



Bilkent University

Department of Computer Engineering

CS319 Object-Oriented Software Engineering Project

InterGalactica

Final Report

Group 18:

Selin Erdem, Ahmet Burak Şahin, Melis Kızıldemir, Ömer Sakarya

Course Instructor: Uğur Doğrusöz
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Table of Contents

| | | |
|-------|---|----|
| 1. | Changes in the Design..... | 3 |
| 2. | Complications during the Implementation | 5 |
| 3. | User's Guide | |
| 3.1. | Introduction..... | 5 |
| 3.2. | System Requirements and Installation Information..... | 6 |
| 3.3 | About InterGalactica | |
| 3.3.1 | Game Overview..... | 6 |
| 3.3.2 | Game Objects..... | 7 |
| 3.3.3 | Game Menu and Screens..... | |
| | | 7 |
| 4. | Current Status of the System..... | 10 |

1. Changes in the Design

We followed MVC design pattern in our project, and we had to make changes in both model, view and controller.

- Changes in the Model package

Due to time limitations, we had to leave Money and Gun bonus items and we only implemented Power Up/Downs Bomb ad Gem bonus items. Furthermore, we came to the conclusion that since we are not implementing Money it would be meaningless to have a MarketPlace so we didn't implement that as well. In the original design of our project, we thought of having planets as levels and every planet would have different stages and alien spaceships but due to time limitations, we had to leave this as well and in the final products, we had 5 levels with different difficulties.

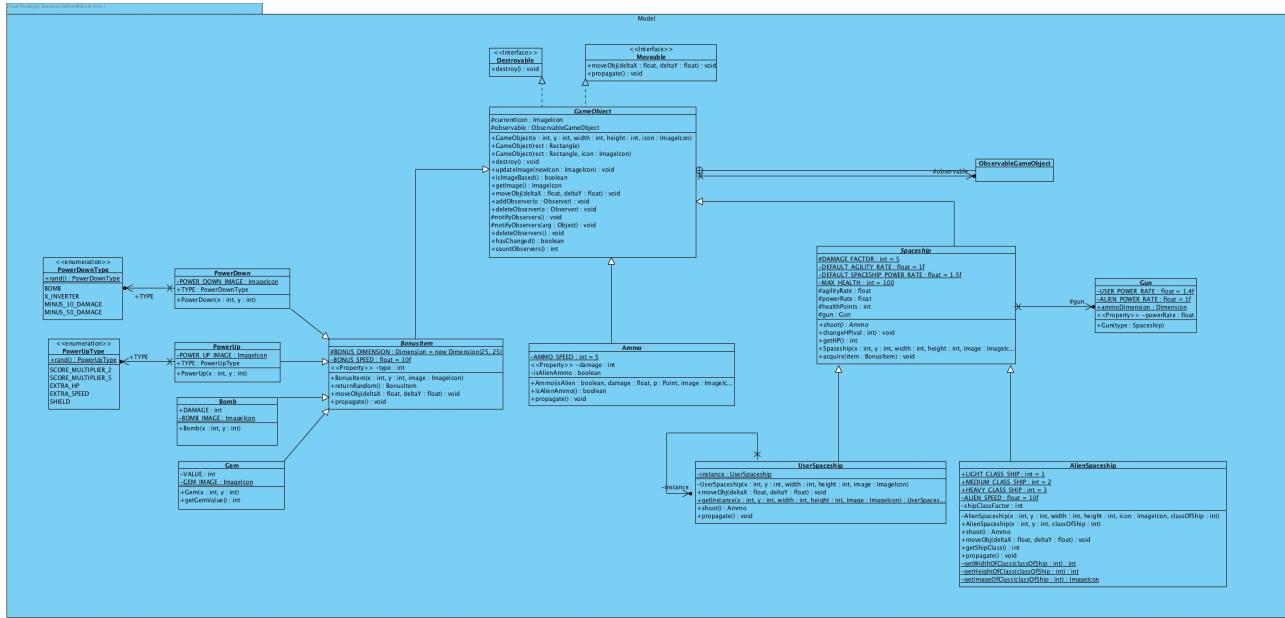


Figure 1: Final class diagram of model package.

- Changes in the Controller package

In the original design of our project we had 4 different managers and a game engine in our controller package. However, since we decided not to use planet system with stages we decided

we didn't need an AlienManager, so we didn't implemented that. Furthermore, we added two new classes, ImageUtils and SoundUtils to handle images and sounds which we didn't anticipated we needed them. We also added a SoundManager to handle sounds of the game.

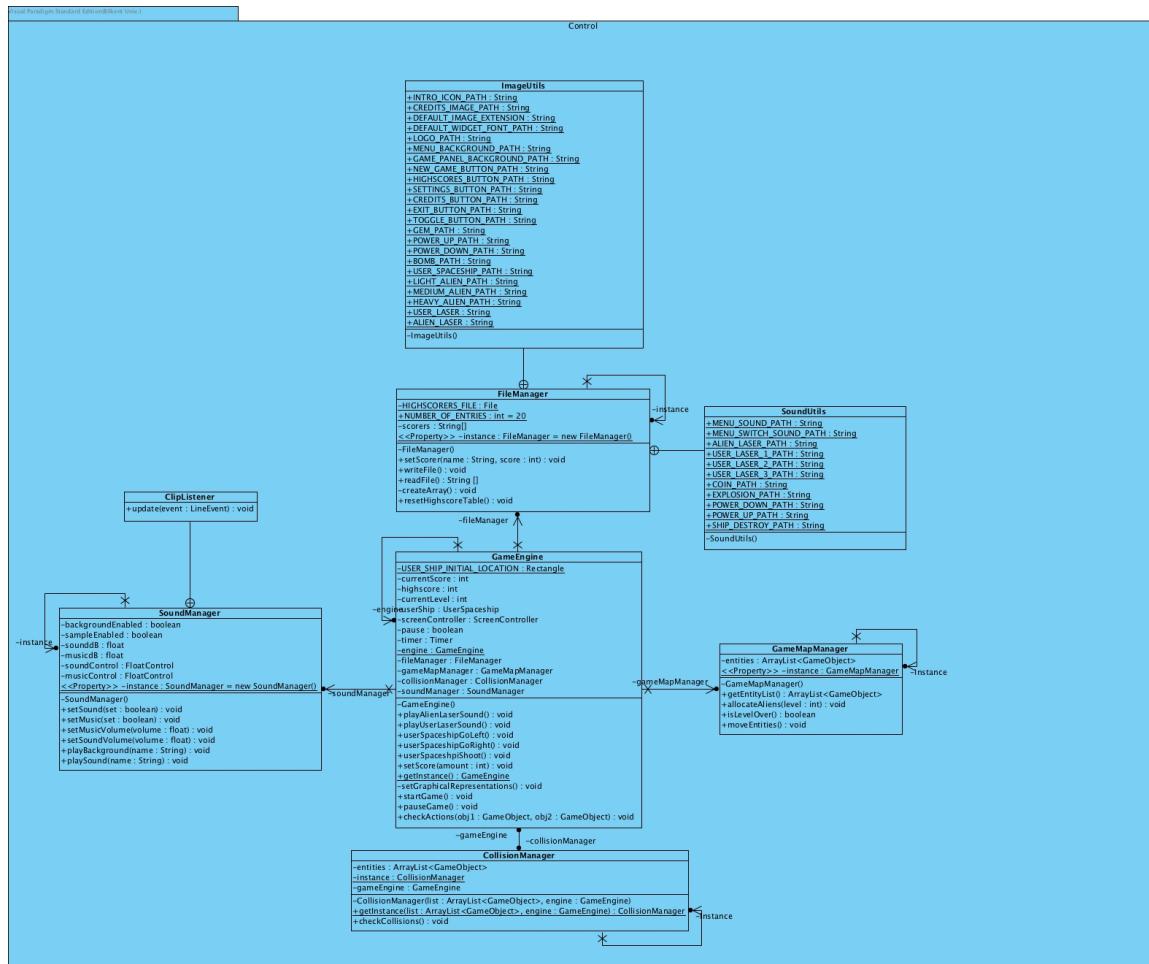


Figure 1: Final class diagram of control package.

• Changes in the View package

Since we were unexperienced with the GUI design we didn't anticipated all the classes we needed in the view package. Functionality of the view package did not change however we added few more classes.

Latest version of the view package can be seen below

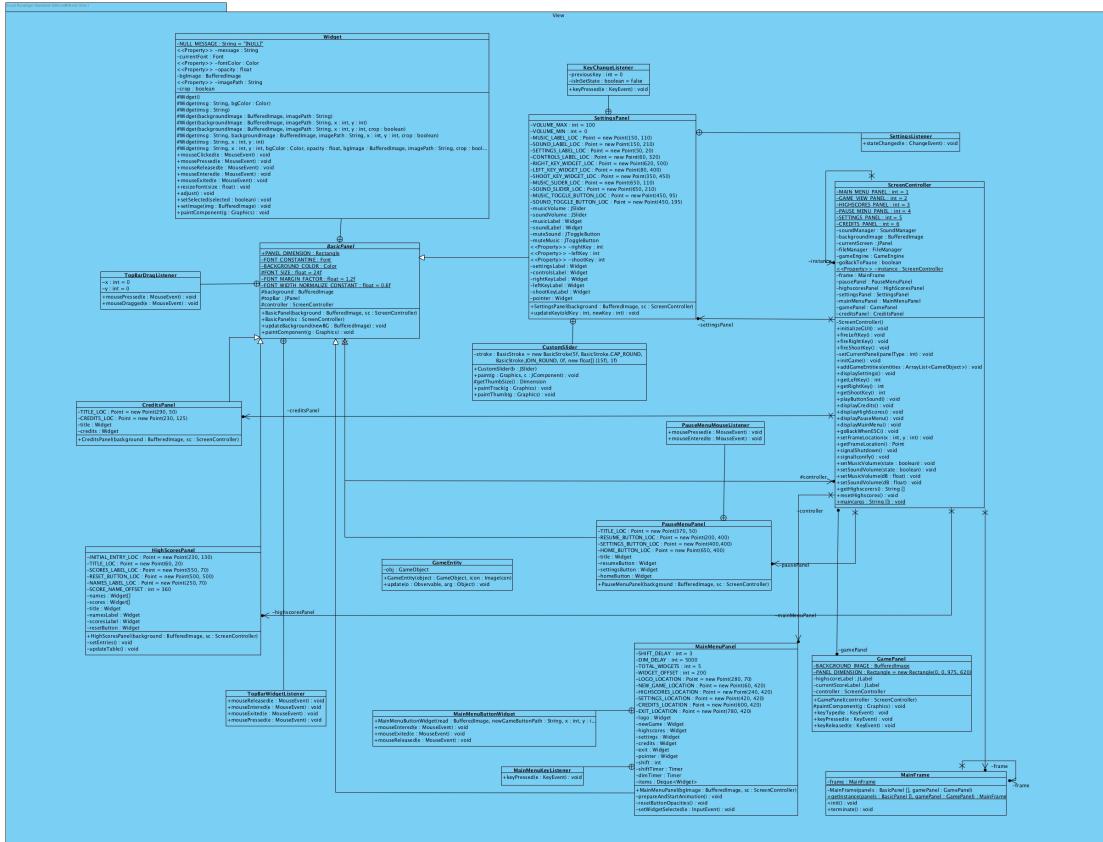


Figure 3: Final class diagram of view package.

Complications during the Implementation

- Finishing the project on time was one of the biggest challenges we faced during the implementation. We were not used to spend equal times on three phases of the project: analysis, design and implementation, so time we spend for implementation was not enough and consequently we were not able to implement all of the functionalities that we suggest on the Analysis Report.
- Since we are new with object oriented design with three phases we were unable to follow the specifications we declared in the analysis and design phases in the implementation phase. And the changes we made in the implementation phase resulted in bugs and unanticipated running of code which took long time to solve.

3. Users Guide

1. Introduction

Intergalactica is a 2D arcade game that is similar to Galaga, which is a popular arcade game. The player is expected to destroy all of the alien invaders at each level by shooting them with the gun that is attached in front of the user-guided spaceship. The main objective in the game is to reach to the homeland planet without getting destroyed by alien invaders. In order to be able to finish the game, the user should success all 5 levels.

2. System Requirements and Installation

2.1. System Requirements

The latest version of the Standard Java Runtime Environment (JRE) is required for running InterGalactica. Hence, it should be downloaded and installed beforehand. JRE is available online on: <http://java.sun.com/javase/downloads/index.jsp>

2.2. Installation and Execution

- First, download the intergalactica.zip file from InterGalactica's GitHub repository:
<https://github.com/selinerdem/intergalacticaGr18>
- Unzip the intergalactica.zip file and run the intergalactica.jar file in order to execute the game.

3. About InterGalactica

3.1. Game Overview

- There are five different levels in InterGalactica. Each level is harder than the previous one in terms of the number of alien invaders to be destroyed. The user should successfully complete all five levels in order to win the game. The user can move his spaceship through the x-axis by the assigned keys his keyboard which can also be changed through settings menu. Whenever the player manages to destroy all of the alien spaceships without being destroyed by them(detailed information is available on the health points section) he will level up. If the player health points are drained then the game will be over.
- The player can pause the game by pressing the “esc” key and resume it by clicking on the resume button on the pause screen. The player can also restart the game from the pause menu

without going back to the main menu. Here are some main features of the game explained in details:

- **Health Points:**

The player starts the game with 100 Health Points and his/her health points(HP) decreases when whenever his spaceship is shot by an alien invader. When the player's HP drain away, the game finishes. The HP of the player can also be increased by the HP bonus items which falls randomly whenever an alien spaceship is destroyed. The player can view his remains HP from the health bar which is located at the top of the game screen.

- **Bonus Items:**

There are bonus items in InterGalactica. When the player destroys an alien spaceship, a bonus item drops from the destroyed spaceship gradually as a question mark symbol. The player manages to catch that bonus item by moving his spaceship under the location which it drops. The bonus items are generated randomly and it may be a power-up as well as a power-down.

- **Scoring System and High Scores:**

The player gains some varying amount of points whenever he destroys a spaceship or manages to catch a bonus item. At the end these points contribute to his overall score. Whether the user completes all five levels and wins the game or loses it, his overall score is compared with previous high scores and if it is higher than one of the highest ten high scores, then his score will be displayed in high scores list.

3.2. Game Objects

3.2.1.User Spaceship

User spaceship is the game object that the player controls . It moves through the x axis and the player controls it with the corresponding keys on his keyboard. It shoots the alien spaceships.

3.2.2.Alien Spaceship

Alien spaceship are the game objects that correspond to the enemies that player should destroy by shooting them. Alien spaceships move through both x and y axis and there are approximately 30 alien spaceships in each level. They can also shoot user spaceship.

3.2.3.Bullet

Bullets are the game objects that are fired when the player shoots the alien spaceships.

3.2.4.Bonus Items

There are two types of bonus items in InterGalactica which are power-ups and power-downs.

3.2.4.1.Power-Ups

Score Multipliers: There are two kinds of score multipliers which multiply the current score of the player by two or five.

Extra HP: This bonus item increases the HP of the player in a random amount.

Extra speed: This bonus item increases the speed ratio of user's spaceship.

Shield: This bonus item protects the player from the alien spaceship for 30 seconds.

3.2.4.2.Power-Downs

Bomb: This power-down item causes a large damage to the user spaceship

X inverter: This bonus power-down item changes the direction that the user spaceship moves.

Damage Decrease: This power-down item decreases the damage that the user spaceship causes to alien spaceships by 20 or 50 points.

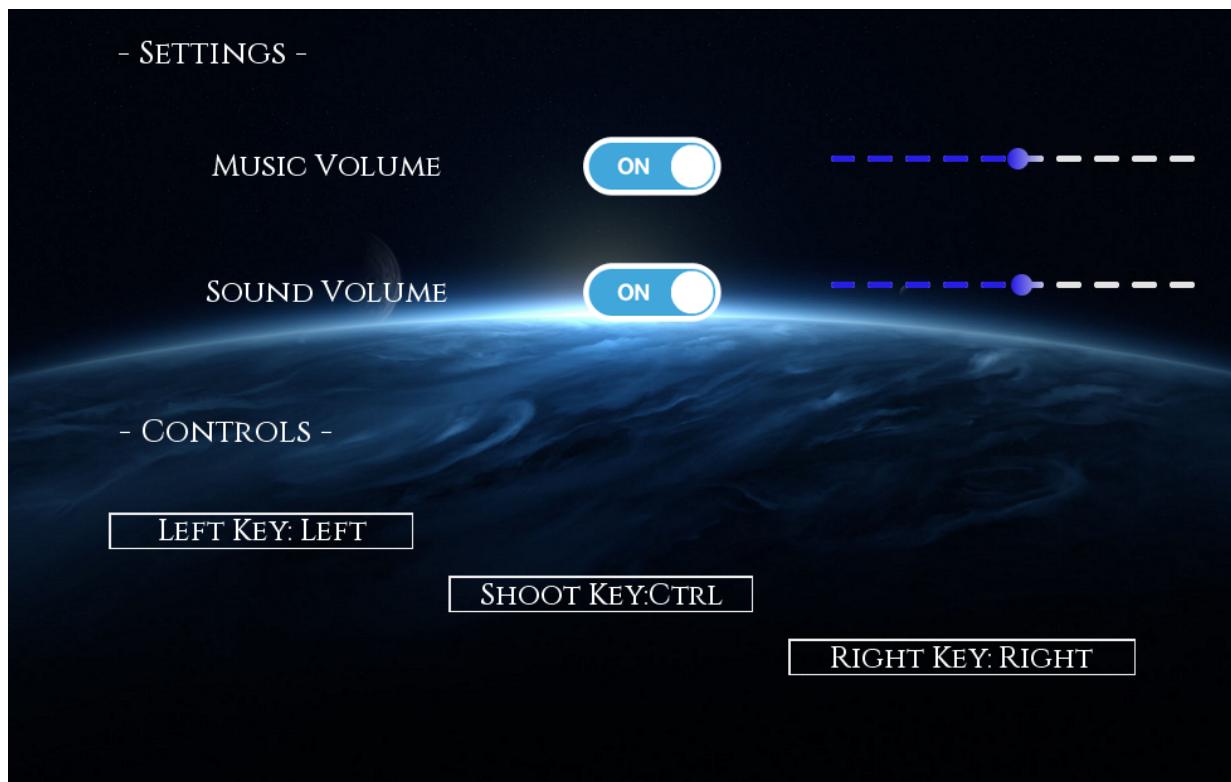
3.3. Game Menus and Screens

3.3.1.Main Menu

When the game is executed, the main screen will be displayed to the player. On this menu there are five options which are represented with buttons and each of them displays another screen except for one. The options which are available on main screen are, starting a new game , viewing the high scores , changing the settings of the game, viewing the credits and exiting the game.



Image 1: A screenshot of InterGalactica's main menu



3.3.2.Settings Menu

When the player clicks on the settings button, the settings menu is displayed. The player can change the control keys, music and sound volume through this menu.

Image 2: A screenshot of InterGalactica's settings menu

3.3.3.High Scores Screen

When the player presses the high scores button on the main screen he will be redirected to the high scores screen which he can view the top ten highest scores within the names of the players.

| NAMES | SCORES |
|------------|--------|
| 1. [NULL] | -1 |
| 2. [NULL] | -1 |
| 3. [NULL] | -1 |
| 4. [NULL] | -1 |
| 5. [NULL] | -1 |
| 6. [NULL] | -1 |
| 7. [NULL] | -1 |
| 8. [NULL] | -1 |
| 9. [NULL] | -1 |
| 10. [NULL] | -1 |

RESET

Image 4: A screenshot of InterGalactica's high scores screen

3.3.4.Credits Screen

When the player chooses the view credits option, he/she can view the names of the developers of InterGalactica through the credits screen.



Image 4: A screenshot of InterGalactica's credits screen

3.3.5. Game Screen

On the game screen the game panel is displayed. Furthermore, a health bar that shows the remaining HP of the user, a high score and a current score panel is also displayed at the top of the screen.

3.3.6. Pause Menu

When the player presses the Esc key on his or her keyboard, the game will be paused and the pause menu will be displayed. The player can resume or restart the game through the pause menu, also can return to the main menu.

4. Current Status of the Report

We were able to implement the view package properly. The user interface components of our project is complete and bug free. However we have some bugs in the controller package due to the time limitations that we faced during the implementation stage. Hence our game is not working properly.

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