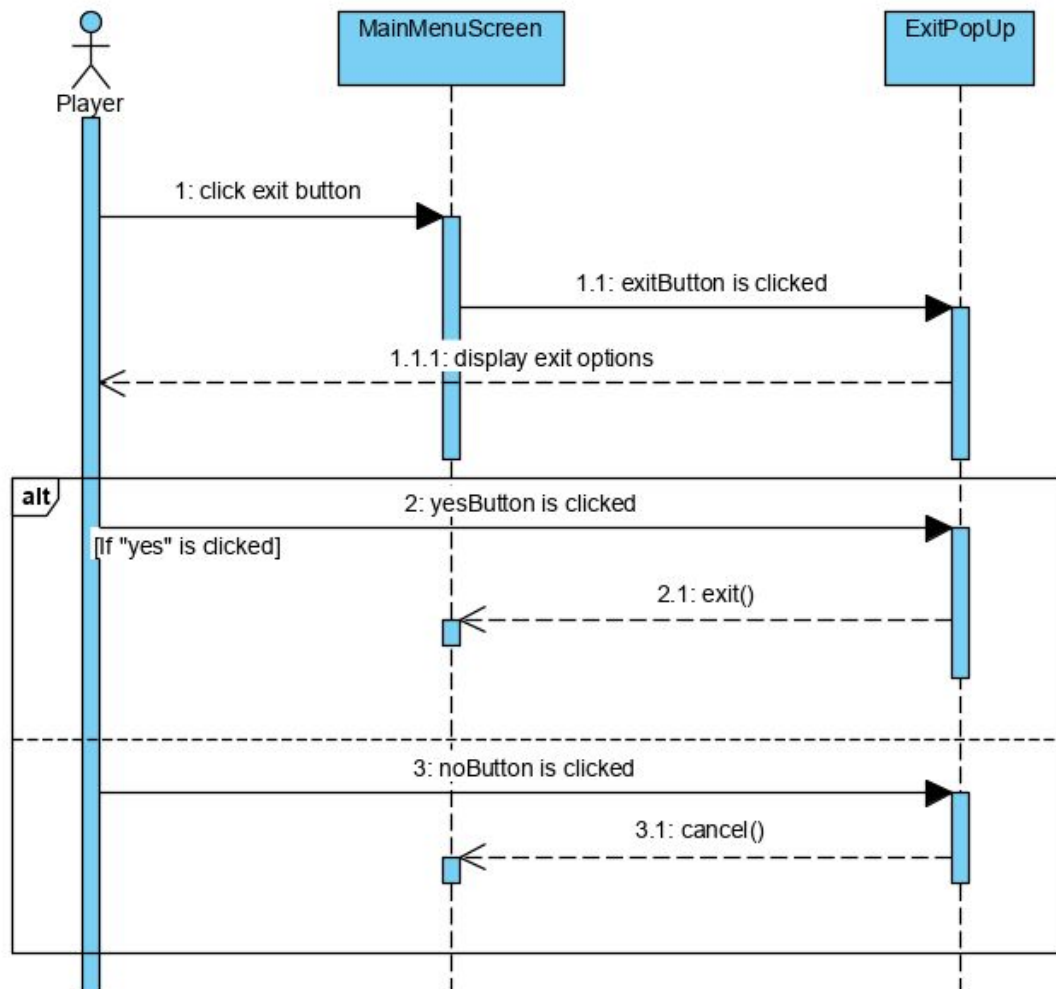
Figure 13 - Sequence Diagram of Opening Exit Pop-up

In **Figure 13**, the player clicks the exit button. An exit pop-up appears and gives the player the options to continue playing or exiting.
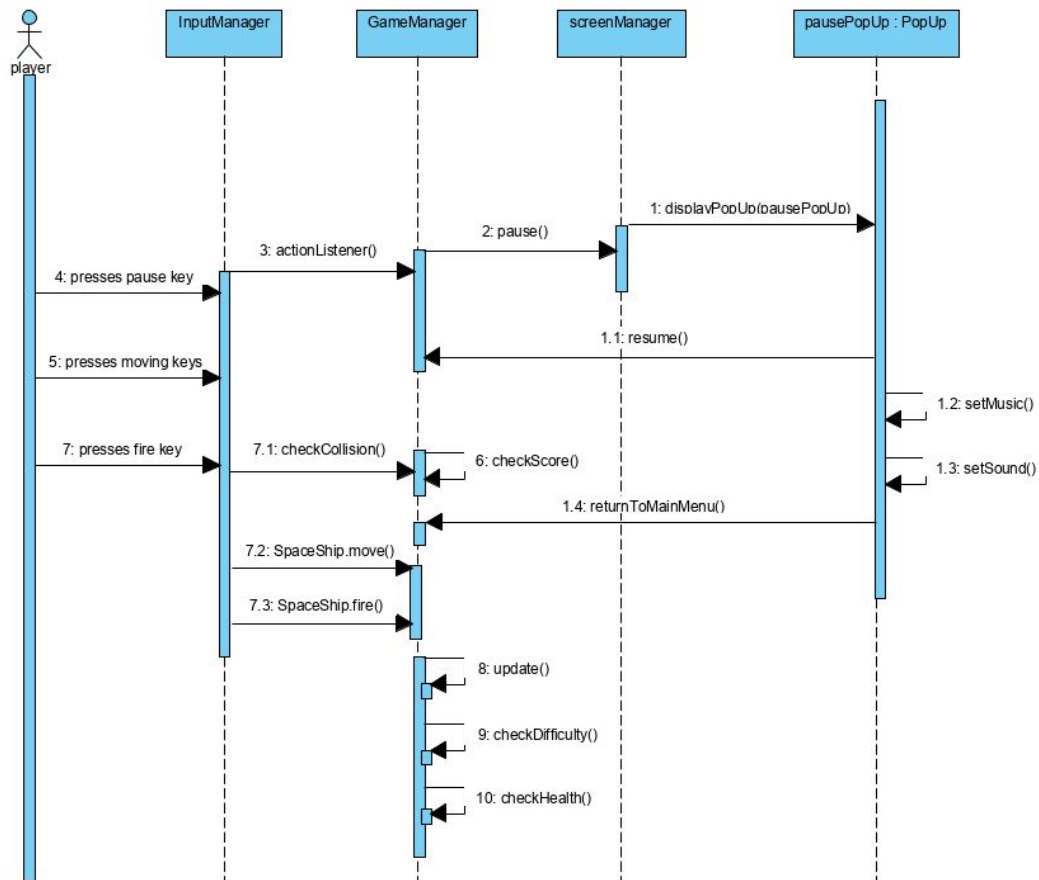
Figure 14 - Gameplay Sequence Diagram

This diagram shows the game play process with low level design concerned and how classes interact with each other through the game play.

6.2.3. State Diagram
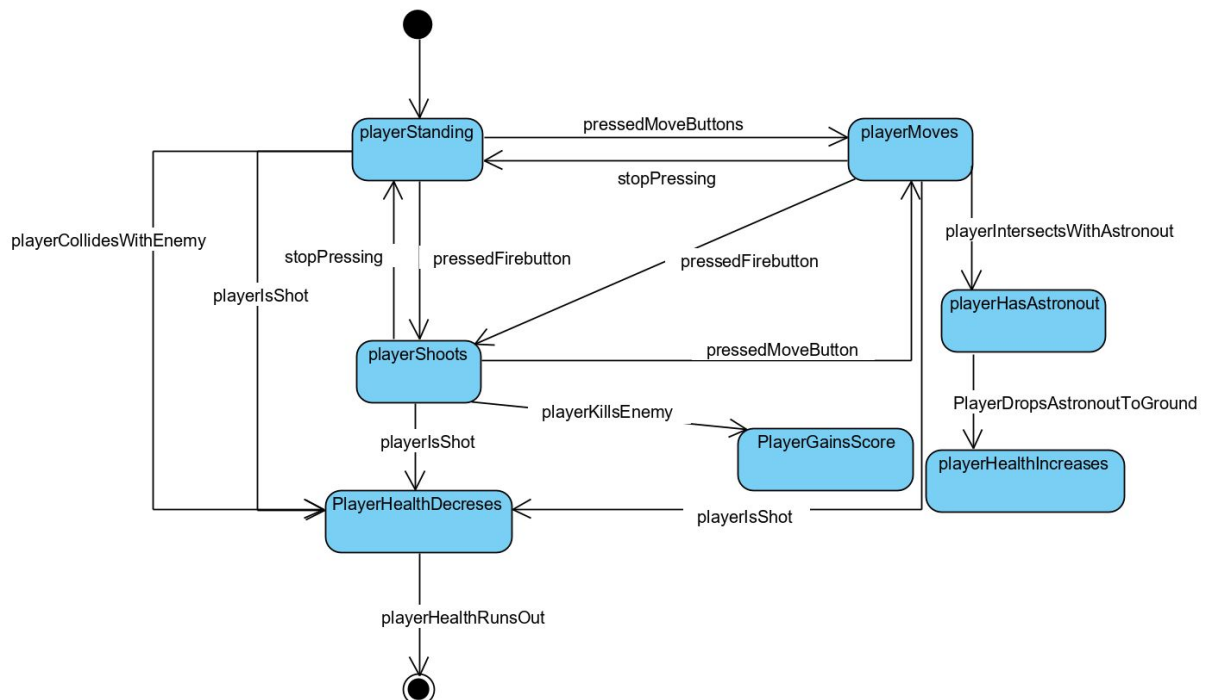
Figure 15 - State diagram of Gameplay

State diagram shows basic stages of spaceship through the game and how user can transition between them, there are a total of 7 stages which is shown through the diagram.

6.3. Object and Class Model
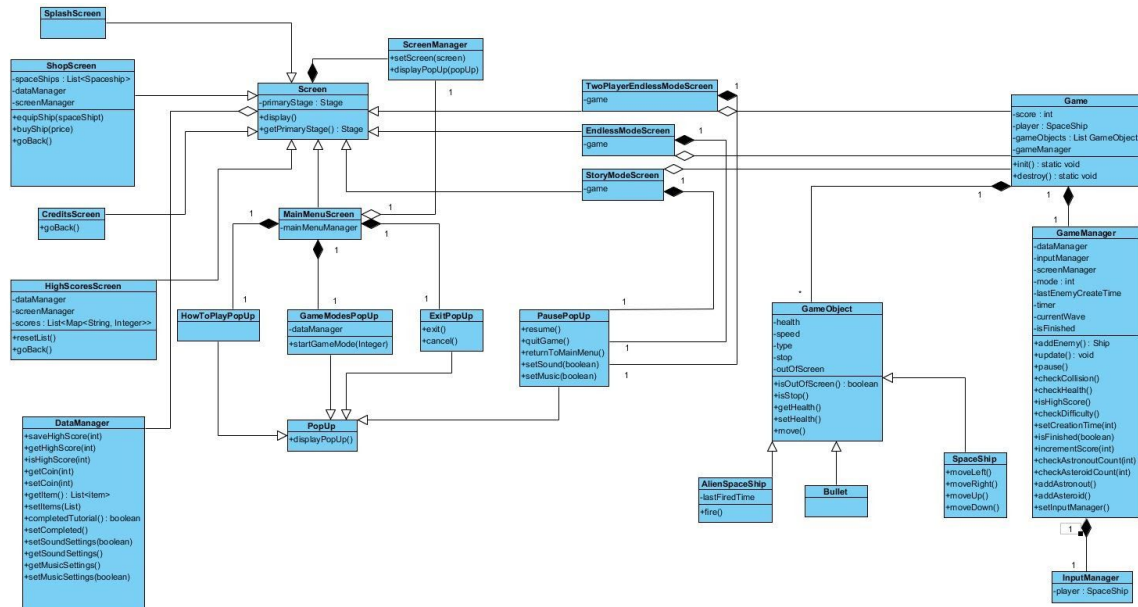
Figure 16 - Final Class Diagram
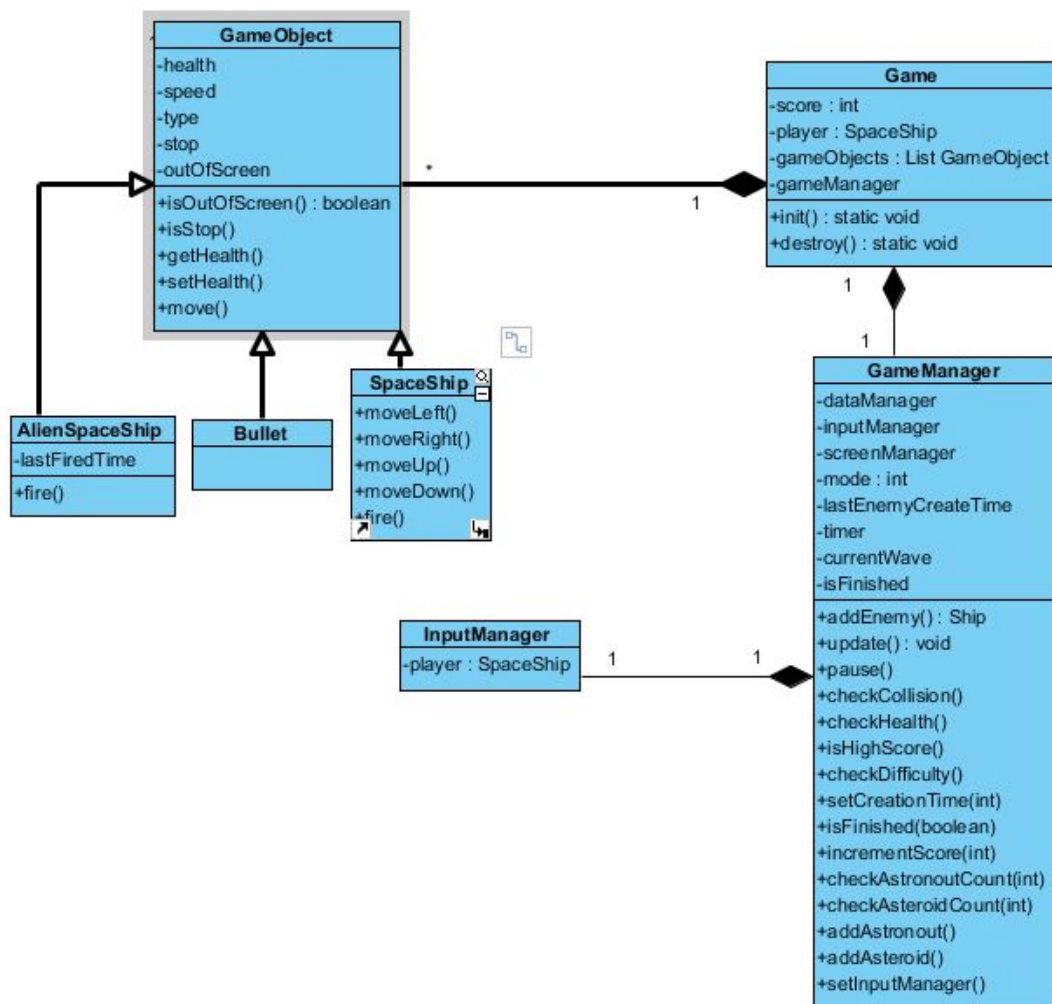
Figure 17 - Game Components

Figure 18 - PopUp Screens

Figure 19 - Managers and Screen
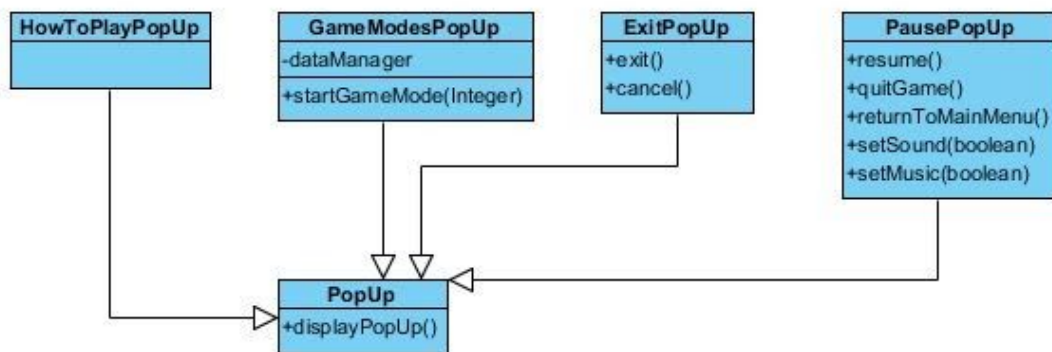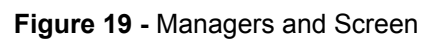
6.4. User Interface
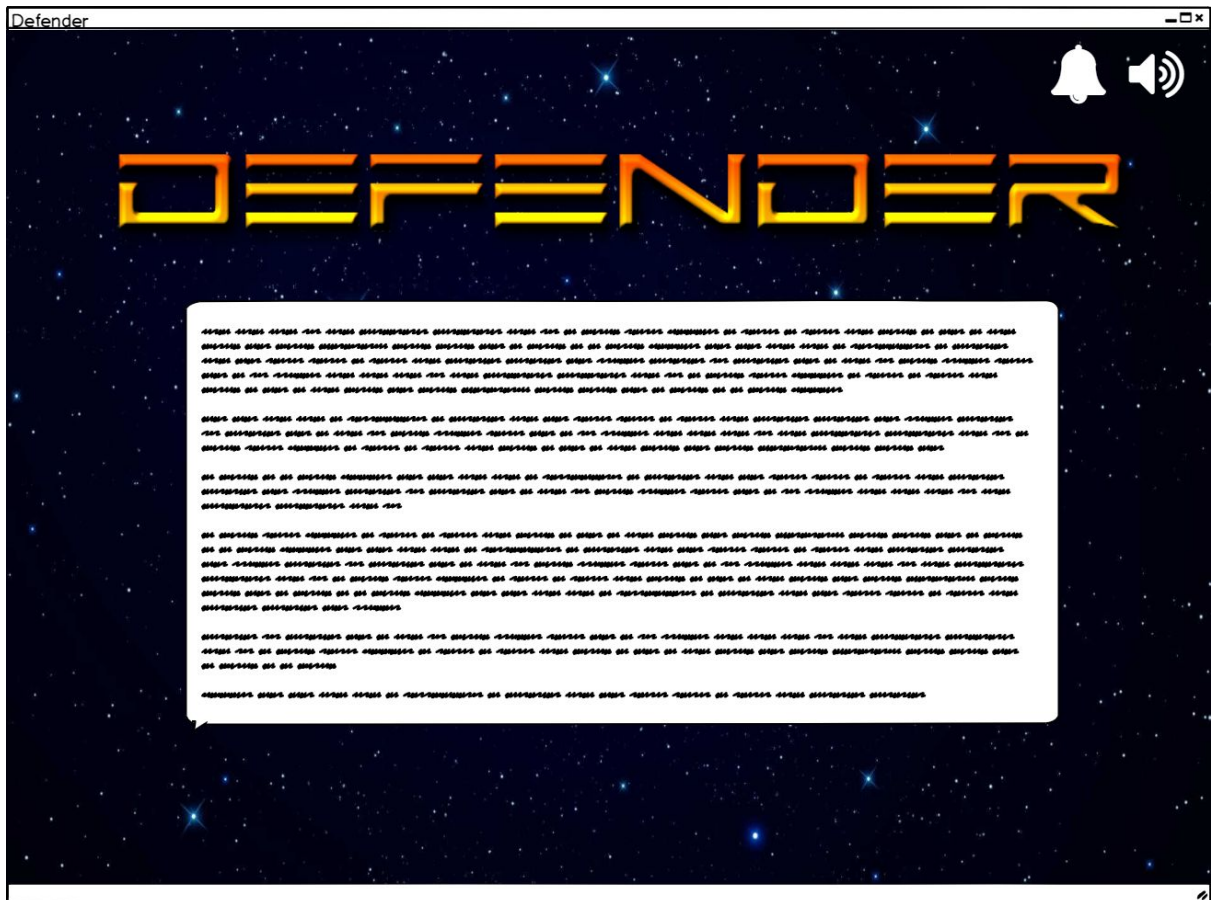
Figure 20 - Story screen
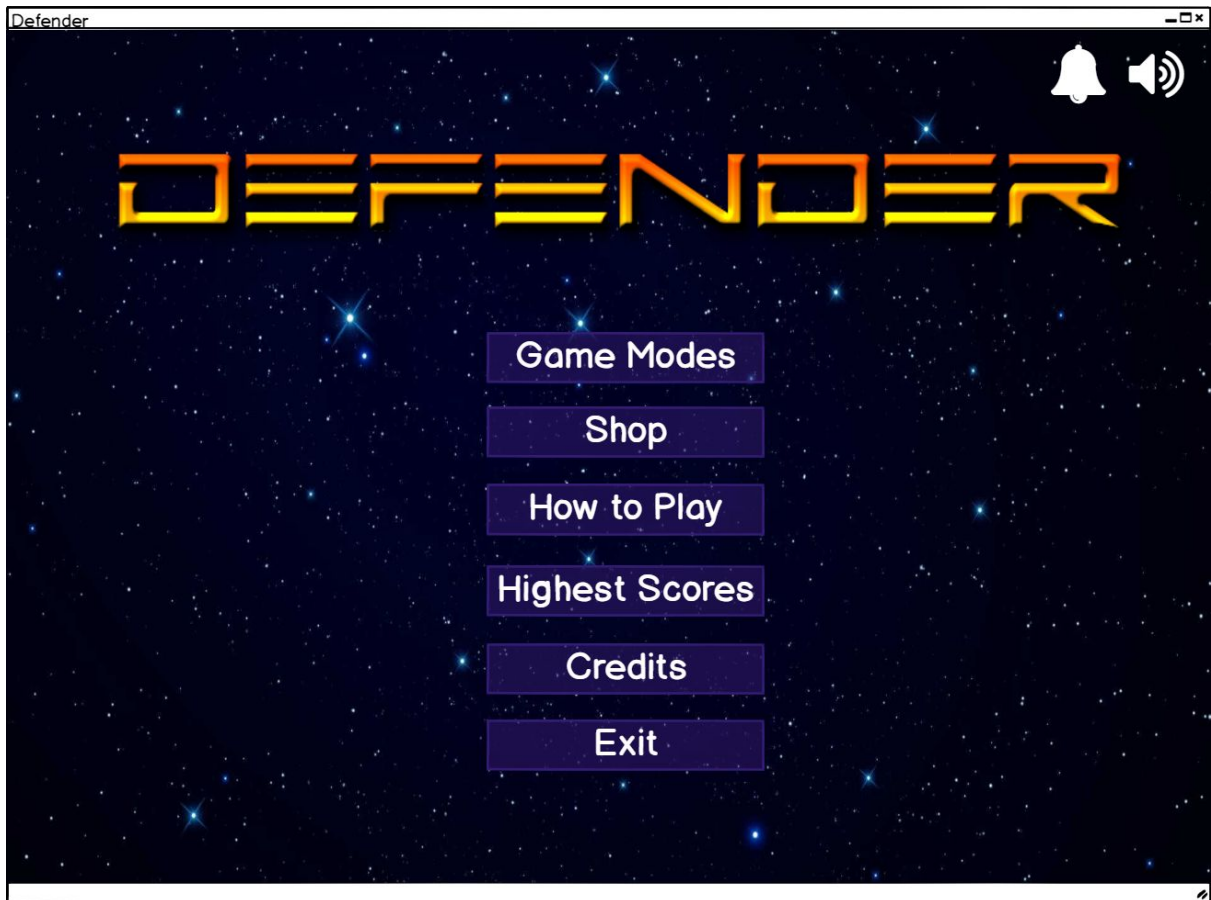
Figure 20.1 - Main menu
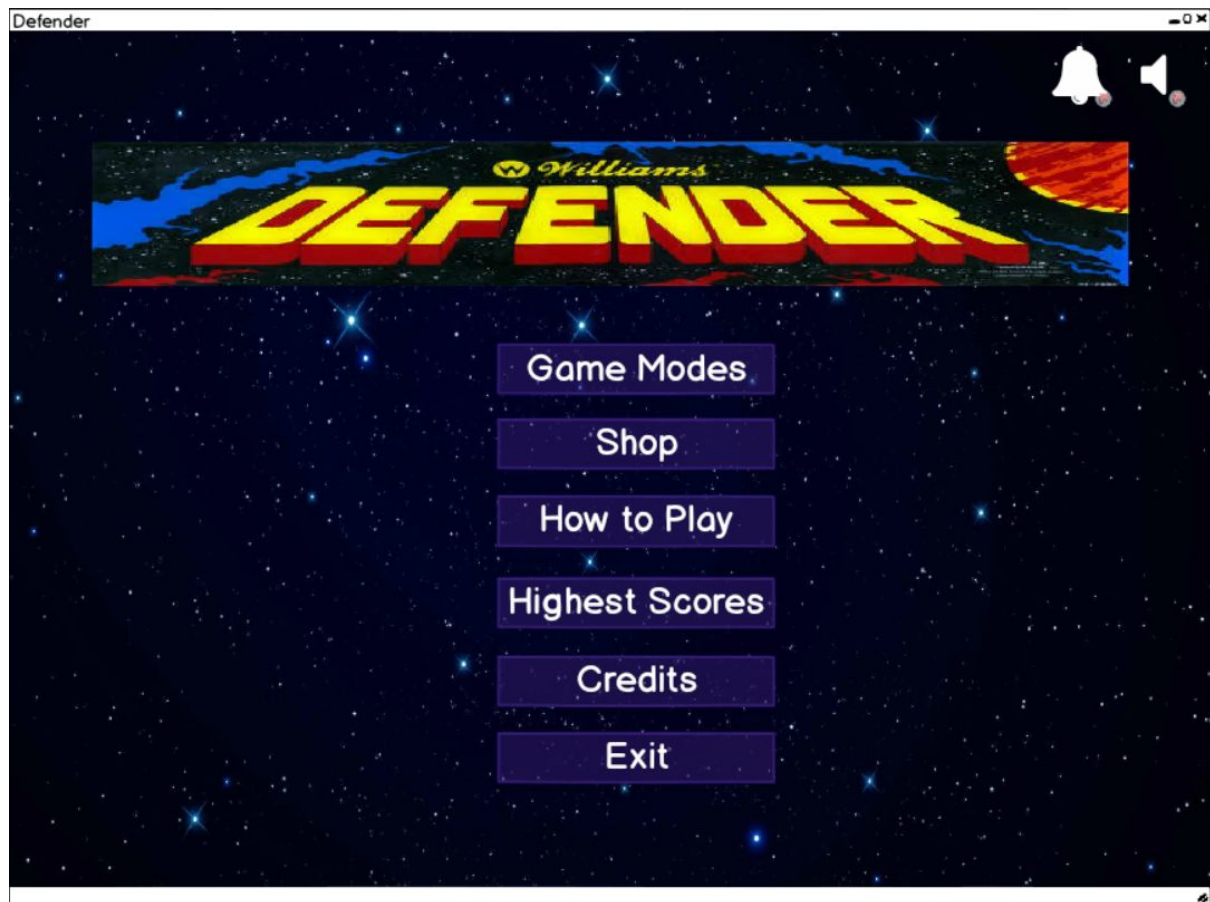
Figure 20.2 - Main menu, background music closed
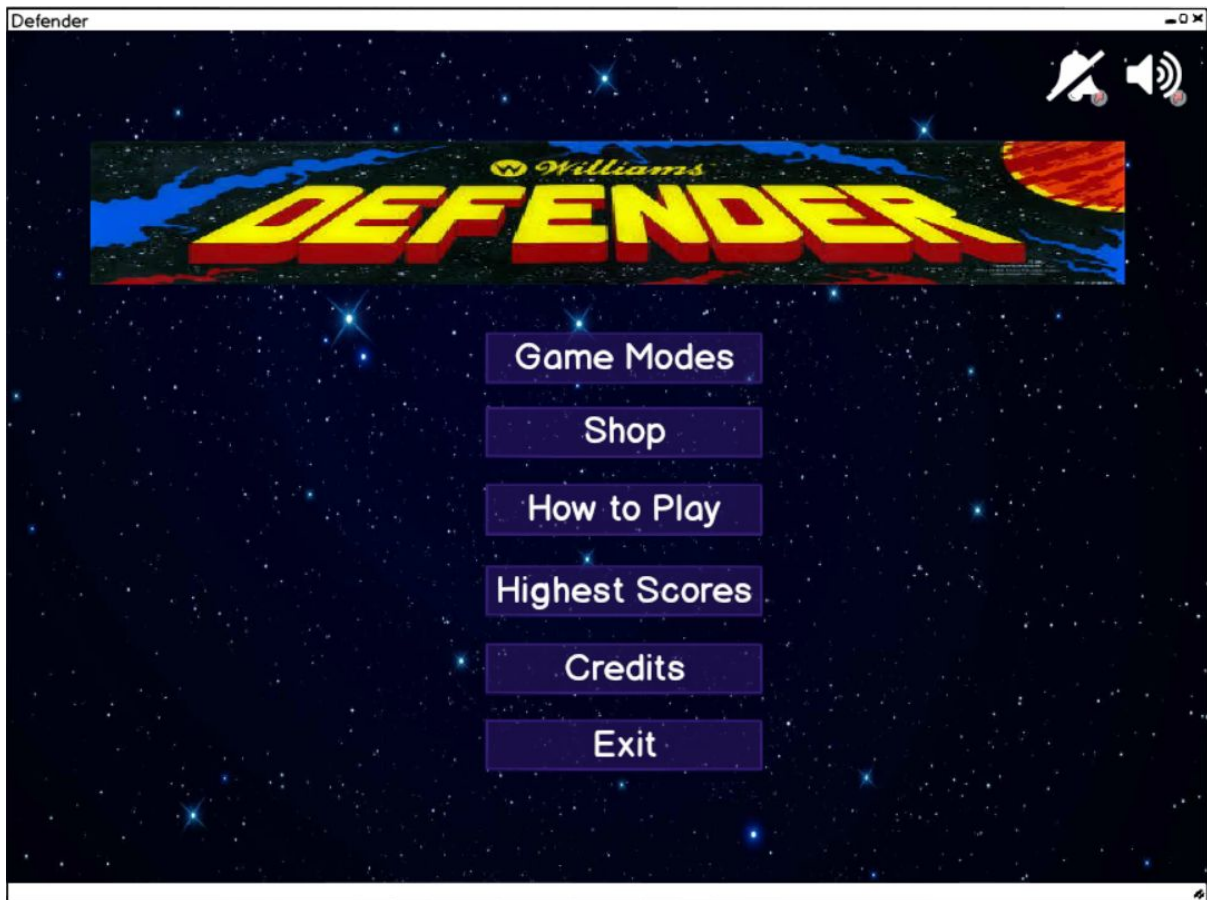
Figure 20.3 - Main menu, sound effects closed
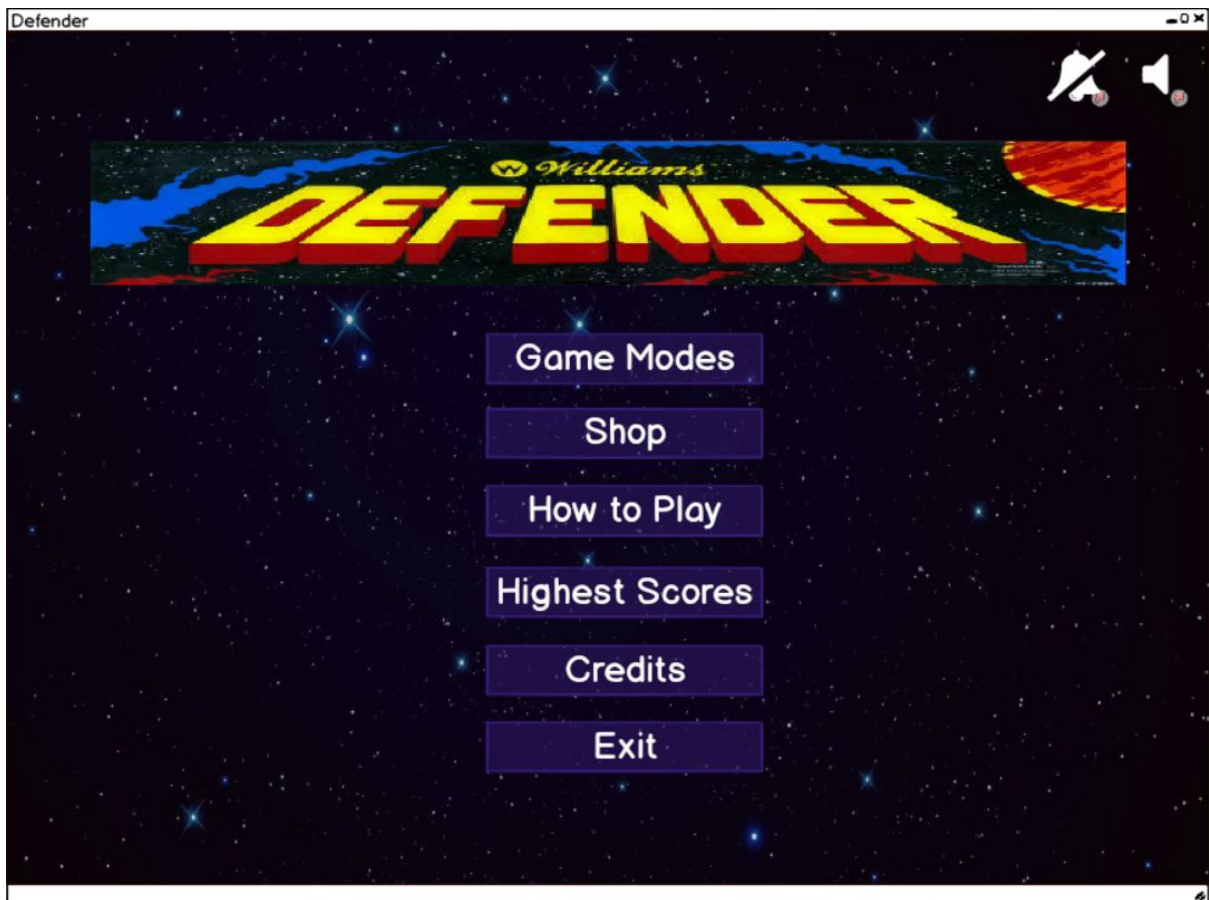
Figure 20.4 - Main menu, no sound
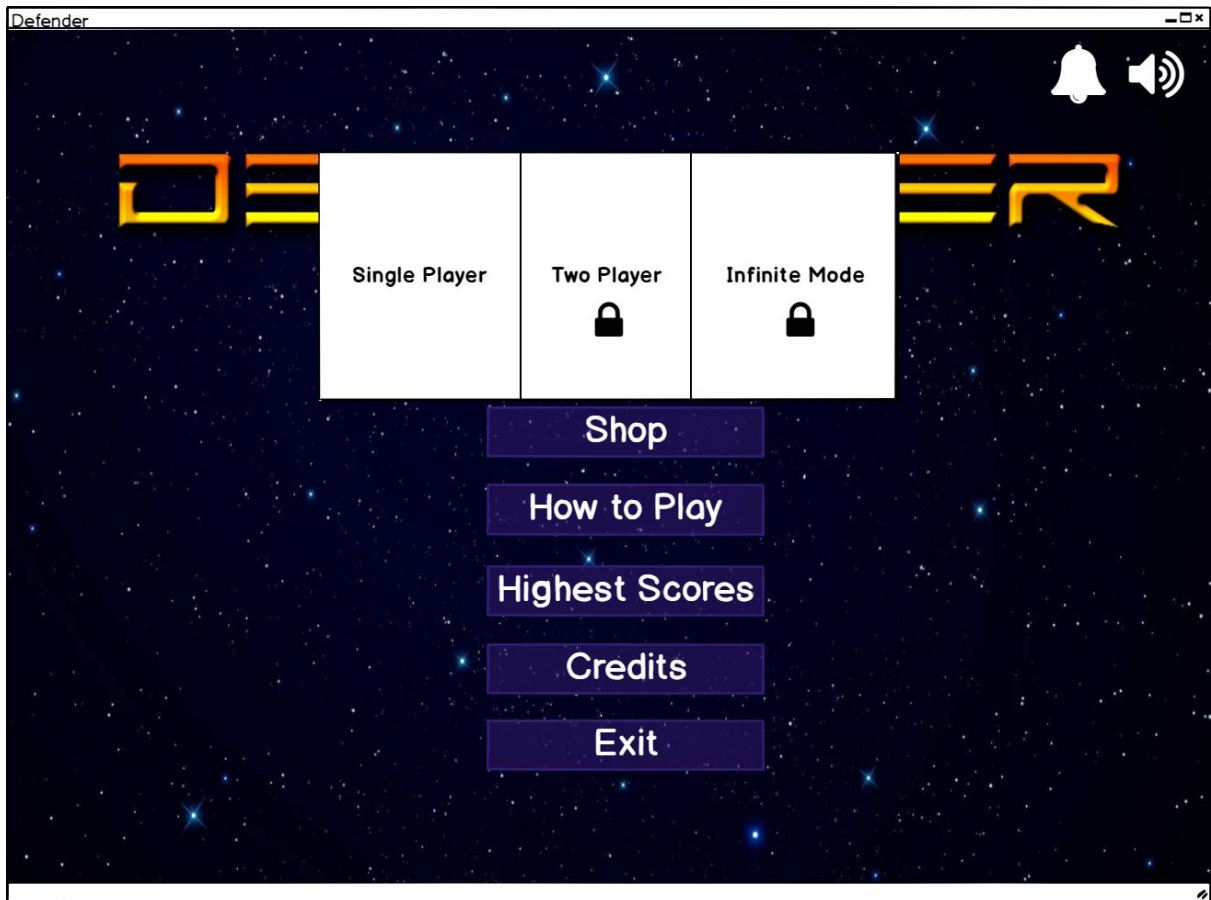
Figure 21.1 - Game modes
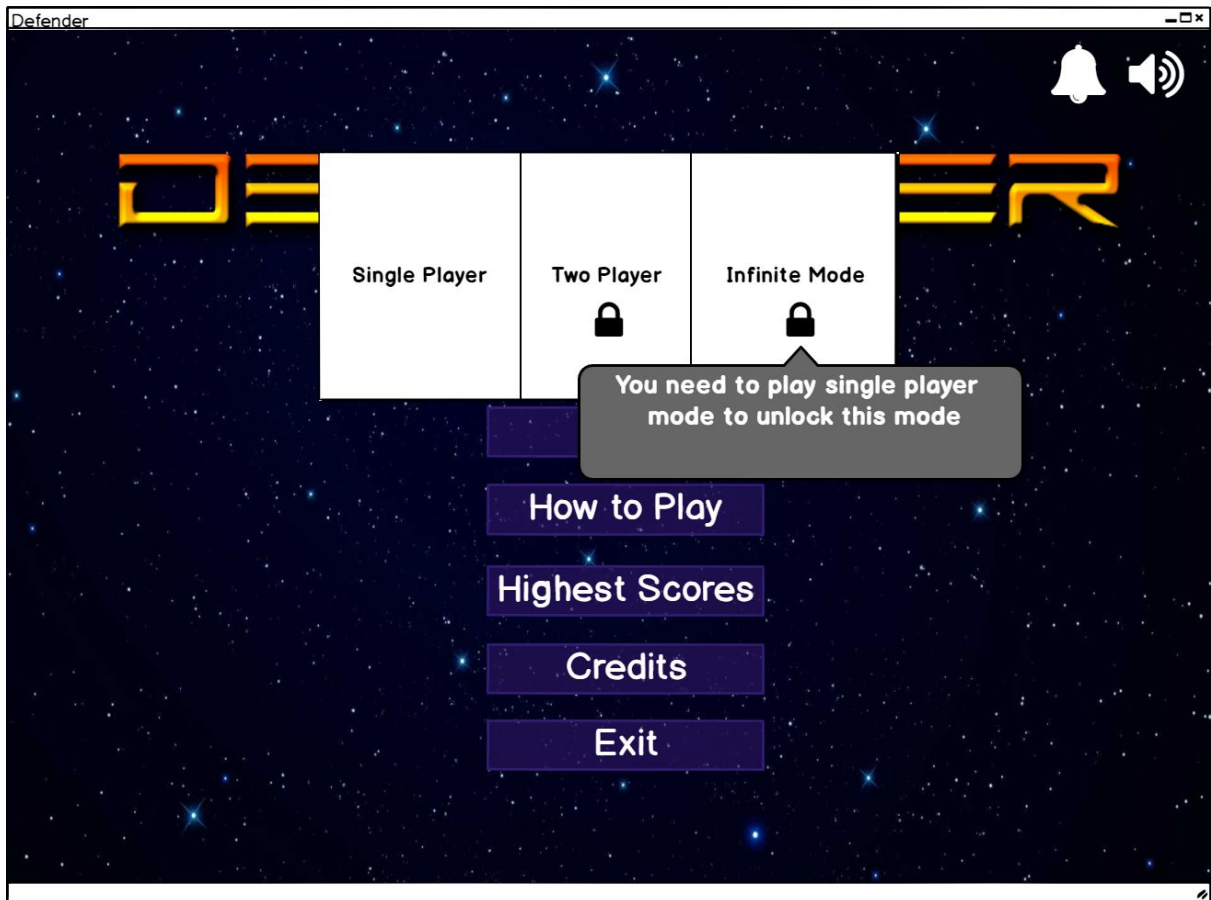
Figure 21.2 - Game modes, locked message for endless mode
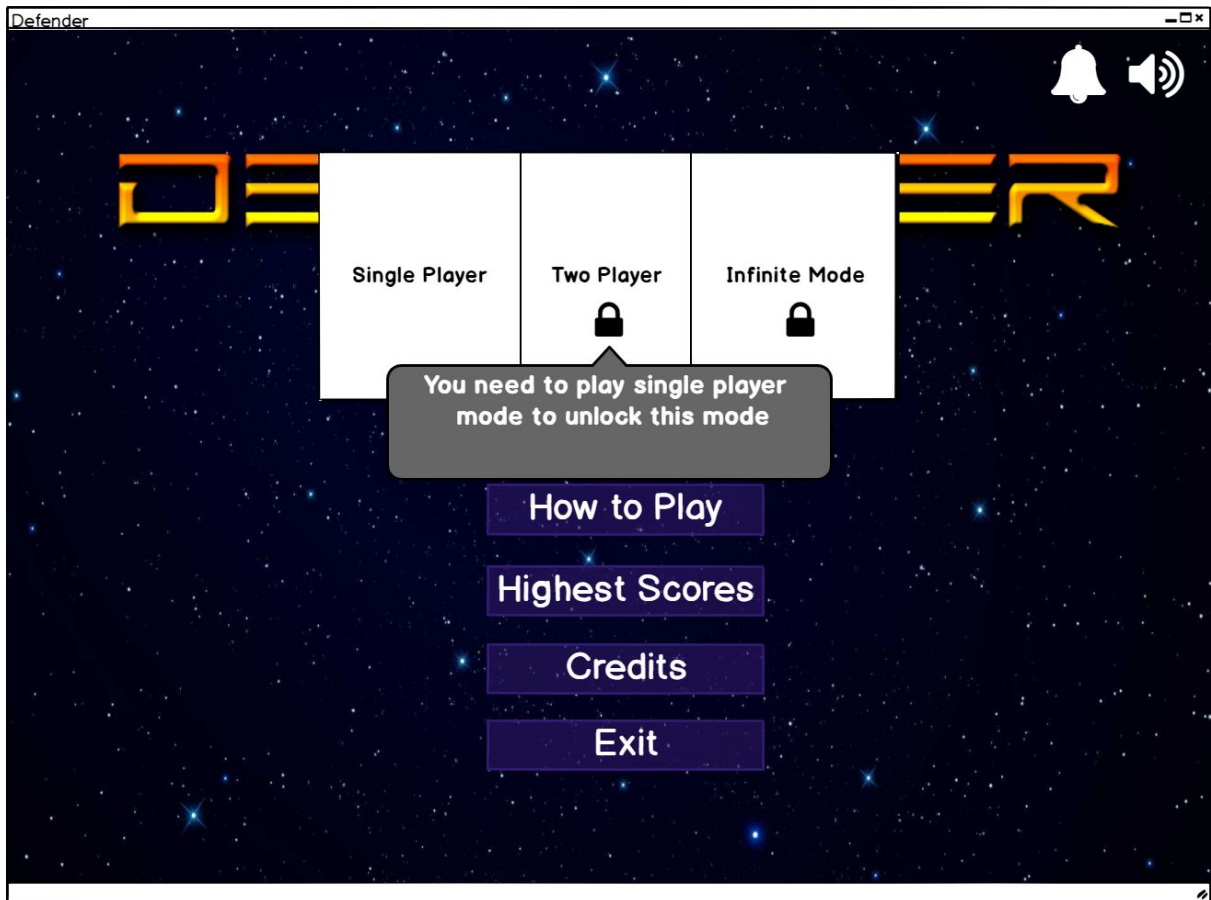
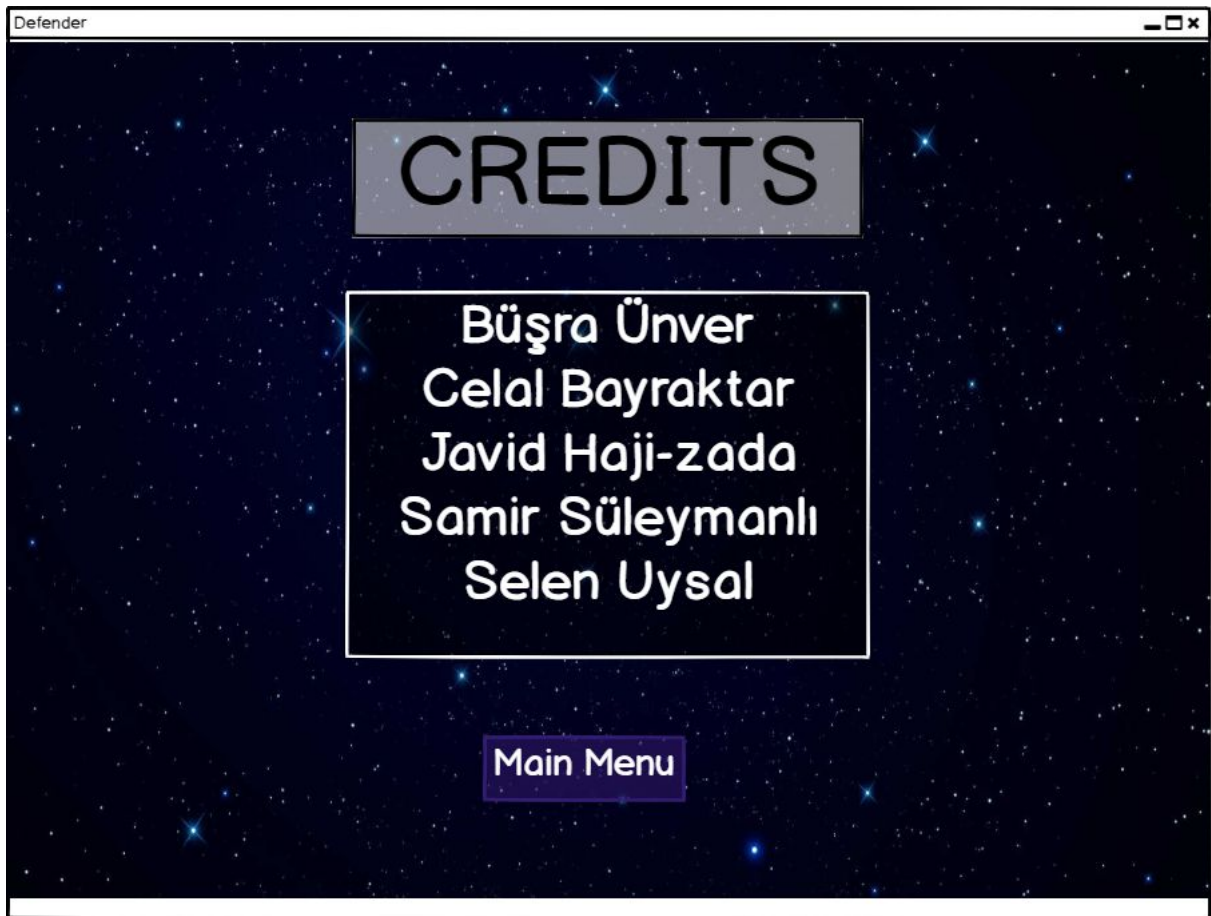**Figure 21.3 -** Game modes, locked message for two players
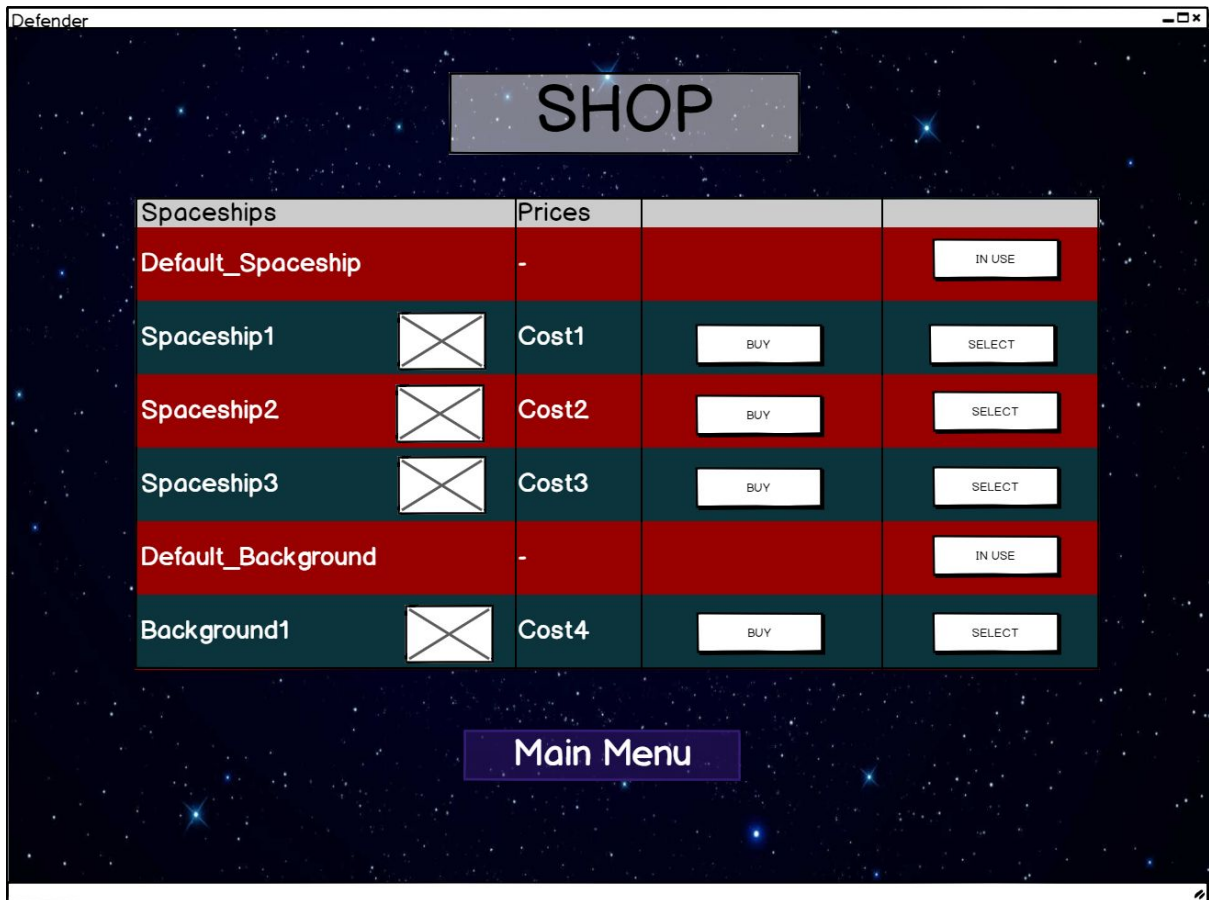
Figure 22 - Shop screen

Figure 23 - Credits screen
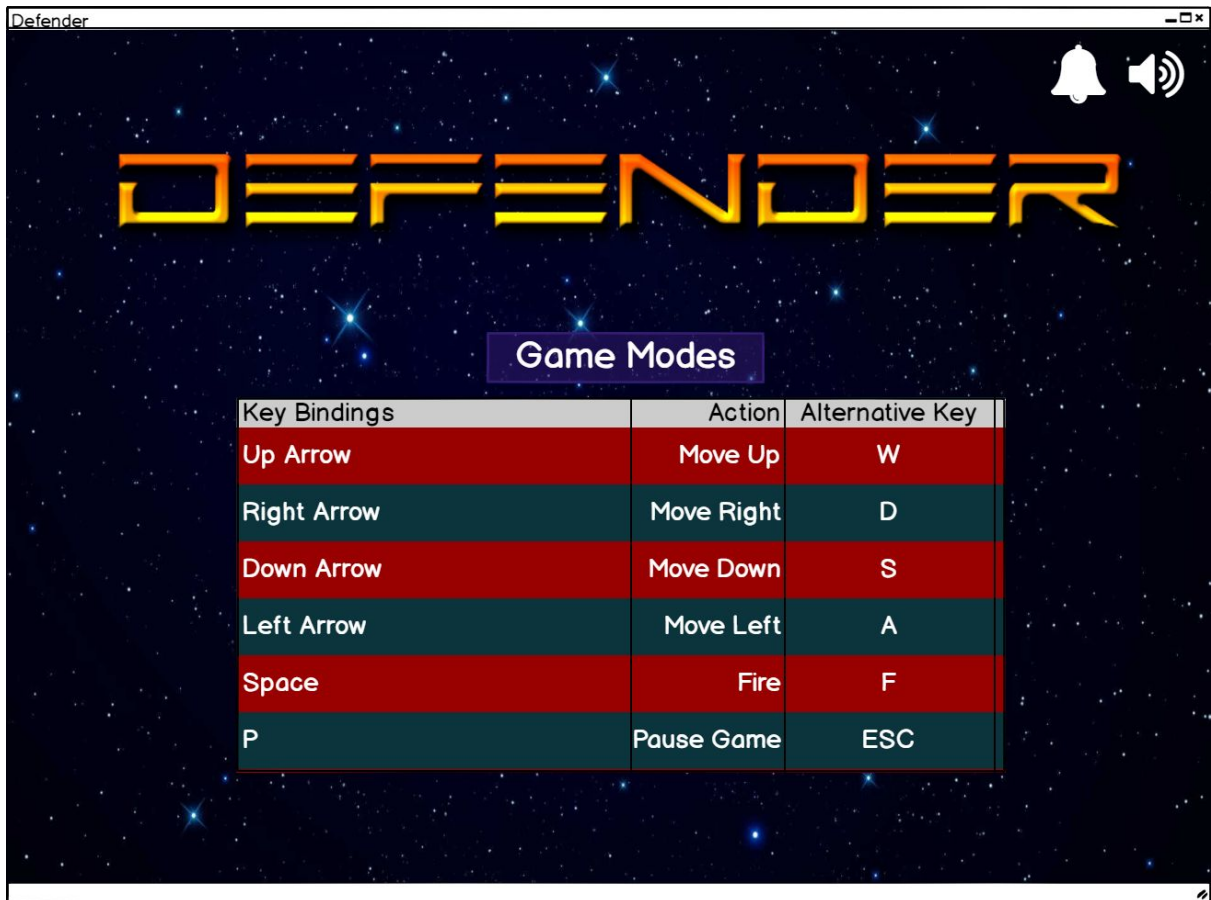
Figure 24 - How to play screen

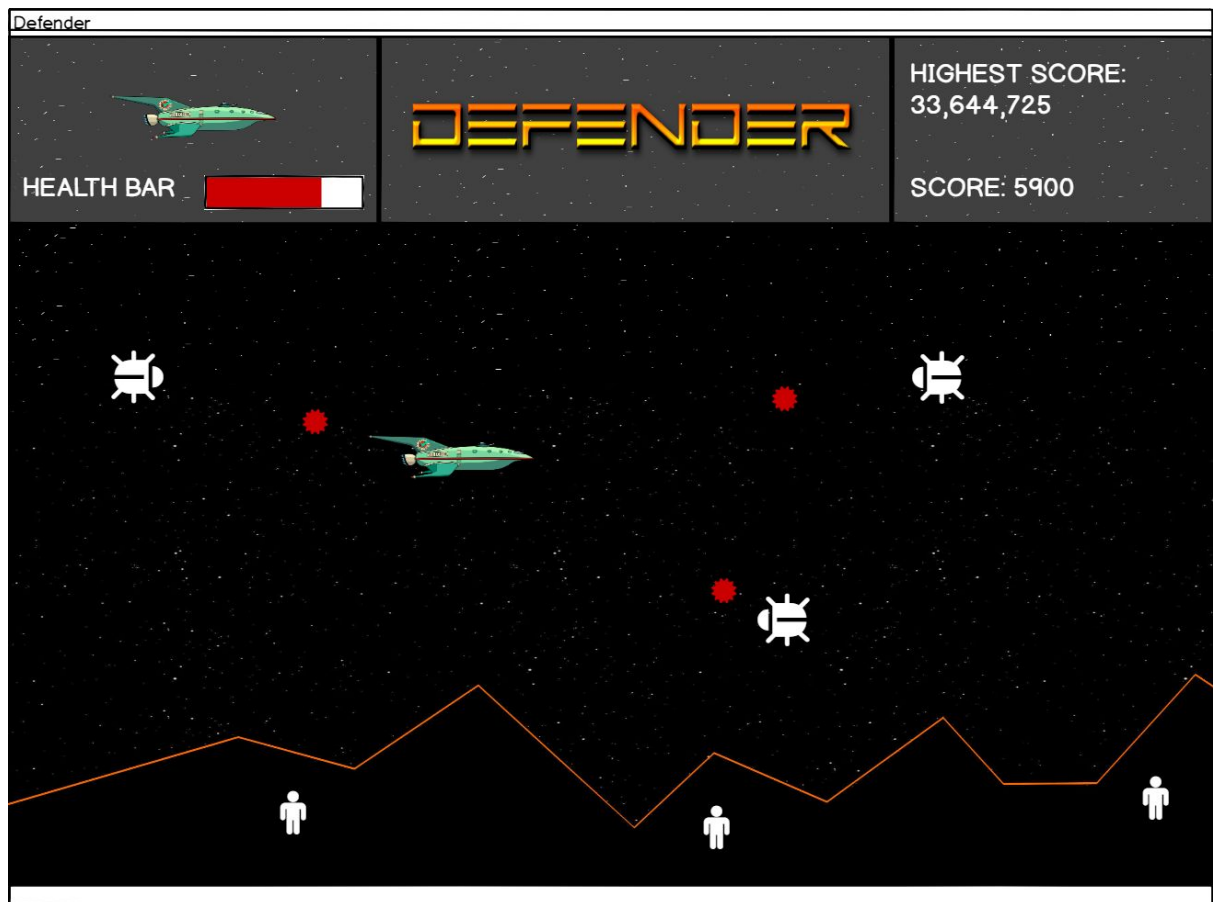**Figure 25 -** High scores screen

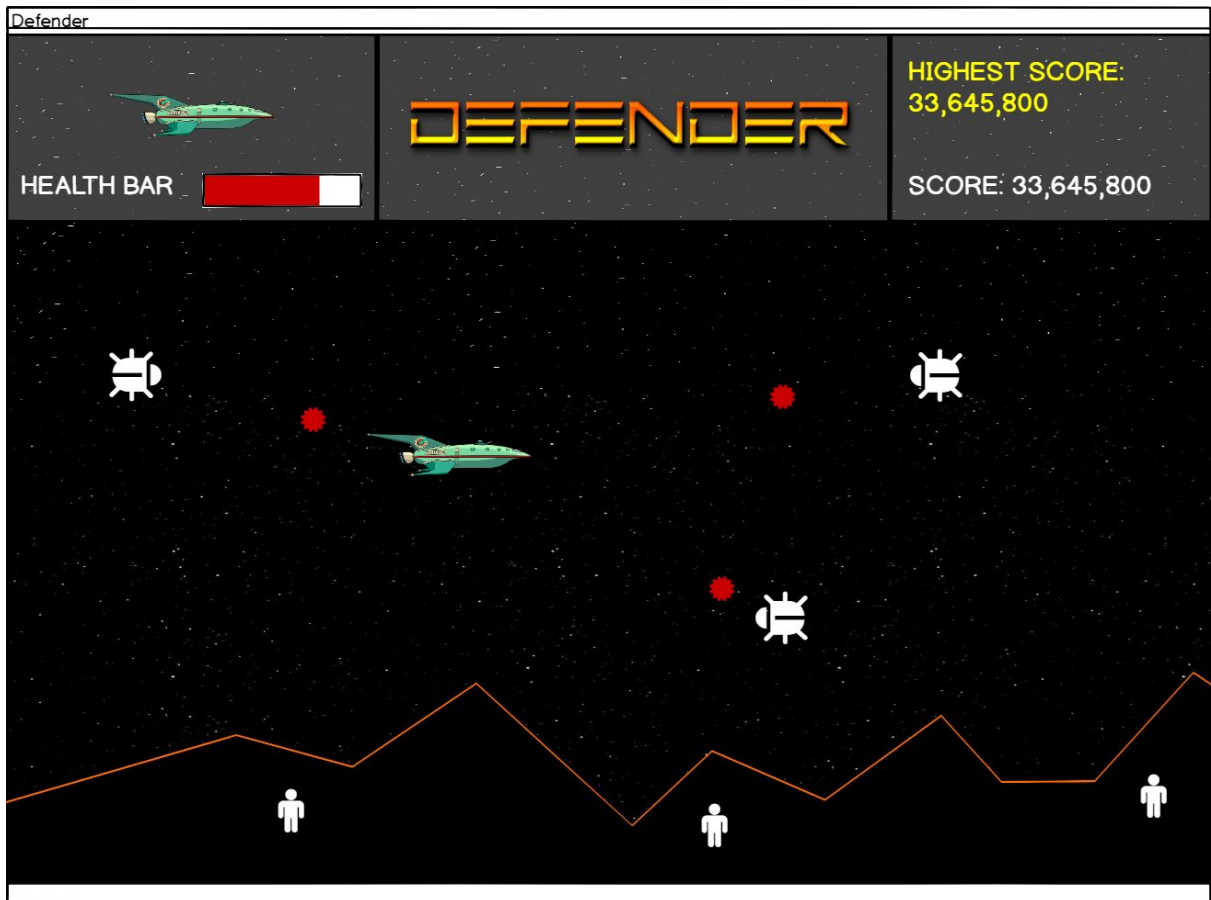**Figure 26.1 -** Single player

Figure 26.2 - Single player, new high score
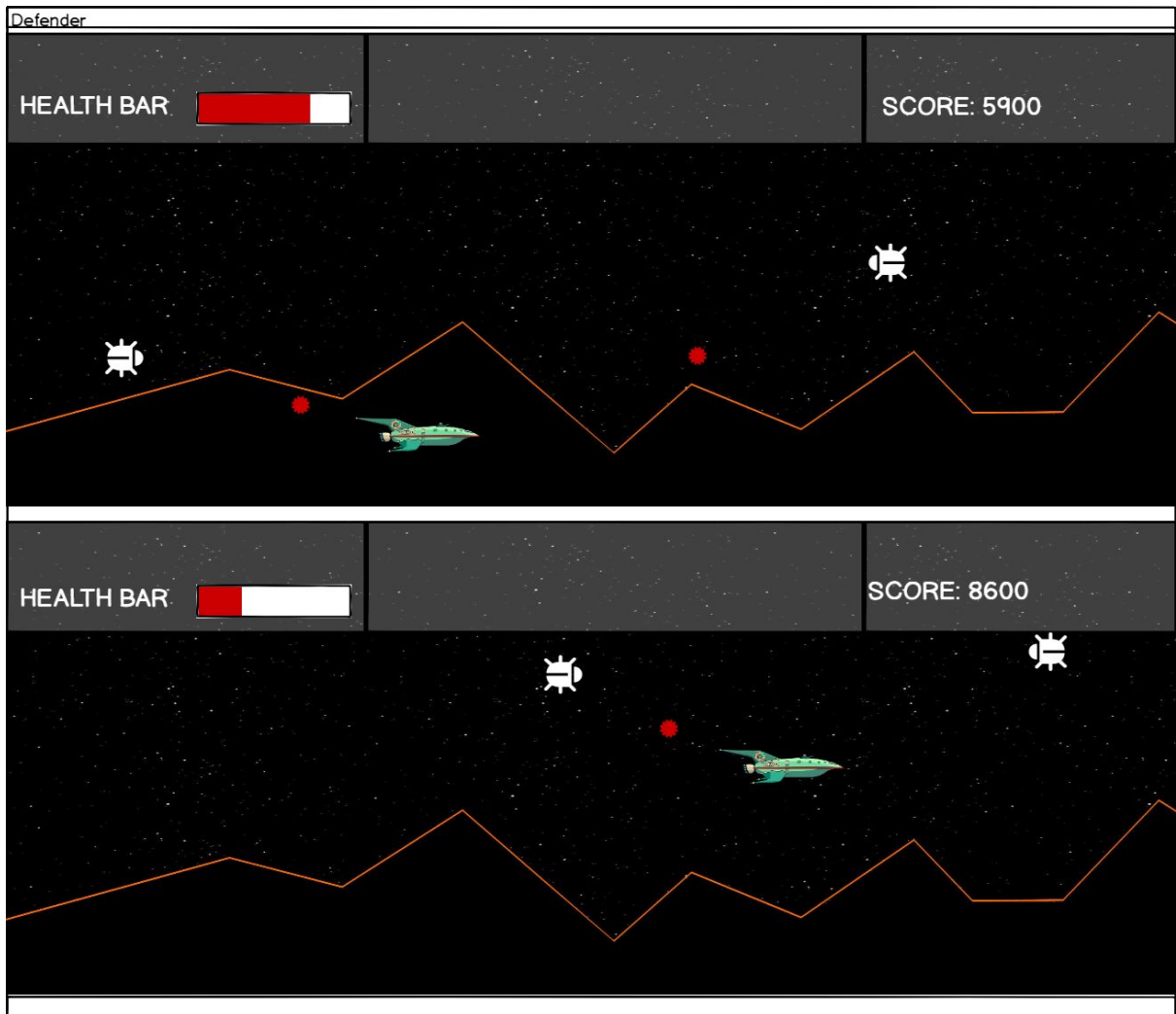
Figure 26.3 - Game over

Figure 27.1 - Two players

Figure 27.2 - Two players, one died

Figure 27.3 - Two players, conclusion

7. Improvement Summary

First, we tried to focus on the feedback we get from TA and the instructor. There were ambiguous features of the game due to some details not being designed thoroughly at the time of first iteration. As the project progressed and we started designing low level features, some details became more clear. Those include the details about the difficulty of the game which now described in the game modes section. Secondly, we fixed our diagrams. Again, as the low design became more clear we were able to draw more accurate representations of the sequence and activity diagrams deriving from our improved class diagram.

8. References

[1] "*Defender.*" Accessed on: Dec. 1, 2019. [Online]. Available: https://www.arcade-museum.com/game_detail.php?game_id=7547