Requirement Document

SFWRENG 3XA3

Group 30, Team 30
Alan Yin (yins1)
Huajie Zhu (zhuh5)
Junni Pan (panj10)

October 5, 2017

Contents

List of Tables

List of Figures

1 Major Revision History

Date	Version	Note
Oct 9,2017	1.0	draft
Oct 11,2017	1.1	add all information to document
Oct 13,2017	1.2	Final version for requirement document rev 0
Dec 6,2017	1.3	Final version for requirement document rev 1

2 Project Driver

2.1 The Purpose of The Project

The purpose of this project is to create a Tower Defence Game with graphic effects. The original game is fairly simple and crude. We are going to modify it by adding new features and graphic effects, to make it become a lively game.

2.2 The Client, the Customer, and Other Stakeholders

The client of the project is Professor Asghar Bokhari. The customers of the project are casual gamers and any people who would like to enjoy a less time consuming game during their leisure time. Other stakeholders include current development team and any future developers, since current developers can obtain knowledge on software project developing, and future developers can be benefit from this open source project.

2.3 Constraints

2.3.1 Development Constraints

The project is going to be developed by Java in Eclipse IDE. So team members can cooperate with each other no matter what operating they are using.

2.3.2 Operation Constraints

The game can run in any platform that supports Java. (E.g. Windows OS, Mac OS, Linux.)

2.3.3 Schedule Constraints

This project must be completed by December 2017, and the development process will specifically follow the Gantt Chart.

2.3.4 Budget Constraints

This is a open source project, so the budget will be $0 for both developers and users.

2.4 Naming Conventions and Terminology

Term	Description
API	API stands for application program interface. It is a set of routines, protocols, and tools for building software applications.
LWJGL	LWJGL stands for Lightweight Java Game Library. It is a Java library that enables cross-platform access to popular native APIs.
Health Points	The amount of health that a player has. The player stays alive if health points is greater than 0.
Damage	The amount of health points an attacker can take away from the player.
Map	Map determines where towers can be placed, and the route where attackers will follow.

Table 1: Terminologies and corresponding descriptions

3 Functional Requirements

3.1 The Scope of the Work

This project is simulating an entire software developing process. All the documentations, along with the program are going to be submitted before December 6, 2017. Deliverables include Project Approval Doc, Problem Statement, Development Plan, Requirement Document, Proof of Concept Demonstration, Test Plan, Design & Document, Revision 0 Demonstration, Final Demonstration, Peer Evaluation, and Final Documentation.

3.2 The Scope of the Product

The product is a simple tower defense game. The game allows players to construct towers on the map, to defend the enemies who are supposed to attack through a pre-determined route. The product is implemented in Java. It has all the basic features which other existing tower defense games already have, including elimination rewards and upgradable towers. The graphic is easily understood by the users.

3.3 Functional Requirements

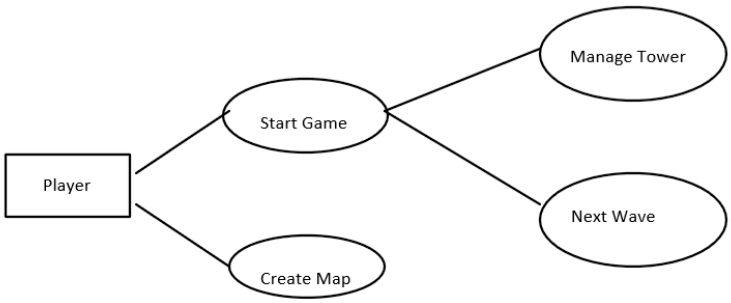

Figure 1: Context Diagram

Requirement: FR01
Description: The game will have an unambiguous main menu to guide the player
Rationale: Only one picture and one button for start the game
Originator: Junni Pan – Developer
Fit Criterion: Over 70% of the players know exactly the meaning of each button and operation
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

Requirement: FR02
Description: Four types of towers and six types of enemies have their distinct models
Rationale: Particular models can show the strength and ability of the towers and enemies
Originator: Junni Pan – Developer
Fit Criterion: Over 50% of the players can clearly understand the basic properties of towers and enemies
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

Requirement: FR03
Description: The trajectory(4 types) and tower upgrade(3 levels) shall have graphic effects
Rationale: The player need some visual feedback from the game
Originator: Junni Pan – Developer
Fit Criterion: The player can understand the game process by visual feedback
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

Requirement: FR04
Description: Game application panel contains 4 tower buttons, 1 clear button, a speed drag bar, a strategy dropdown menu, a startwave button, a main menu button and a pause button.
Rationale: The play can operate the game in one panel, and all the functions are clearly labelled.
Originator: Alan Yin – Team Leader
Fit Criterion: Over 80% of the players can find the operation buttons in their first gameplay.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None

History: Created October 5, 2017

Requirement: FR05

Description: Game switch to new stage after completing 10 waves of enemies.
Rationale: Switching stages gives the game more fun, in case player is bored by playing on just one map.
Originator: Alan Yin – Team Leader
Fit Criterion: Stages can be automatically switched without any operation from the player.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None

History: Created October 5, 2017

4 Nonfunctional Requirements

4.1 Look and Feel Requirements

Requirement: UFR01
Description: The game has a start menu with four buttons, the game window has a 50*30 map, 8 buttons for operations and a drop down menu for selection.
Rationale: The UI is simple and clear, which reduces the learning difficulty for users.
Originator: Alan Yin – Team Leader
Fit Criterion: No negative feedback received on user interface.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

4.2 Usability and Humanity Requirements

Requirement: UFR02
Description: The game uses symbols, icons and plain English for building, selling and upgrading tower.
Rationale: English is the most internationally used language.
Originator: Alan Yin – Team Leader
Fit Criterion: No negative feedback received because of language or wording confusions.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: Medium **Conflicts:** None
History: Created October 5, 2017

Requirement: UFR03
Description: The game should be feasible to run on any platform (Windows OS, Mac OS or Linux) that supports Java.
Rationale: More users can be benefited by the software if it is made to be cross-platform.
Originator: Alan Yin – Team Leader
Fit Criterion: The game supports execution on Windows, Linux and MacOS.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

4.3 Performance Requirements

Requirement: UFR04
Description: The game will not crash after running all the 10 rounds.
Rationale: The program is supposed to run smoothly without any unexpected crashes.
Originator: Huajie Zhu – Tester
Fit Criterion: The program passes all the test cases before publication.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

4.4 Operational and Environmental Requirements

Requirement: UFR05
Description: The game could be distributed as a jar file
Rationale: Jar file can run on any device that supports Java Virtual Machine.
Originator: Huajie Zhu – Tester
Fit Criterion: The game can run on different platforms without compatibility issue.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: Medium **Conflicts:** None
History: Created October 5, 2017

4.5 Installability Requirements

Requirement: UFR06

Description: The game size is compact and has executable jar file not exceed 30 MB.

Rationale: A compact size can facilitate the users by reducing their download and installation time.

Originator: Huajie Zhu – Tester

Fit Criterion: The final file size does not exceed 30 MB.

Customer Satisfaction: 5 **Customer Dissatisfaction:** 5

Priority: Medium **Conflicts:** None

History: Created October 5, 2017

4.6 Maintainability and Support Requirements

Requirement: UFR07
Description: Create API documentation by using Javadoc for easy maintainability.
Rationale: Providing proper documentations on the program for future maintenance and development.
Originator: Huajie Zhu – Tester
Fit Criterion: The documentations are readable and easily understandable by any developer with Java knowledge.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: Medium **Conflicts:** None
History: Created October 5, 2017

4.7 Security Requirements

Not applicable for this project.

4.8 Cultural and Political Requirements

Not applicable for this project.

4.9 Legal Requirements

UFR08
Description: Use open source tool to develop the program.
Rationale: Using correct licensing and citation to avoid potential legal issues.
Originator: Alan Yin – Team Leader
Fit Criterion: Both the original project and tools used are open source.
Customer Satisfaction: 5 **Customer Dissatisfaction:** 5
Priority: High **Conflicts:** None
History: Created October 5, 2017

5 Project Issues

5.1 Open Issues

The implementation of Slick2D is hard to collaborate with current project due to limit of knowledge. The project team is trying hard to make these two parts work together, in order to modify the game using Slick2D. This is currently the major problem.

5.2 Off-the-Shelf Solutions

If the Slick2D is too difficult to implement, the game could be modified by Java Swing interface or any applicable alternatives. But it is the goal for the development team to make use of Slick2D if possible.

5.3 New Problems

Currently, there is no further problems.

5.4 Tasks

Tasks	Estimated Time of Completion
Modified Tower and Enemies	Oct 15, 2017
Modified Trajectory and Tower Upgrade	Oct 22, 2017
Design & Implement UI	Oct 29, 2017
Test & Debug	Nov 13, 2017
Product Release & Final Demonstration	Nov 27, 2017

Table 2: Tasks

5.5 Risks

The project may not complete by the estimated time because of the lacking knowledge on Slick2D. Also, the map creator may cause program malfunction if the players create maps with extreme cases.