

Brooklyn College Spring 2017
Software Design & Implementation 2
Group 1 Class Project

“College Invaders” Specification

2nd Edition

Group Roster

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CISC 3140 Spring 2017 College Invaders Project SRS

Group 1

Specifications As Of: March 13th 2017

1. Introduction

1.1 Purpose

- The purpose of this SRS is to provide a comprehensive and exhaustive description of the software being developed by Group 1 of CISC 3140-ET6, laying out both the functional and the non-functional (dependent) requirements.
- This SRS is intended to be a guideline for the entire group while developing the project for what to expect the end product to be. This SRS will be use by each team in the following ways
 - Specs will be developing this document and making sure that the entire scope of the project is laid out and a framework is put in place for all other teams to follow.
 - Backbone will use this as a guide for coding the game, developing classes based on the requirements laid out here.
 - Graphics will use this as a checklist for creating the visual and audio assets necessary for the game.
 - QA will be able to test the software against this SRS, making sure that development of the game is going according to plan, and also to identify conflicts in design vs. implementation of features, so that they can be resolved.

1.2 Scope

- The software being produced is “College Invaders”, A Space Invaders style game with a Brooklyn College “students vs. administration” theme.
- The software will be runnable on any reasonably recent computer with Java 7
- The software will allow the user to play our game, attempting to attain high scores, which will be saved to a list with initials, arcade-style, and will be viewable via an in game scoreboard.
- The software will not require any network connectivity, running locally on the user’s machine.

1.3 References

- Documents and other material referenced in the creation of this SRS:
 - IEEE Std 830-1998 - IEEE Recommended Practice for Software Requirements Specifications. Approved 25 June 1998 IEEE-SA Standards Board. Available at <https://standards.ieee.org/findstds/standard/830-1998.html>
 - Example of classic space invaders gameplay in flash, published by phatcatmedia.net. Available at <http://www.pacxon4u.com/space-invaders/>
 - Wikipedia article on Space Invaders, originally published June, 2004 by Wikipedia. Available at https://en.wikipedia.org/wiki/Space_Invaders
 - Java Language Specification, Java SE 7 Edition, final release published by Oracle Corporation July 2011. Available at <http://docs.oracle.com/javase/specs/index.html>

1.4 Overview

- The remaining two sections of this SRS Cover the overall description and the specific technical requirements of the software.
- Section 2 broadly encompasses all the details of this software's interface with the user, as well as other software and hardware systems. A summary of features and functionality is included, as well as a profile of the typical user. Finally, project constraints and hardware/software dependencies are addressed.
- Section 3 explains the technical specification of the software. This section lists all requirements for the software's inputs and outputs to a level of detail sufficient for developers to write code needed to execute these specifications, and for testers to verify their correct functionality. This section is exhaustive and explicit so that developers, designers, and users may be able to perceive the requirements unambiguously

2. Overall description

2.1 Product perspective

2.1.1 System interfaces

- *list all system interfaces (how software will be able to function on system)

2.1.2 User interfaces

- * characteristics of each interface between software and user
- *how the system(game) will appear to the user (what the user should and shouldn't see, or be able to do)

2.1.3 Hardware interfaces

- As a stand alone, self contained game, this software has minimal hardware interface requirements. The software must receive input from a keyboard and/or mouse, must output graphics to a monitor, and must read and write to/from a disk.

2.1.4 Software interfaces

- *Add all required software/applications to run or interface with game
- Java Standard Edition Runtime Environment 7
 - (JRE) 7
 - JSR-000901 Java Language Specification
 - Version 7
 - <https://docs.oracle.com/javase/specs/>

2.1.5 Communications interfaces

- This software is intended to function entirely on a local machine and therefore does not require any network connectivity.

2.1.6 Memory

- Considering the scope of this software project, and the only saved data being a text list of high scores, the memory requirements for this software can be considered negligible.

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2.2 Product functions

- To re-create the classic game of Space Invaders, with as college student vs. administration theme
- Show the user via in game menu options the object of the game, and how to play
- Allow the user to adjust the volume via in game menu options
- To allow the user to start new games, pause and unpause during gameplay, set high scores along with their name, saved to a file that can be viewed on an in-game scoreboard.
- To allow the user to reset the score list via in game options

2.3 User characteristics

- This game is intended for users who possess rudimentary computer and/or video game knowledge and and ability to make use of computer input and output devices.

2.4 Constraints

- All code for the game must be written in Java
- Should run “smoothly” on any machine capable of installing and running Java 7 JVM.
- Should not consume unnecessary memory (hard drive, RAM).
- Must be able to read and write to a file for recording and retrieval of high scores

2.5 Assumptions and dependencies

- It is assumed that the end user will have access to a computer running at least Java 7 JVM, with a mouse and keyboard for input and a monitor. Additionally the user should have permissions sufficient to save a text file of high scores so they can be maintained across different game sessions.

3. Specific requirements

3.1 External interface requirements

3.1.1 User interfaces

3.1.1.1 Main Menu

- start game
- view high scores
- options
 - instructions
 - controls
 - sound
 - screen size/resolution
 - high score reset
- quit

3.1.1.2 Pause Menu

- continue game
- options(same as above)

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- quit to main menu
- 3.1.1.3 Scoreboard
 - number of scores to track
 - length of strings for high score names
- 3.1.1.4 Game Screen (active gameplay)
 - element layout
 - lives
 - score
 - enemies
 - special(UFO, boss) enemies
 - barriers
 - player
- 3.1.1.5 Game over screen
 - name entry for high score(if score is high enough)
 - new game
 - view high scores
 - quit to main menu
- 3.1.2 Hardware interfaces
 - 3.1.2.1 Keyboard input
 - Input should be based on US QWERTY standard keyboard.
 - 3.1.2.2 Mouse input
 - Menus may include input via mouse for ease of use.
- 3.1.3 Software interfaces
 - Code should be completed using Standard Java Libraries for which there exists an API. Currently there are no constraints on software components, or data sharing. Simply follow standard Java programming practices.
- 3.1.4 Communications interfaces
 - Java JVM

3.2 System Features

3.2.1 Feature - Gameplay Mechanics

- ◆ This mode is simply the actual game.
- ◆ Bots/A.I the bots that players will shoot at using the keyboard.

3.2.1.1 Controls

- In menu
 - keyboard selection (up, down, left, right, confirm)
 - mouse selection
- In game
 - move left
 - move right
 - shoot
 - pause

3.2.1.2 Player

- player movement
- player projectile type/movement
- player health/lives
- player score

3.2.1.3 Barriers

- barrier number
- barrier health
- barrier regeneration?

3.2.1.4 Enemies

- enemy types/number per type (rows & columns)
- enemy movement style
- enemy movement speed changes
- enemy projectile type/movement/speed
- enemy health
- enemy worth(points)
- special enemies(UFO, boss)

3.2.1.5 Score

- point notification upon kill
- continually updated current score
- high score notification?
- Extra life per certain number of points?

3.2.2 Feature – Graphics

- ◆ Based on what was provided by Professor Gross.
- ◆ Bosses which include CUNY staff, and others provided by Professor Gross.
- ◆ Weapons: Pens,Pencils etc... Provided by Professor Gross.
- ◆ (Possibly final Boss President Donald J Trump).
- ◆ Note: Most of these requirements were provided in class via Professor Gross, refer to him for more information.

3.2.2.1 Background image/animation

- main menu
- scoreboard
- gameplay screen
- game over screen

3.2.2.2 Fonts

- uniform or per mode?

3.2.2.3 Menus

- buttons
- sliders

3.2.2.4 Player sprites

- idle appearance
- movement left/right
- death
- projectile(s)

3.2.2.5 Barrier sprites

- default appearance
- hit/decay
- destruction

3.2.2.6 Enemy sprites (per enemy type)

- idle appearance
- movement left/right/down
- death(bloody)
- projectile(s)

3.2.2.7 Special(UFO, boss) enemy sprites

- idle appearance
- movement left/right
- death(most bloody)
- projectile(s)?

3.2.2.8 Score

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- number sprites (upon enemy kill)

3.2.3 Feature – Sound

3.2.3.1 Background music

- main menu
- high score list
- pause menu
- gameplay
- game over screen

3.2.3.2 Menus

- menu open/close effects
- selection/click/confirmation effects

3.2.3.3 Gameplay

- Player
 - movement left/right effect?
 - projectile firing effect
 - death effect
 - game over effect
- Barrier
 - projectile striking effect
 - destruction effect
- Enemies(per enemy type)
 - movement left/right/down effect (speed adjusted)
 - projectile firing effect
 - death effect
- Special(UFO, boss) enemies
 - appearance/movement effect
 - projectile firing effect?
 - destruction effect
- Score
 - new high score achieved

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3.3 Performance requirements

- 3.3.1 Should run “smoothly” on any machine capable of installing and running Java 7 JVM.
- 3.3.2 Should not consume unnecessary memory(hard drive, RAM).

3.4 Design constraints

- 3.4.1 Game should be designed using standard programming practices. Java Standards may be read here: <https://google.github.io/styleguide/javaguide.html>.
- 3.4.2 Hardware is limited to computers that are able to completely run Java 7’s JVM. Display or Resolution should be full screen to avoid issues with lower and higher end resolutions.

3.5 Software system attributes

- 3.5.1 All code should be done on a machine currently running Java 7 JVM or better.

3.6 *Other requirements

4. *Index

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*Starred and/or highlighted text indicates areas substantially (or completely) lacking content