# **Requirements Specification Document**

# **Interrobang**

# **Interactive Puzzle Game**

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# 5.1 Introduction

Interrobang will be a fun, interactive puzzle game designed to improve spatial awareness and critical thinking. In order to create such a game, several resources are required in order to design, model, develop, play test, and build this game. Most of these requirements will be satisfied using a game development environment called Unity paired with a code-writing environment known as Visual Studio. All other requirements will largely be centered around team communications and version control software.

# 5.1.1 Outline

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5.1.1 Outline

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# 5.2 CSCI Component Breakdown

Interrobang is composed of the following Computer System Configurations:

5.2.1 Game Execution CSC -- Many parts to the program-execution pipeline

5.2.1.1 Graphics Rendering CSU -- In game graphics rendering pipeline

5.2.1.1.1 DirectX 11 Rendering module -- Graphics will be handled on DirectX 11 platform

5.2.1.2 Input Handling CSU -- Input handling process

5.2.1.2.1 Windows Mouse and Key Input Drivers -- Reports mouse and key input

5.2.1.2.2 Player Controller Script -- Handles mouse and key input

5.2.1.3 Audio Handling CSU -- Audio manipulation process

5.2.1.3.1 Windows audio decoder libraries -- Decodes audio files

5.2.1.3.2 Game Manager Script -- Handles the timing of audio decoding and playback

5.2.1.4 Asset Manipulation CSU -- Handles storage and delivery of Assets

5.2.1.4.1 Windows File System -- Stores Assets on Client’s machine

5.2.1.4.1 Unity Game Backend -- Retrieves Assets from File System

5.2.1.5 Game State Management CSU -- Keeps track of current game state

5.2.1.5.1 Game Manager Script -- Stores game state and executes game events

# 5.3 Functional Requirements

Interrobang should function as any other game would be expected to function. The game should initialize when the client starts the game. The game will assume its initial state and stay in that state until the correct inputs are given by the user, then it will carry on to the next state based on the given conditions, and will continue to do so repeatedly. Given a specific state, the game will render a specific set of images to the screen including: 3D objects and 2D Graphical User Interfaces. The game will also output audio based on a specific state as well. When the user wishes to terminate the game, a specific set of inputs must be given and the game will terminate properly. The game will also have safeguards in place for unintended failures such as power-loss, improper termination, and code errors. When the game is restarted, it should load the last known state based on the state saved by the game previously.

5.3.1 The graphics rendering pipeline shall represent the current game state to the user.

5.3.2 The input handling pipeline shall interpret inputs given by the user for the game.

5.3.3 The audio management system shall represent the current game state to the user.

5.3.4 The asset manipulation system shall manage assets for the game.

5.3.5.1 The game management software shall control the state of the game.

5.3.5.2 The game management software shall trigger asset utilization.

5.3.5.3 The game management software shall trigger audio playback.

5.3.6 The Unity Game Backend should manage unintended failures.

5.3.7 The game management software should load the game state from the previously saved state of the game.

5.3.8 The game shall allow the player to use the camera to view optical illusions in order to solve puzzles.

5.3.9 The game shall allow the player to utilize the “gravity” of the level by being able to walk/run/jump on the ceiling or the ground at certain times

5.3.10 The opening screen shall display the “How To” button which describes the controls and instructions of the game.

5.3.11 The opening screen shall display the “Play” button which allows the player to run and play the game.

5.3.12 The opening screen shall initially show the player staring down a dimly lit hallway.

5.3.13 The game shall allow the player to walk around the level.

5.3.14 The game shall allow the player to run around the level.

5.3.15 The game shall allow the player to jump around the level.

5.3.16 The game shall allow the player to interact with various objects in order to progress through the level.

5.3.17 The game shall allow the player to interact with various objects in order to progress through the level

5.3.17.1 The game shall allow the player to press a button to open a door.

5.3.18 The game shall allow the player to traverse through the looping levels.

5.3.19 The game shall allow the player to lose the level by running into spikes.

5.3.20 The game shall allow the player to spawn back at the start of the level after losing a level.

5.3.21 The game shall not allow the player to clip through the outer walls of the level.

5.3.21.1 The game shall not allow the player to clip through the exit of the level as an easy way of winning.

5.3.22 The game shall make sure that the player shall be able to collide/interact with the walls of the level.

5.3.22.1 The game shall not allow the player to clip through the platforms of the level.

5.3.23 The game shall make sure that the player’s point of view follows the mouse movement/location

5.3.24 The game shall not allow the player to “slide” around the level

5.3.24.1 The game shall allow the player to walk/run/jump around each level properly

5.3.25 The game shall allow the player to move around the world using the directional keys (WASD).

5.3.26 The game shall allow the player to run using the ‘Shift’ key.

5.3.27 The game shall start with showing the player an intro start screen

5.3.28 The game shall give the player the option to start the game via keyboard press (Enter Key).

5.3.29 The game shall render a 3D image to be rotated around to offer a background to the intro start screen while it waits for input from the player

5.3.30 The game shall fade the intro screen out and replace it with the image of the main game to be played by the player.

5.3.31 The game shall render lighting correctly so that the player can accurately see the screen and the level around them.

5.3.32 The game shall allow the player to slow there movement in the air by holding the back movement key (S key).

5.3.33 The game shall allow strafing in a slower manner than moving forward to back (Movement given from key presses A and D shall move the player more slowly than key presses W and S).

5.3.34 The game shall start the player on a standable ground so as to allow the player to move correctly instead of falling endlessly.

5.3.35 The game shall indicate a clear direction of movement to the player to indicate in which direction they should move initially.

5.3.36 The game shall allow the player to press a key to pause the game (Escape Key).

5.3.37 The game shall allow the player to navigate a menu from the pause screen.

5.3.38 The game shall allow the player to quit the game from the pause menu.

5.3.39 The game shall allow the player to access a settings menu from the pause menu.

5.3.40 The game shall allow the player to navigate a menu from the settings menu.

5.3.41 The game shall allow the player to change mouse sensitivity from the settings menu.

5.3.42 The game shall allow the player to change key bindings for movement of the player.

5.3.43 The game shall allow the player to change the volume of sound effects in the settings menu.

5.3.44 The game shall allow the player to change the volume of music

# 5.4 Performance Requirements

Interrobang should also perform like most other games would be expected to. Given a recommended set of hardware and software specifications, the game should perform at a level the the user finds enjoyable to play. Processes like rendering graphics, audio outputs, and key inputs should be handled quickly so that the game feels responsive. Note that all of these performance requirements will be met only if the game is run with the specified hardware and software needed to run it.

5.4.1 The graphics rendering pipeline shall always display the game at 30 frames per second or more.

5.4.2 The input handling pipeline shall interpret inputs given by the user within 1 second given.

5.4.3 The audio management system shall output specific sounds within 1 second of being triggered.

5.4.4 The asset manipulation system shall retrieve assets for the game within 10 seconds.

5.4.5 The game management software shall change game states given the right user inputs within 1 second.

5.4.5 The game management software shall utilize specific assets given the correct state within 1 second.

5.4.5 The game management software shall trigger audio playback given the correct state within 1 second.

5.4.7 The game management software should load the game state from the previously saved state of the game within 1 second.

# 5.5 Project Environment Requirements

## 5.5.1 Development Environment Requirements

Following are the hardware requirements for development of Interrobang:

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| --- | --- |
| Category | Requirement |
| Processor | Intel Core i3, 2.30 GHz or Better |
| Hard Drive Space | 2 Gb |
| RAM | 4 Gb or better |
| Display | 800x600 or better |

The large 2Gb hard drive space requirement is necessary for the storage of all the assets used by the game. The game uses a dynamic graphics rendering system that allows display sizes less than 800x600 to be used as well as irregular screen aspect ratios. It is recommended that the user run the game at the native resolution of their computer or at 800x600 at a minimum to prevent screen distortions. Sound cards are built-in systems into modern motherboards so it is expected that the user will have a functioning sound card already.

Following are the software requirements for developing Interrobang:

|  |  |
| --- | --- |
| Category | Requirement |
| Operating System | Windows 10 |
| Graphics Rendering System | DirectX 11 or Newer |
| Input Handling | Keyboard and Mouse Drivers |
| Audio Playback and Decoding | Audio Drivers |
| 3D Asset Design | Maya Studio |
| Compiler | Microsoft Visual C# |

Computers using a previous version of DirectX will not be able to run Interrobang whatsoever. Newer versions of DirectX should be compatible with older games in most cases. Although the game has not been tested on older operating systems, it should still be compatible with Windows 7 and 8.

## 5.5.2 Execution Environment Requirements

The hardware requirements for executing Interrobang are equivalent to those for developing Interrobang. The same hardware clarifications apply as well.

Following are the software requirements for executing Interrobang:

|  |  |
| --- | --- |
| Category | Requirement |
| Operating System | Windows 10 |
| Graphics Rendering System | DirectX 11 or Newer |
| Input Handling | Keyboard and Mouse Drivers |
| Audio Playback and Decoding | Audio Drivers |

The properties specified above regarding older versions of Windows and DirectX still apply when executing Interrobang.