Physics-Based Chipmunk2D Game

Software Requirements Specification

Based on the Volere Template

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Contents

List of Tables

Revision History

Date	Version	Notes
October 7, 2015	1.0	Created document
October 7, 2015	1.1	Major edits in progress

1 Project Drivers

1.1 The Purpose of the Project

The purpose of this project is to produce a game that will be used as a demonstration for students in a third year software engineering game design course at McMaster University. The game will incorporate the Chipmunk2D physics library and highlight its capabilities.

1.2 The Stakeholders

1.2.1 The Client

The client for this project is Dr. Spencer Smith of the Computing and Software department at McMaster University.

1.2.2 The Customer

The customer for this project are students who will take the game design course in the future.

1.2.3 Other Stakeholders

Other stakeholders include future instructors of the game design course and other related courses.

2 Project Description

2.1 Game Overview

The game will follow along those lines allowing the user to play as his or her own character through multiple levels where the user levels up the more and better he plays. The user will be able to use multiple weapons to combat a variety of enemies. Experience is accumulated by defeating enemies and is used to progress the hero. As the users character progresses through the game it will become more difficult to level up as enemy difficulty is substantially increased.

The game consists of the game world, within which the hero and interact with enemies.

2.1.1 Game World

The maps, otherwise known as levels, provide an interactive way for the user to progress deeper into the game. Some maps have a beginning and end, like a 2-D Mario level, whereas certain levels are constant in their placement, however have more enemies.

The game world consists of a virtual environment in which the gameplay takes place. This environment is made up of platforms which control where the hero and enemies are permitted to, as well as blockades which limit the possible movements of the hero throughout the game. The maps have environmental hazards and objects which the user is able to interact with. Some objects, such as power ups, give the user temporary boosts while other map elements such as spikes and fire can cause damage to the user. Besides these two the user is also responsible for navigating around blockades placed on the level. This provides a challenge for the user as he navigates through the level.

2.1.2 The Hero

The hero is the protagonist of the game, and is controlled by the user. The hero is able to move left or right and to jump in order to progress through the game. The hero can interact with several objects in the game, such as enemies, blockades, and hazards. When the hero comes into contact with an object an event is triggered. Depending on the type of object, events include:

1. If the object is an enemy the hero will lose health and be knocked back from the enemy.

2. If the object in a blockade the hero will be stopped and unable to pass.

3. If the object is an environmental hazard the hero will lose health and may be knock back depending on the type of hazard. Spikes, for example, will cause a knock-back effect, whereas fire would not.

4. If the object is an item the hero will gain some bonus or ability.

2.1.3 The Enemies

When an enemy is encountered during the game, combat may ensue if the user wishes to attack the enemy. The use may also attempt to avoid the

Table 1: List of terminology

Term	Definition
Boss	Important enemy with increased stats
Bounds	The boundaries inside which game play occurs
Character	A
Enemy	Hostile NPC; normally attacks hero
Hero	The main character of the game controlled by the user
NPC	Non-playable character; may be friendly or hostile

enemy altogether. Users can employ multiple different weapons to attack enemies. Enemies in their own capacity are capable of engaging in contact with the players. The enemies may use weapon or just come in contact with the player to instantiate damage. If the enemy weapons or the enemy itself come in contact with the user then the player loses health relative to the type of enemy it is. Different enemies deal different levels of damage. The stronger enemies may deal more damage, however are slower, whereas the weaker ones attack at a higher frequency but with less damage. The goal of the enemies is to completely make the users health reach zero.

Maps:

2.2 Mandated Constraints

The project is subject to the following mandated constraints:

1. The game must make significant use of the Chipmunk2D physics library.
2. The game must support all major PC operating systems.
3. Project milestones must be completed by the dates given in the CS 4ZP6 syllabus.
4. The project must be fully completed by April 1, 2015.

2.3 Naming Conventions and Terminology

The terminology used in this project is given in Table 1.

3 Functional Requirements

3.1 The Scope of the Work

Use Case #: 1

Name:	Exit Game
Trigger:	The user selects exit game
Precondition:	The main menu is open
Postcondition:	The application is terminated
Actor:	User

Use Case #: 2

Name:	New Game
Trigger:	The user selects to start a new game
Precondition:	The main menu is open
Postcondition:	A new game commences
Actor:	User

Use Case #: 3

Name:	Load Game
Trigger:	The user selects to load a game
Precondition:	The main menu or in-game menu is open
Postcondition:	A saved game state is loaded and the game commences from that point
Actor:	User

Use Case #: 4

Name:	Save Game
Trigger:	The user selects to save a game
Precondition:	The in-game menu is open
Postcondition:	A saved game state is created
Actor:	User

Use Case #: 5

Name:	Move Hero
Trigger:	Inputs related to controlling the hero
Precondition:	The in-game menu is open
Postcondition:	A saved game state is created
Actor:	User

Use Case #: 6

Name:	Combat
Trigger:	Hero comes in contact with enemy
Precondition:	postcond
Postcondition:	A saved game state is created
Actor:	User

Use Case #: 7

Name:	Open In-game Menu
Trigger:	The user
Precondition:	The user is currently in game
Postcondition:	The in-game menu is opened
Actor:	User

Use Case #: 8

Name:	Open Hero Menu
Trigger:	The
Precondition:	The user is currently in game
Postcondition:	The in-game menu is opened
Actor:	User

3.2 The Scope of the Product

3.3 Functional Requirements

Requirement #: 1 **Requirement Type:** 3.3 **Use Case:** 1

Description:	The user shall have the ability to load a saved game state
Rationale:	The user must be able to save his or her progress
Fit Criterion:	User is able to successfully load game

Cust. Satisfaction:	1	**Cust. Dissatisfaction:**	5
Priority:	High	**Conflicts:**	None

Supporting Materials:	None
History:	Created October 7, 2015

Requirement #: 2 **Requirement Type:** 3.3 **Use Case:** 1

Description:	The hero shall remain in bounds
Rationale:	The hero must remain in the intended boundaries of play for the game to function properly
Fit Criterion:	Hero is unable to pass through walls and other obstacles

Cust. Satisfaction:	5	**Cust. Dissatisfaction:**	5
Priority:	High	**Conflicts:**	None

Supporting Materials: None
History: Created October 7, 2015

4 Non-functional Requirements

4.1 Look and Feel Requirements

4.2 Usability and Humanity Requirements

Requirement #: 3 **Requirement Type:** 4.2 **Use Case:** 1

Description: The game shall be entertaining
Rationale: A game that is not fun is a failure
Fit Criterion: The game should be ranked at least 7/10 for entertainment based on a usability study

Cust. Satisfaction:	2	**Cust. Dissatisfaction:**	5
Priority:	High	**Conflicts:**	None

Supporting Materials: None
History: Created October 7, 2015

4.3 Performance Requirements

Requirement #: 4 **Requirement Type:** 4.3 **Use Case:** 1

Description: The game shall maintain a framerate of at least 30 fps
Rationale: A framerate of 30 fps or greater will ensure smooth animation
Fit Criterion: The game shall

Cust. Satisfaction:	2	**Cust. Dissatisfaction:**	5
Priority:	High	**Conflicts:**	None

Supporting Materials: None
History: Created October 7, 2015

4.4 Operational and Environmental Requirements

4.5 Maintainability and Support Requirements

Requirement #: 5 **Requirement Type:** 4.5 **Use Case:** 1

Description: The game shall support Windows, Linux, and OS X operating systems
Rationale: Students use a variety of operating systems
Fit Criterion: Check that game compiles and runs on each operating system

Cust. Satisfaction:	3	**Cust. Dissatisfaction:**	3
Priority:	High	**Conflicts:**	None

Supporting Materials: None
History: Created October 7, 2015

4.6 Security Requirements

There are no security requirements related to this project.

4.7 Cultural Requirements

Requirement #: 6 **Requirement Type:** 4.7 **Use Case:** N/A

Description:	The game shall use the English language		
Rationale:	Students at McMaster University are expected to speak English		
Fit Criterion:	The game will use proper English free of spelling and grammar errors		
Cust. Satisfaction:	1	**Cust. Dissatisfaction:**	3
Priority:	Medium	**Conflicts:**	None
Supporting Materials:	None		
History:	Created October 7, 2015		

4.8 Legal Requirements

There are no legal requirements related to this project.

5 Project Issues

5.1 Open Issues

There are no open issues at this time. This section will be updated as required.

5.2 Off-the-Shelf Solutions

There are no off-the-shelf solutions.

5.3 New Problems

No new problems are expected to arise as a result of this project.

5.4 Tasks

5.5 Migration to the New Product

There is no product being replaced, and thus no migration is required.

5.6 Risks

There are no risks associated with this project.

5.7 Costs

There are no costs associated with this project.

5.8 User Documentation and Training

User documentation will be created with . Training will be provided via built-in tutorials throughout the game.

5.9 Waiting Room

At this point in the project timeline, there are no backlogged requirements. This section will be updated as required.

5.10 Ideas for Solutions

There are no ideas for solutions at this time. This section will be updated as required.