## 1. Introduction

This report informs essential information of the SENG201 project and how the process executed by Bach Vu and Linh Luu.

The report covers six parts. The first three parts are the structure of the application, explanations of unit test coverage, reflection during the project as well as improvements for next. The fourth and fifth sections are about the declaration of partners' contribution, included a brief self-statement of key involvements in the project by individual and feedbacks on the assignment. Lastly, there is an attachment to the UML class diagram.

## 2. Structure

About its structure, we built our app primarily based on Object-oriented, very few static fields. A super-abstract class named Entity to display objects on the screen which has subclasses Outpost, BlackHole, and Planet. The independent Crew and Galaxy classes did not inherit by any others. Instead, the Crew-class implemented the entire status of each crew members in Spaceship (extends Outpost), and Galaxy-class groups space objects (instance of Entity) together. In details, each crew has health, hunger and morale, and their actions which associate with Spaceship stats and inventory via using supplements. The stock interface executed through classes Stock_Medicine, Stock_Food and ShipModule because of having same variables (boost-Value and the amount of stock). Also, we had some static classes to enhance UI such as Messbox, incomingMessage (for tutorial) and resized images.

Pattern of design was MVC. Backend classes served as a model, which player view via frame and issue commands with JPanel implemented the KeyListener Adapter. The controller (JPanel SpaceshipController) then grabbed info in backend and updated view (GameEnvironement).

We mainly used ArrayList to store crews and crew actions, stock and ship modules, entities (via blackhole, planet, outpost), as well as the images of the crew and galaxy entities.

## 3. Unit Test (images attached below)

The JUnit Test covered the statistics of crew member via health, hunger and morale and the change after using supplements. It also tested the bonus statistics of the spaceship when the special type of crew was chosen. For example, if the player chooses Captain, then the morale of each crew automatically increases by 25. Besides, it also covered the property of the crew action and the movement of the ship as well. It is to ensure the game sustainable and detect unintended effect sides. The test also checked whether the use of stock was valid and how attributes of this object associated with other objects (amount, boost-Value to health/morale/hunger).

UnitTest (20/05/2019 9:55:27 PM)

| Element | Coverage | Covered Instructions | Missed Instructions | Total Instructions |
|---|---|---|---|---|
| SpaceExplorer | 27.9 % | 3,113 | 8,037 | 11,150 |
| src | 27.9 % | 3,113 | 8,037 | 11,150 |
| GUI | 0.0 % | 0 | 6,202 | 6,202 |
| FrontEnd | 0.0 % | 0 | 770 | 770 |
| SpaceVessel | 71.0 % | 1,180 | 483 | 1,663 |
| CustomUIELmt | 3.3 % | 15 | 436 | 451 |
| Backend | 76.2 % | 439 | 137 | 576 |
| UnitTest | 99.4 % | 1,479 | 9 | 1,488 |

*Figure 1. Coverage Integration test of backend classes*

WelcomeFrame (20/05/2019 4:40:32 PM)

| Element | Coverage | Covered Instructions | Missed Instructions | Total Instructions |
|---|---|---|---|---|
| SpaceExplorer | 66.5 % | 7,260 | 3,655 | 10,915 |
| src | 66.5 % | 7,260 | 3,655 | 10,915 |
| UnitTest | 0.0 % | 0 | 1,256 | 1,256 |
| GUI | 86.5 % | 5,367 | 835 | 6,202 |
| FrontEnd | 0.0 % | 0 | 770 | 770 |
| SpaceVessel | 57.7 % | 957 | 703 | 1,660 |
| Backend | 89.1 % | 513 | 63 | 576 |
| CustomUIELmt | 93.8 % | 423 | 28 | 451 |

*Figure 2. Coverage UI testI*

## 4. Our thoughts and feedback

Firstly, we assume this project successfully not only improve our knowledge in JAVA but also broaden our insight/mind about how a real game is made. Secondly, we recognise the importance of teamwork skills which is one of the keys to the success of the project. If each member seriously aware of their duties and passionately and creatively work on it, the assignment would be potentially smooth. Although facing difficulties is inevitable during the project, patience and discriminately figuring out the problems which might be an optimal solution. That is also what we experienced and learnt from this assignment. In overall, we both satisfied with the outcome of this project. This assignment is ideal for students to introduce JAVA and emphasise strict requirements that software engineers must manage.

## 5. Review

At the beginning of the project, we got a struggle of constructing and developing the GUI game because of the different point of views. The situation was quite intense but luckily no conflict happened. We got the idea of creating multiple galaxies, however, got some problems about how to update randomly the image of planets into each galaxy (panel). It took days to figure out, then the progress finally started working very well on track and caught up the schedule. Moreover, in the final steps of the project, we met a few troubles with the length of classes. Especially, the GUI Game Environment contained a huge amount of details, therefore, it was hard to keep track of what was going on and the readability was downgraded significantly.
In the following projects, we would consider more seriously from a better sight of skills a software engineer must have, moreover, strictly comply with software requirements.

## 6. Contribution

We put so much effort on this assignment since very first weeks it released before the term break, roughly 5-10 hours per week. After a short discussion, we agreed that Bach Vu contributed 60%, and Linh Luu did 40% of the project. In details, Bach mainly implemented work in super-classes. He also did the integration testing, fixed the tough bugs and created the storyline as well as the tutorial composing. Writing JAVA doc also is his job. Linh contribution is focused on sketching the outline of the app by building the command-line app, tested Junit at the early stage, class diagram and worked with graphics in interface design and mainly executed classes in Backend package. Both involved in the development of the GUI package, which integrates all objects to the main game and displays in multiple frames (game environment serves as the MDF frame). Individual parts are typically shown in JAVA doc.

## 7. UML Class Diagram (attached in ZIP)

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