

# **SALVATION PLAN**

**Final Year Project**

**Session 2016-2020**

A project submitted in partial fulfillment of the degree of

BS in Computer Science



Department of Computer Science

Faculty of Computer Science & Information Technology

The Superior College, Lahore

FALL 2020

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\*The candidates confirm that the work submitted is their own and appropriate credit has been given where reference has been made to work of others

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# Project Report

## [Salvation Plan]

### Change Record

Author(s)	Version	Date	Notes	Supervisor's Signature
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			<Changes Based on Feedback from Supervisor>	
			<Changes Based on Feedback From Faculty>	
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			<Changes Based on Feedback from Supervisor>	

# APPROVAL

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## **Dedication**

*We dedicate our work to our loving parents, siblings and friends, who kept our moral high to accomplish this task*

## **Acknowledgements**

Countless thanks to Allah Almighty for accrediting us to accomplish this task and all respect and regards to Holy Prophet Hazrat Muhammad (Peace Be Upon Him) who is forever a torch of guidance and knowledge for humanity.

We are deeply obliged in paying our sincerest gratitude to our supervisor Sir Asadullah Tariq, under whose supervision we completed our design and development work. He has supported us throughout our research work with his patience, support and helpful guidance for improving our work.

Last but not the least we would like to express our gratitude to loving parents, siblings and friends. Our fortune is due to their prayers

## **Executive Summary**

A story mode is introduced in the game. The character is an agent sent to infiltrate a city which is under control of Aliens and they've set-up a machine which is absorbing Earth's life force if nothing is done the Earth will be destroyed. He will search for the Safe house. Once he reaches the Safe House he will find supplies and food to regain his health, ammunition for killing the enemies and surviving, and a map to locate the device and enemies. He will then fight his way through different Aliens and mutated creatures to get to the life-absorbing machine and plant the bomb on it. After planting the bomb he has to get out of the city to a safe location out of the range of bomb blast and then detonate the bomb.

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# Chapter 1

## Introduction

# Chapter 1: Introduction

It is a first-person offline single player shooter game. In terms of gameplay there will be one playable character and resources, weapons and shelter will be available in further gameplay. The character is an agent sent to infiltrate a city which is under controlled of Aliens and they've set up a Machine which is absorbing Earth's life force. The goal of our player is to fight through those Aliens and reach that machine and plant a bomb on it, destroy it, and save the Earth.

## 1.1. Background

Nowadays, it's such a dry market if we talk about good games. Games are not perfect, some have good graphics and some have good storyline. We need both at the same time. There's a lack of good quality game which is up to the mark in every aspect.

So in order to solve this problem we are creating a game which will provide rich graphics and to match that we are creating an addictive and creative storyline. So by the end of mixing these two together, you will have a top notch game which will be loved by everyone.

## 1.2. Motivations and Challenges

Our motivation for selecting this particular project is that we love playing games, since childhood and now we want to design one ourselves. So we came up with an interesting and unique storyline and started working on it.

There will be a lot of challenges in this project.

- Character Designing
- Map Designing
- Animation Effects
- Sound Effects
- User Interface
- Cinematic

### 1.3. Goals and Objectives

Salvation Plan is a first-person shooter offline single player game aimed at providing a fun and entertaining player experience to gamers all around the world. The game will initially release for Windows 64-bit on Steam.

The main objective of the game is to help people from all around the world improve some of their skills that will aid them in real life such as survival, better decision-making, improved observation and faster reaction time through our game. The game will also be the foundation of PC game development in Pakistan as most (if not all) of the game development studios in the country are limited to mobile game development only.

Game will comprise of

- First Person Perspective
- Guns and Ammunition
- Different Terrains and Locations
- Aliens and Wild creatures as Enemies/Target
- Different Difficulty Levels
- Health Bar
- Character Animation
- Sound Effects

### 1.4. Literature Review/Existing Solutions

Salvation Plan itself is a new and unique idea and is not a follow-on member of any game. There are many other games regarding Aliens with different storylines, but this game is different with a unique storyline that has never been introduced in any games.

### 1.5. Gap Analysis

Nowadays, it's such a dry market if we talk about good games. Games are not perfect, some have good graphics and some have good storyline. We need both at the same time. There's a lack of good quality game which is up to the mark in every aspect.

## 1.6. Proposed Solution

We are creating a game which will provide rich graphics and to match that we are creating an addictive and creative storyline. So by the end of mixing these two together, you will have a top notch game which will be loved by everyone.

## 1.7. Project Plan

The Project Plan is described below in Gantt Chart, WBS and RRM.

### 1.7.1. Work Breakdown Structure

Work Breakdown Structure Table					
<i>Provide basic information about the project including: Project Title – The proper name used to identify this project; Project Reference / ID - The unique reference or ID for the project; Project Manager - the person with responsibility for the successful delivery of the project to time cost and quality. Project Sponsor - the person ultimately accountable for the success of the project. Prepared by – The person(s) preparing this document; Date/Control Number – The date the plan is finalized and the change or configuration item control number assigned.</i>					
Project Title:	Salvation Plan	Project Reference / ID:			
Project Manager:	Zaman Aziz	Project Sponsor:	AsadUllah Tariq		
Prepared by:	Ebad Khan	Date / Control Number:			
<a href="#">For more tips on completing this template see WBS Excel template</a>					
Element Number	WBS Elements Activity, Task, or Sub-Task Name	Definition of Activity or Task (Description)	Responsible Person or Group	Estimated (E) or Actual (A) Cost (Cross reference to budget)	Project Phase (Cross reference to schedule)
<i>The unique reference ID for the activity or task.</i>	<i>Enter the name or title of the Task, Sub-task, Activity or Deliverable.</i>	<i>Provide a brief description of this Activity, Task or Sub-Task.</i>	<i>Enter the person or group who are responsible</i>	<i>Enter the estimate or actual cost of the activity or task or add a cross reference to the budget.</i>	<i>Provide the name or number of the Project phase that this activity falls into.</i>
1	Introduction	Brief introduction of the overall Project.	Ebad Khan		Phase 1
2	Background	Problem&Solution	Ebad Khan		Phase 1
3	Gantt Chart	Project Plan in GanttChart	Ebad Khan		Phase 1
4	Roles & Responsibility Matrix	1st Iteration's RRM	Aqil Mughal		Phase 1
5	WorkBreakdown Structure	1st Iteration's WBS	Aqil Mughal		Phase 1

Figure 1 - Work Breakdown Structure

### 1.7.2. Roles & Responsibility Matrix

## RACI Matrix

[Salvation Plan]

### Roles and Responsibilities

Responsible, Accountable, Consulted, Informed

Deliverable or Task	Status	Sponsor / Leadership					Project Team				Other Resources					
		Sponsor	Name or Role	Name or Role	Name or Role	Name or Role	Zaman Aziz	Technical Lead	Ebad Khan	Aqil Mughal	Name or Role	Consultant	AsadUllah Tariq	Name or Role	Name or Role	Name or Role
<b>Phase 1</b>																
Iteration 1							C		R	D					C	
Deliverable/Task 2																
<b>Phase 2</b>																
Deliverable/Task 1																
Deliverable/Task 2																
<b>Phase 3</b>																
Deliverable/Task 1																
Deliverable/Task 2																
<b>Phase 4</b>																
Deliverable/Task 1																
Deliverable/Task 2																

Figure 2 - RACI Matrix

### 1.7.3. Gantt Chart

[Salvation Plan] Project Schedule

Gantt Chart Template © 2006-2018 by Vertex42.com.

[Group 10]

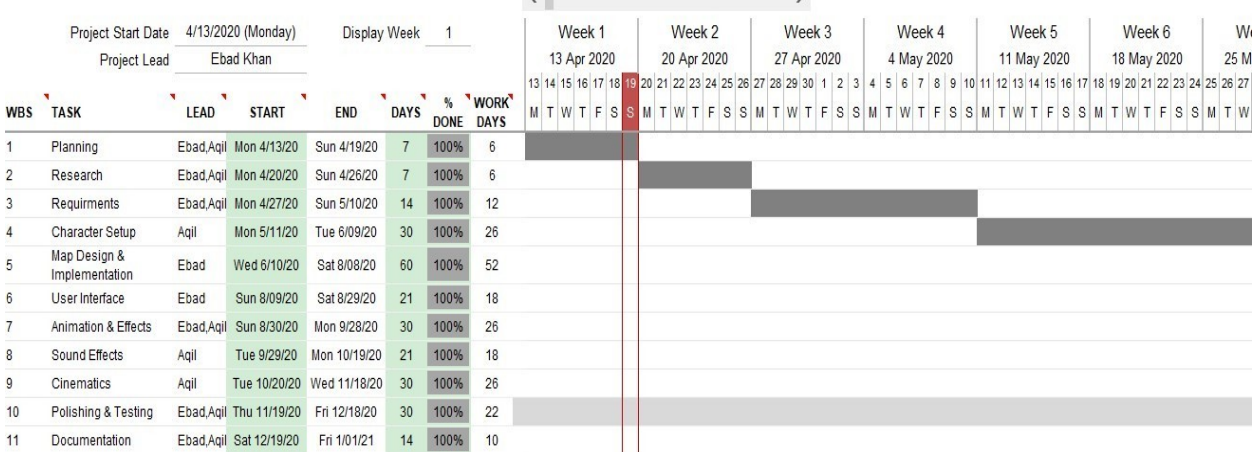


Figure 3 - Gantt Chart

# Chapter 2

## Software Requirement Specifications

### **Chapter 2: Software Requirement Specifications**

## 2.1. Introduction

### 2.1.1. Purpose

This documentation provides the Software Requirement Specifications for the 3D video game, “**Salvation Plan**”. It is a first-person shooter offline single player game.

All aspects of the game, including the game’s internal working, user interfaces, operating environment, features and requirements are covered in this document.

### 2.1.2. Document Conventions

Following conventions are used for the documentation:

- **Font Style:** Calibri
- **Paragraph Font Size:** 12
- **Sub-sections Headings Font Size:** 14
- **Sections heading Font Size:** 18
- **Bold Texts:** Used for headings, sub-headings and important keywords

### 2.1.3. Intended Audience and Reading Suggestions

This Software Resource Specification documentation is intended for the developers of this game, testers and any authorized person that may relate to the project in any way during its development life cycle. It cannot be made available to public and end users as it may compromise the security of the product.

Readers are required to read the document in the order it is organized. The order of this document is arranged in a convenient way such that readers do not have to jump back and forth in the document for proper understanding of it.

### 2.1.4. Product Scope

Salvation Plan is a first-person shooter offline single player game aimed at providing a fun and entertaining player experience to gamers all around the world. The game will initially release for Windows 64-bit on Steam, but portable to Android, IOS, Mac OS, PlayStation 4, Xbox One and Nintendo Switch.

The main objective of the game is to help people from all around the world improve some of their skills that will aid them in real life such as survival, better decision- making, improved observation and faster reaction time through our game. The game will also be the foundation of PC game development in Pakistan as most (if not all) of the game development studios in the country are limited to mobile game development only.

### **2.1.5. References**

- Call of Duty.
- PUBG.
- Naruto.
- Alien Shooter.

## **2.2. Overall Description**

### **2.2.1. Product Perspective**

Salvation Plan is a new and unique idea and is not a follow-up member of any game. The game will have a unique combat system using unique abilities of the character. Its development is made possible by the game development tool Unity 3D which has the ability to compile C# scripts and build games for use on the Windows platform.

### **2.2.2. Product Functions**

- Play Game
- Training Mode
- Game Settings
- Pause Menu
- Exit

### **2.2.3. User Classes and Characteristics**

Players of any age and skill level should be easily able to pick the pace up. However, as like in any other game, there is always a natural division between casual and hardcore gamers. These two classes will naturally differentiate themselves through the use of the gameplay mechanics and the structure of the game.

The abilities and characteristics distinguishing hardcore players will include:

- Using of character abilities at right time.
- High APM (Actions per Minute).
- Good teamwork and coordination with weak team members.

## 2.2.4. Operating Environment

Game will only support Windows 64-bit operating system on launch. Support for other operating systems can be added in future if the demand ever arises. Following are the system's hardware specifications required to run the game:

### ❖ Minimum Requirements:

- OS : Windows 7 64-Bit / Windows 8 64-Bit / Windows 8.1 64-Bit / Windows 10 64- Bit
- Processor : Intel(R) Core(TM) i5-750 at 2.67 GHz or equivalent
- Memory : 4.0 GB of RAM
- Graphics : NVidia GeForce GTX 470 at 1GB or ATI Radeon HD 6970 at 1GB
- DirectX : Version 11.0
- Hard Drive : 12.0 GB of free space
- Sound Card : DirectX Compatible

### ❖ Recommended Specifications:

- OS : Windows 7 64-Bit / Windows 8 64-Bit / Windows 8.1 64-Bit / Windows 10 64- Bit
- Processor: Intel(R) Core(TM) i5-3570 at 3.40 GHz or equivalent
- Memory : 8.0 GB of RAM
- Graphics : NVidia GeForce GTX 750 Ti at 2GB / ATI Radeon HD 7870 at 2GB
- DirectX : Version 11.0
- Hard Drive : 12.0 GB of free space
- Sound Card : DirectX Compatible

## 2.2.5. Design and Implementation Constraints

Following are the major constraints that are concerned with the game:

- **Hardware Limitations:**

Salvation Plan is a full-fledged PC game with high quality graphics and visual effects. If the hardware running the game does not meet the specified requirements that are mentioned above in section 2.4 then the game will lag (FPS will be below 60) causing the game to not run smoothly which will eventually lead to cause bottleneck and the game may crash.

- **Steam Specific:**  
Salvation Plan is limited to release on Steam only as it uses steam's distribution service for releasing. Releasing the game on a different platform is possible but will have to render the game according to the standards of the specified platform.

### 2.2.6. User Documentation

Game does not have any external helping content such as a user manual or starter tutorial. There is a “**Help**” option available in the game accessible through main menu, which describes all the basics of game to provide the user with the basic idea of what the game is and how it can be played.

### 2.2.7. Assumptions and Dependencies

Salvation Plan will be initially launched for Windows 64-bit operating system available on Steam (digital game distribution platform). However, Unity will be all responsible for both the development of the game and its integration within the Windows framework. The development of the game includes many built-in component (assets) and plugins which will speed up the process of the development to a great extent.

Game have following dependencies:

- Mid-range Laptop or PC with Graphic Card for development
- Unity Asset Store for downloading high quality assets
- Steam for releasing the game
- Internet for signing up on Steam and downloading the game
- A PC meeting the specified requirements for playing the game

## 2.3. External Interface Requirements

### 2.3.1. User Interfaces

Salvation Plan comprises of the following user interfaces:

- Intro
- Main Menu
- Settings
- About

- Help
- Pause Menu

**Intro:**

The cinematic will be played upon starting the game including the logo of engine in which it is developed i.e. Unity and afterwards the Logo of the game.

**Main Menu:**

This is the first screen that user sees when the game loads up. It provides access to Start Game, Continue Game, Game settings and about option.

**Settings:**

Provides a variety of settings for the game such as graphics, resolution, sound etc. which the user can adjust to improve the frame rate at which the game runs according to their hardware specifications.

**About:**

This option will be available in the main menu which will describe the complete story line of the game, about the character and how it will progress.

**Help:**

This option will be available in the game which describes all the basics of game to provide the user with the basic idea of what the game is and how it can be played.

**Pause Menu:**

The game can be paused anywhere in the gameplay for adjusting the game settings or save the game at the current progress.

**2.3.2. Hardware Interfaces**

Hardware Interfaces Game use 3 different hardware devices to get input from user:

- Mouse
- Keyboard

**Mouse:**

For navigating through menu and camera movement in gameplay.

**Keyboard:**

For navigating through menu and also for player movement and abilities such as movement of the player, shooting and so on that are used during the gameplay.

### 2.3.3. Software Interfaces

Salvation Plan is being developed using the following list of game development tools.

Their description and purpose is discussed as follows:

#### **Unity (Game Engine):**

Unity is a cross-platform gaming engine. It is developed by Unity Technologies. The engine is capable of creating three-dimensional, two-dimensional, virtual reality, and augmented reality games, as well as simulation games and other experiences such as film, architecture etc. This is the main component in which the game is developed.

#### **Visual Studio Code:**

Visual Studio Code is source-code editor developed by Microsoft. This IDE has been used to write and edit all the scripting in C# language related to the game.

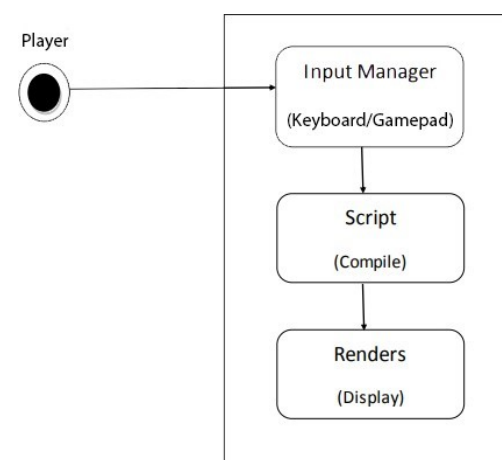
#### **Steam:**

Steam is the world's largest digital distribution platform for games. They provide their own online subsystem for games to integrate their store features. Salvation Plan will use steam's online subsystem for releasing the game.

### 2.3.4. Communications Interfaces

In order to play the game the user must download it from steam by logging in his account. It should be installed on a PC that meets the specified requirements.

The game is an offline story-mode so it does not have any online functionality.



**Figure 4 - Communication Interfaces**

The player can interact with the game by giving input commands (press “Enter” key to start the game) to the system. The system will give those input commands to the backend scripts, if any change will occur (if the condition is true) this will send to render to display the objects (the character changes its position).

## 2.4. System Features

- Title Screen
- Main Menu
- Start Game
- Settings
- About
- Exit
- Pause Menu
- Player

### 2.4.1. Title Screen

#### 2.4.1.1. Description and Priority

The title screen is the screen the player will see every time upon running the game. It will include the splash screen of the development tools used in making the game. After that it will include the main logo of the game with a background according to the game theme.

A message will be displayed on the screen asking the user to press Enter key to start and it will go the main menu screen.

#### 2.4.1.2. Stimulus/Response Sequences

- The player launches the game on the system.
- The title screen loads up and displays on the screen prompting the player to press “Enter” key to start
- The player presses “Enter” key which triggers its function taking the player to the main menu

#### 2.4.1.3. Functional Requirements

- The title screen must load up and display every time upon launching the game
- If the player presses the “Enter” key it should perform its function and load the main menu
- If the player completes the game, the game will end returning the player to the title screen

## 2.4.2. Main Menu

### 2.4.2.1. Description and Priority

The main menu will appear before the user after the title screen upon completing its necessary requirements to complete that are pressing the Enter key in the title screen. It will display the options of Start Game, Continue Game, Settings and Exit.

### 2.4.2.2. Stimulus/Response Sequences

- The player presses **Enter** key from the title screen.
- The main menu comes up displaying the required options

### 2.4.2.3. Functional Requirements

- The **main menu** must always come up after the title screen upon every time launching the game
- The options in the main menu must display on the screen for the user to interact
- If the player starts any of the options available on the main menu their function must be performed

## 2.4.3. Start Game

### 2.4.3.1. Description and Priority

First option available on the main menu upon pressing it the game will start.

### 2.4.3.2. Stimulus/Response Sequences

- The player presses the start game option by selecting it
- The game will load and start

### 2.4.3.3. Functional Requirements

- The game must always start upon pressing the **Start Game** option

## 2.4.4. Settings

### 2.4.4.1. Description and Priority

Settings provides multiple options for users to adjust the graphics, audio and gameplay settings to ensure better player experience as well as smooth running of the game on different types of hardware.

Settings can be accessed by going to the main menu and clicking on the “**Settings**” button. Settings further divides the available settings into four categories: Graphics, Audio and Gameplay.

### 2.4.4.2. Stimulus/Response Sequences

- The player presses the Settings option by selecting it from the main menu.
- The system will open the settings menu that are available.

#### 2.4.4.3. Functional Requirements

- The system must always open the settings menu upon pressing the Settings option.
- All the settings that are available must work and apply in the game.

### 2.4.5. About

#### 2.4.5.1. Description and Priority

The About option will provide all the details of the game. It will also tell the story line of the game, some background of the player that is in the game and how to progress in it.

#### 2.4.5.2. Stimulus/Response Sequences

- The player presses the About option by selecting it from the main menu
- The system will open the About tab

#### 2.4.5.3. Functional Requirements

- The system must always open the About tab upon pressing the About option
- All the details of the game must be included the option

### 2.4.6. Exit

#### 2.4.6.1. Description and Priority

The Exit button will exit the game and close it returning the user to the desktop.

#### 2.4.6.2. Stimulus/Response Sequences

- The player presses the Exit button by selecting it from the main menu
- The system will close the game

#### 2.4.6.3. Functional Requirements

- The system must always exit the game whenever the button is pressed

### 2.4.7. Pause Menu

#### 2.4.7.1. Description and Priority

This is a very important factor that should be present because during gameplay any task can come up with the player so a pause menu is important so that the game will pause at that time and can be resumed afterwards.

This menu will only work during the gameplay to pause the game upon pressing the “Esc” key. It will pause everything that will be going on the game and will open the pause menu which will include the options of Resume, Settings and Exit.

**Exit** option will stop the game and return the player to the title screen.

### 2.4.7.2. Stimulus/Response Sequences

- The player presses the **Esc** during gameplay to open the pause menu
- The options available in pause menu are displayed
- **Resume** option resumes the game returning the player to the gameplay.
- **Settings** option opens the setting menu in which the user can change the settings of the game
- **Exit** option stops the game and returns the player to the title screen.

### 2.4.7.3. Functional Requirements

- The system must always open the Pause Menu upon pressing its desired key
- The game must be paused so no further action takes place in the gameplay
- The options available in the pause menu work effectively
- The game must resume so the player returns to the gameplay and play further

## 2.4.8. Player

### 2.4.8.1. Description and Priority

The player is the main character of the game which the user will control during gameplay. As this is an FPS game so user will see the view of the player as in detail the user will see the arms of the player. All the movements and actions of the player will be controlled by the user depending on their input key.

The player looks will be controlled from the Mouse and he will attack/shoot via pressing the left click of the mouse.

All other movements and actions will be controlled from the Keyboard with several input keys for each function.

### 2.4.8.2. Stimulus/Response Sequences

- The player is present in the game upon starting it
- The control inputs interact with the player and perform the function(moving forward)

### 2.4.8.3. Functional Requirements

- The system must always perform the operation on the player as soon as the user presses its key (upon pressing left click of mouse the player must attack or shoot)

## 2.5. Other Nonfunctional Requirements

### 2.5.1. Performance Requirements

To ensure best player experience with smooth gameplay and high performance, following are the recommended requirements to run the game at maximum graphic settings with stable 60 frames per second:

- OS : Windows 7 64-Bit / Windows 8 64-Bit / Windows 8.1 64-Bit / Windows 10 64-Bit
- Processor: Intel(R) Core(TM) i5-3570 at 3.40 GHz or equivalent
- Memory : 8.0 GB of RAM
- Graphics : NVidia GeForce GTX 750 Ti at 2GB / ATI Radeon HD 7870 at 2GB
- DirectX : Version 11.0
- Hard Drive : 12.0 GB of free space
- Sound Card : DirectX Compatible

### 2.5.2. Safety Requirements

Playing games for prolonged time can cause Computer Vision Syndrome, in which victim faces blurry vision, eye irritation, light sensitivity, neck and shoulder pain.

Game shows dead creatures, aliens, kills and use of guns, which may affect a person if his/her mental state is not stable. It is an offline game which means player will face Aliens creatures of different personalities with unpleasant faces and living corpses which may cause the player to get discouraged or mentally disturbed if faced.

The user is required to take a break after every two hours of continuous playing to prevent eyestrain and repetitive strain injury. Otherwise there are no other safety requirements.

Some people are sensitive to some colors whose exposure may not be appropriate for them, so they should avoid or take precaution if possible because game does not have screen filters available for specific colors or color-blind people.

### **2.5.3. Security Requirements**

Unique username and password will be required to access player account of steam which will allow them to download the game. In purchasing the game and downloading it, Steam does not release any personal info of the user as per security policy.

To ensure the authenticity of game purchases, all services will be provided by steam. This is just a precaution to make sure no unauthorized transaction takes place as someone may try to tamper the game files.

Apart from the above given aspects there are no other specific security and privacy requirements.

### **2.5.4. Software Quality Attributes**

To ensure reliability and correctness, game will respond to the player's input commands in a timely manner without system lag. For adaptability, the Graphical UI will be very intuitive for the player to use, and also game will save the player's progress. That way, in the event that the user has to turn off the game he will have his progress saved.

Salvation Plan is a game that any player can install and play instantly without wasting much time trying to figure out the controls and how to play it.

### **2.5.5. Business Rules**

Game will have only single role that is of player. Every user is a player of the game and has same access to all the game content as any other player.

# Chapter 3

## Use Case Analysis

## Chapter 3: System Analysis

This Chapter includes **Use Case** models and **Fully Dressed Use Cases**

### 3.1. Use Case Model

#### 3.1.1 Run Application:

The user will run the Application by opening the executable file of the game and the game will run.

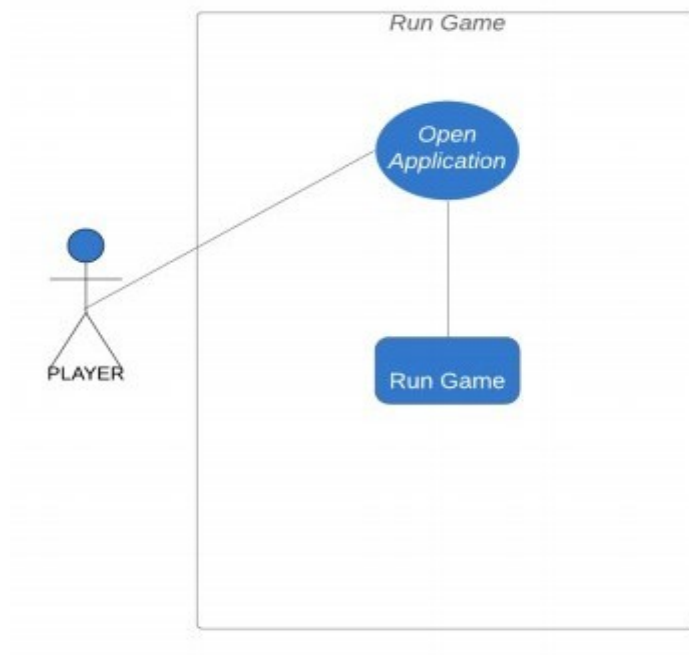


Figure 5 - Run Application Use Case

#### 3.1.2 Main Menu:

- This is the first screen that user sees when the game loads up. It provides access to Play Game, Training, Options and Exit.
- To play the game simply click on the Play button and it will load the next scene. For Training Mode simply click on Training button and the game will load the training scene. To change settings go to the Options button. To Exit the game click on the Exit button.

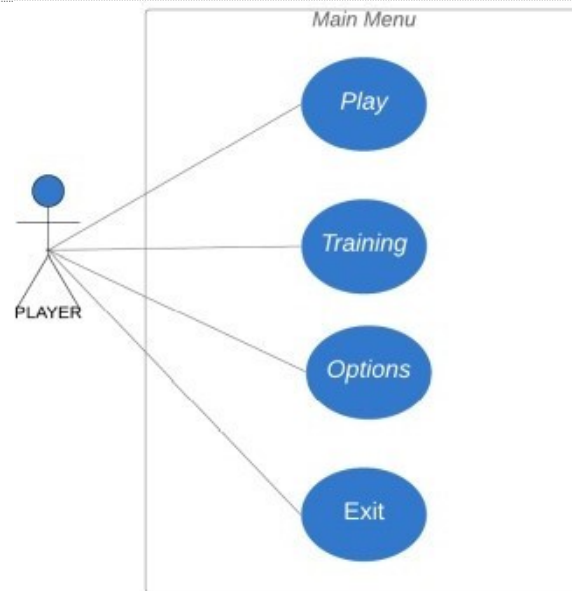


Figure 6 - Training Mode Use Case

### 3.1.3 Player:

- The in game player can perform all the functions available in the diagram.
- This diagram depicts all the movements and actions the player can perform. Look is controlled by the mouse which looks around in the game. The player can move forward, backward, right and left. The player can Aim and Shoot or simply shoot. The player can jump, crouch and run.

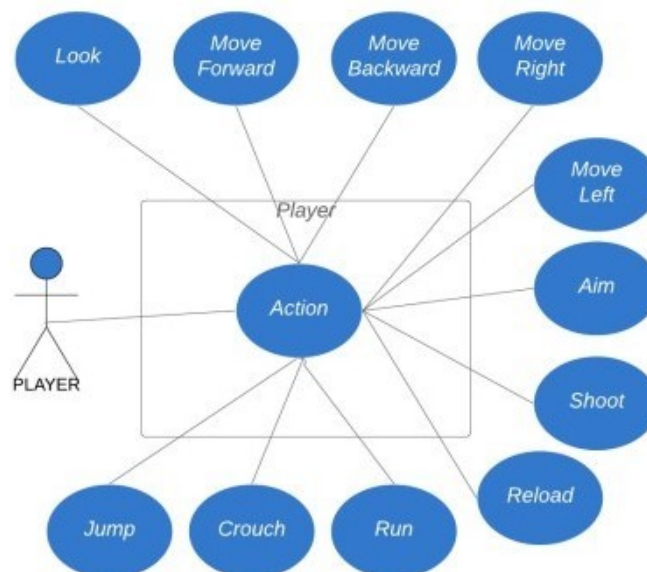


Figure 7 - Player Use Case

### 3.1.4 Inventory:

Any item which is an inventory item can be picked up by the player which will be added to the inventory. The player can use it, drop it or bind a shortcut key to it. Any inventory that the player picks up adds up in the inventory tab where he can view the item. When an item is added in the inventory the player can either use the item, drop the item and if it is a weapon a shortcut key can be bind to it

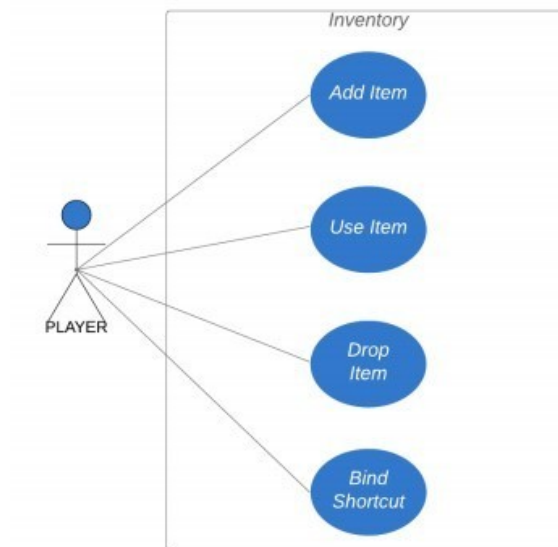


Figure 8 - Inventory Use Case

### 3.1.5 Weapon System:

The player will find weapons in the game he can pick them up which will add up to the inventory or drop a weapon.

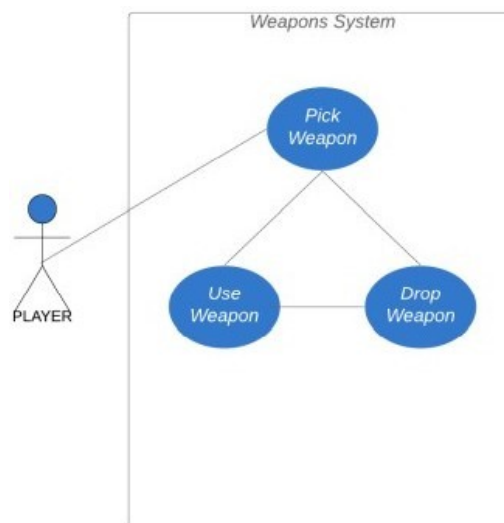


Figure 9 - Weapon System Use Case

### 3.1.6 Options:

Settings provides multiple options for users to adjust the graphics, audio and gameplay settings to ensure better player experience as well as smooth running of the game on different types of hardware settings can be accessed by going to the main menu and clicking on the “Options” button. Settings further divides the available settings into three categories: General, Graphics and Controls.

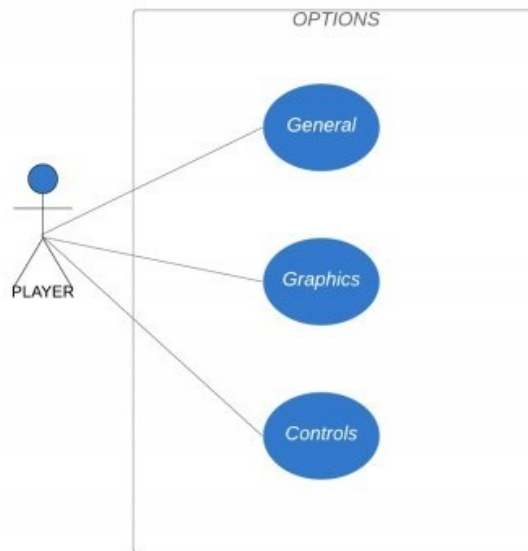
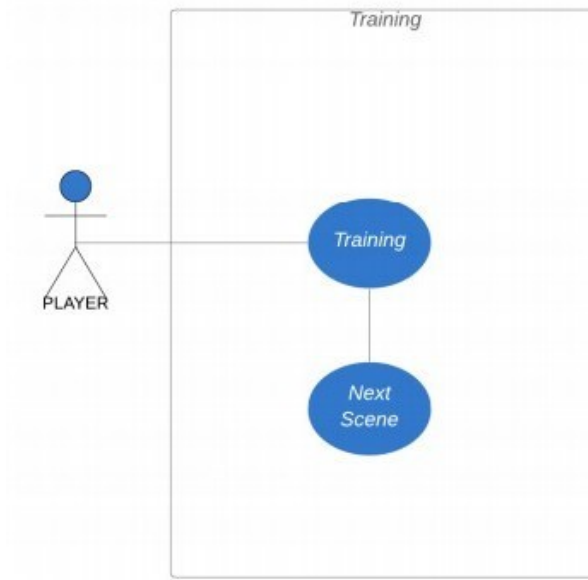


Figure 10 - Options Use Case

### 3.1.7 Training Mode:

Training is a mode to test in-game items. Users can test any in-game item in this mode to ensure the controls and gameplay of the player.

It can be played by going to main menu and clicking on “Training” button. The player clicks on the Training button and game loads the training scene.

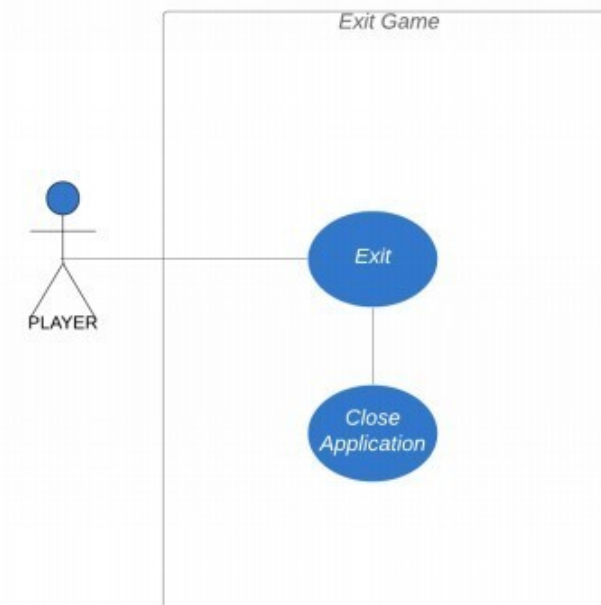


**Figure 11 - Training Mode Use Case**

### 3.1.8 Exit:

The Exit button will be used to exit the game from the Main Menu. To exit simply click on the exit button.

The user clicks on the Exit button from the Main Menu and the application exits.



**Figure 12 - Exit Use Case**

## 3.2. Use Case Descriptions

### 3.2.1. Run Game:

<b>Use Case Number:</b>	UC-1		
<b>Title:</b>	Run Game		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	The user will run the Application by opening the executable file of the game and the game will run.		
<b>Trigger:</b>	The player need to start new game		
<b>Preconditions:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	<ol style="list-style-type: none"> <li>1. Go to the main Menu of the game;</li> <li>2. Click play game button.</li> <li>3. New game loaded on system.</li> </ol>		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Game Crashed		

Table 1 - Run Game Fully-Dressed Use Case

### 3.2.2. Main Menu:

<b>Use Case Number:</b>	UC-2		
<b>Title:</b>	Main Menu		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	To go to the Main Menu		
<b>Trigger:</b>	The player need to start new game		
<b>Preconditions:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	<ol style="list-style-type: none"> <li>1. Go to the main Menu of the game;</li> <li>2. Click play game button.</li> <li>3. New game loaded on system.</li> </ol>		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Game Crashed		

Table 2 - Main Menu Fully-Dressed Use Case

**3.2.3. Training Mode:**

<b>Use Case Number:</b>	UC-3		
<b>Title:</b>	Training		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	Training is a mode to test in-game items. Users can test any in-game Item in this mode to ensure the controls and gameplay of the player.		
<b>Trigger:</b>	The player need to select the Training Mode		
<b>Preconditions:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	<ul style="list-style-type: none"> <li>• Go to the main Menu of the game;</li> <li>• Click Training Mode button.</li> <li>• Training Mode will be loaded on system.</li> </ul>		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Game Crashed		

Table 3 - Training Mode Fully-Dressed Use Case

**3.2.4. Player:**

<b>Use Case Number:</b>	UC-4		
<b>Title:</b>	Player		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	The player can move forward, backward, right and left. The player can Aim and Shoot or simply shoot. The player can jump, crouch and run.		
<b>Trigger:</b>	Pressing buttons and giving commands from the keyboard.		
<b>Preconditions:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	While playing the game, the character perform the actions when the respected buttons for those actions is pressed e.g Jump, crouch, run, aim and shoot.		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Player is not responding to the commands Game Crashed		

Table 4 - Player Fully-Dressed Use Case

**3.2.5. Options:**

<b>Use Case Number:</b>	UC-5		
<b>Title:</b>	Options		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	To load options in setting module.		
<b>Trigger</b>	Player Need to tap options button in the menu.		
<b>Preconditions:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	Press options button in menu Options for setting menu opens up.		
<b>Alternative Flows:</b>	None		
<b>Exceptions</b>	Game Crashed		

Table 5 - Options Fully-Dressed Use Case

**3.2.6. Inventory:**

<b>Use Case Number:</b>	UC-6		
<b>Title:</b>	Inventory		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	Any item which is an inventory item can be picked up by the player which will be added to the inventory. The player can use it, drop it or bind a shortcut key to it.		
<b>Trigger:</b>	The player need to press the inventory button		
<b>Preconditions:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	1. Press the Inventory button in the game; 2. Inventory will open up.		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Inventory will not open. Game crashed		

Table 6 - Inventory Fully-Dressed Use Case

3.2.7. **Weapon System:**

<b>Use Case Number:</b>	UC-7		
<b>Title:</b>	Weapon System		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	The player will find weapons in the game he can pick them up which will add up to the inventory or drop a weapon.		
<b>Trigger:</b>	When a weapon is found. Press the Pickup Option.		
<b>Preconditions</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	'Pick Up' option is selected when new weapon is found. Weapon will be add in the inventory. Weapon will be drop if ' Drop' option is selected		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Player couldn't Add or Drop the Weapon Game Crashed		

Table 7 - Weapon System Fully-Dressed Use Case

3.2.8. **Exit:**

<b>Use Case Number:</b>	UC-8		
<b>Title:</b>	Exit Game		
<b>Created By:</b>	Ebad Khan Aqil Mughal	<b>Edited By:</b>	
<b>Date Created:</b>	13/06/2020	<b>Date Edited:</b>	13/06/2020
<b>Actors:</b>	Player(Character)		
<b>Summary:</b>	To exit game		
<b>Trigger:</b>	Need to tap exit button		
<b>Preconditions</b> <b>:</b>	Game is installed on the computer Game is working.		
<b>Normal Flow:</b>	<ol style="list-style-type: none"> <li>1. Go to the main Menu of the game.</li> <li>2. Click the exit button.</li> <li>3. Game shut down.</li> </ol>		
<b>Alternative Flows:</b>	None		
<b>Exceptions:</b>	Player couldn't Exit. Game Crashed		

Table 8 - Exit Fully-Dressed Use Case

# Chapter 4

## System Design

### **Chapter 4: System Design**

This Chapter includes Different Models and diagrams of the System

### 4.1. Architecture Diagram

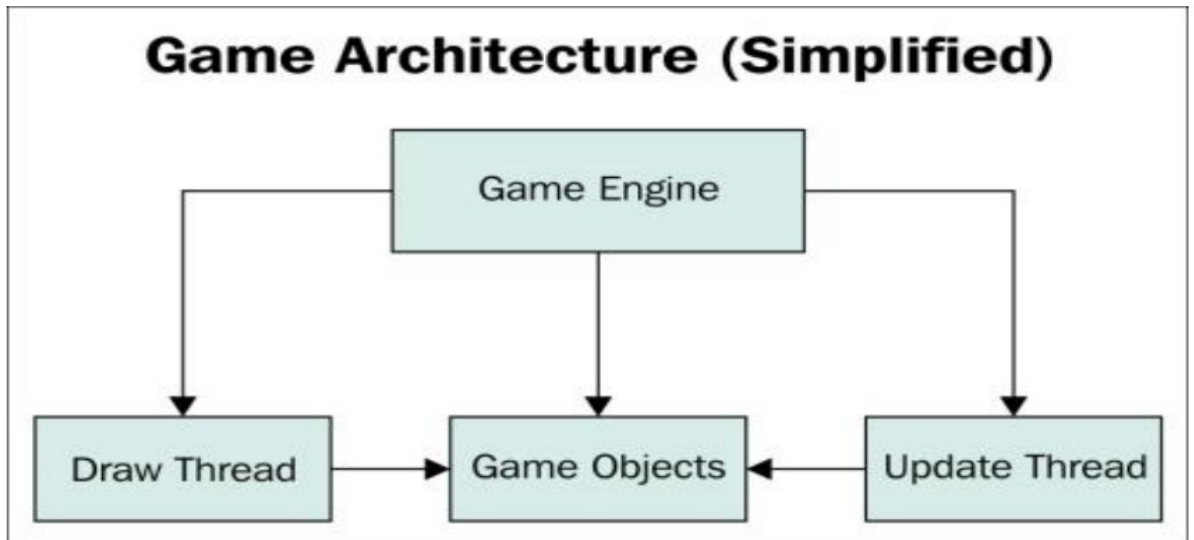


Figure 13 - Architecture Diagram

### 4.2. Domain Model

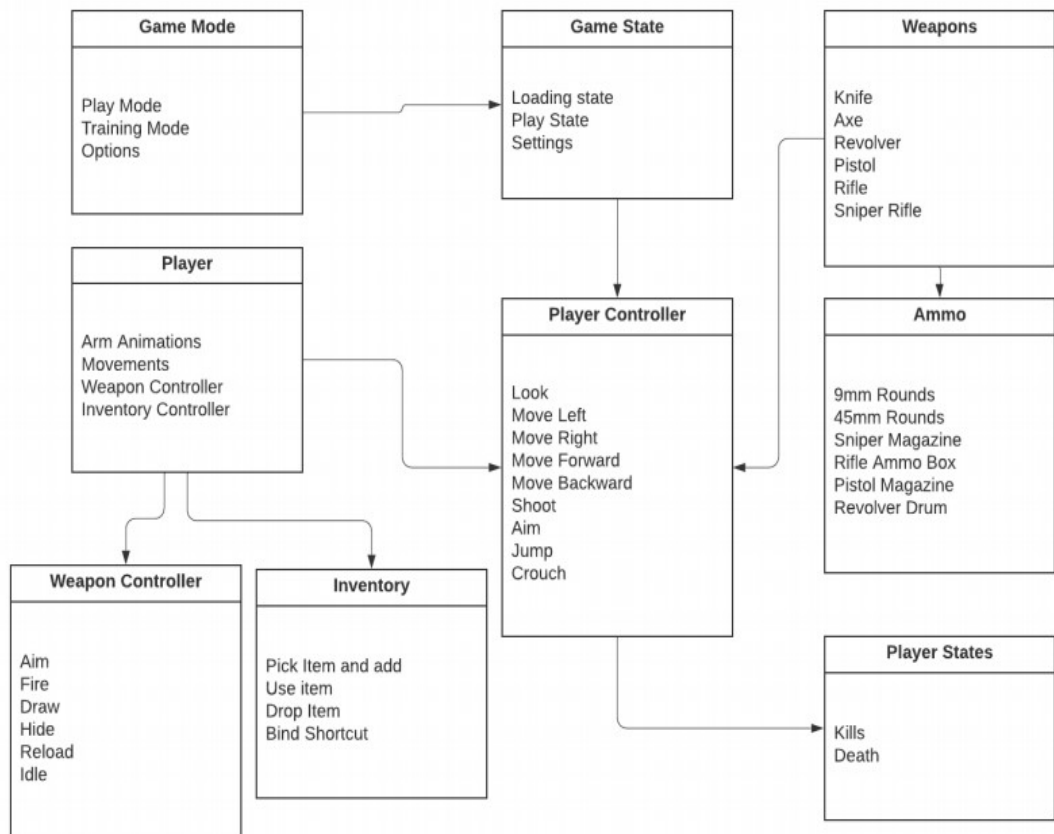


Figure 14 - Domain Model

### 4.3. Entity Relationship Diagram with data dictionary

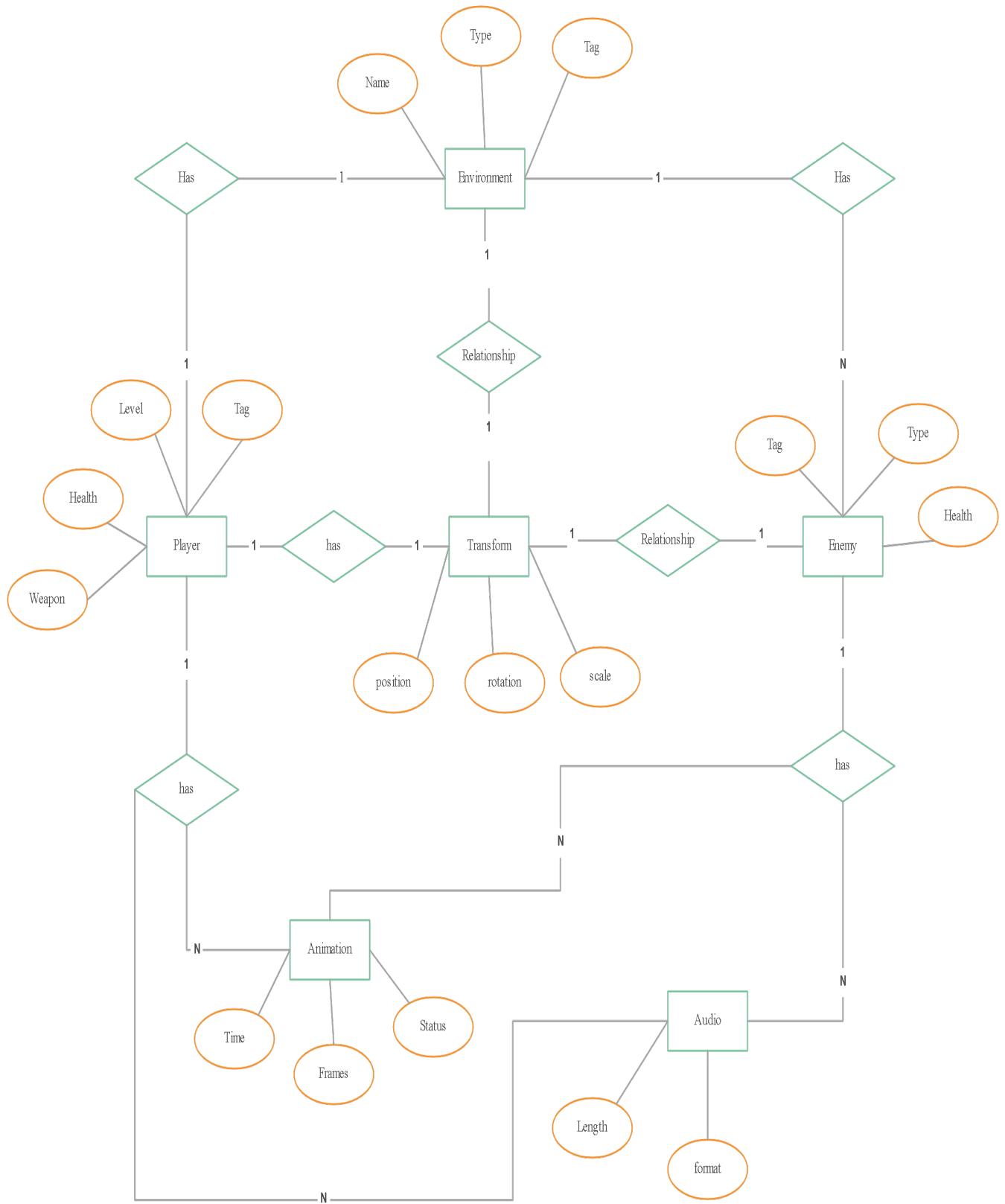


Figure 15 - ERD

### 4.4. Class Diagram

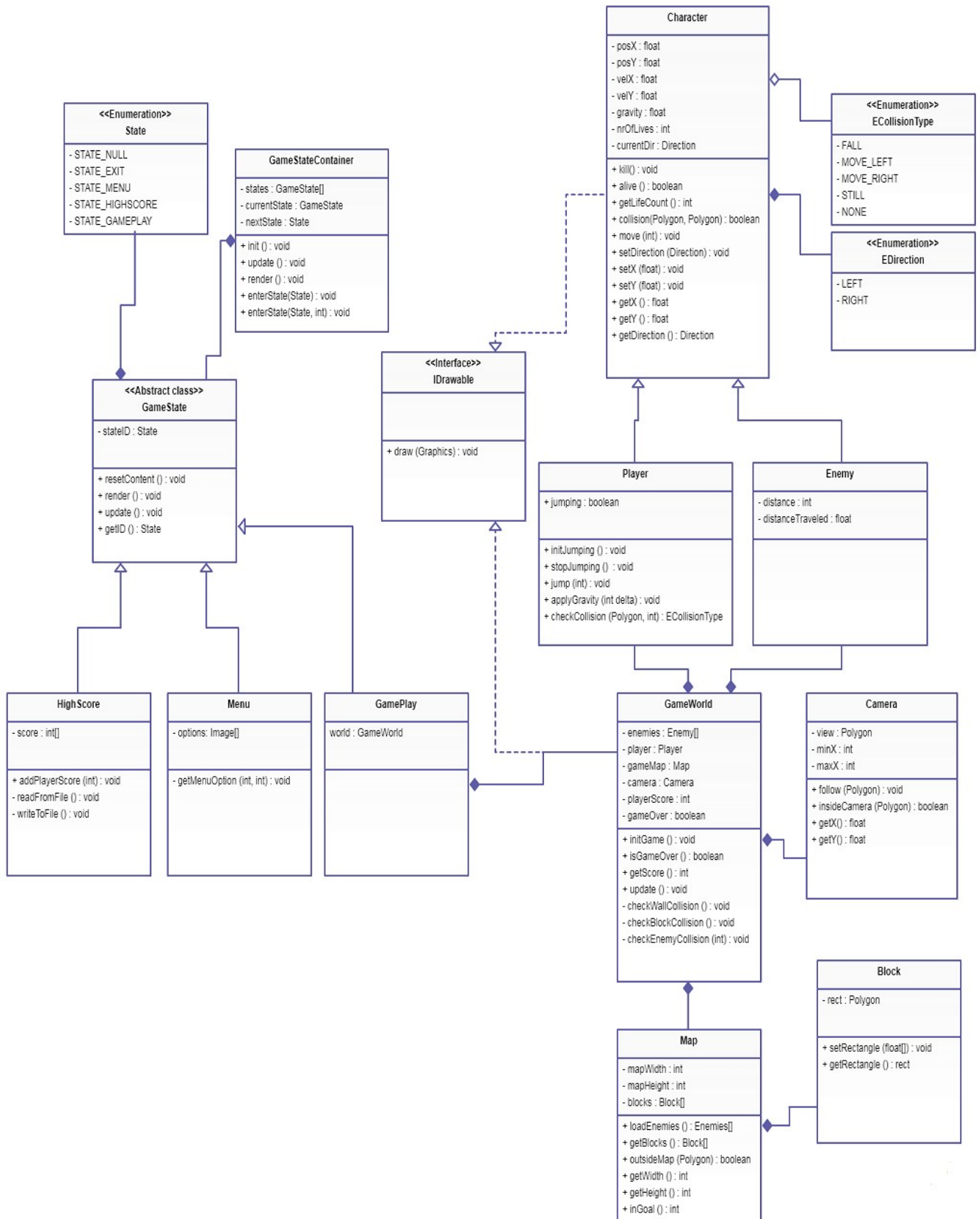


Figure 16 - Class Diagram

## 4.5. Sequence / Collaboration Diagram

### ➤ Start Game:

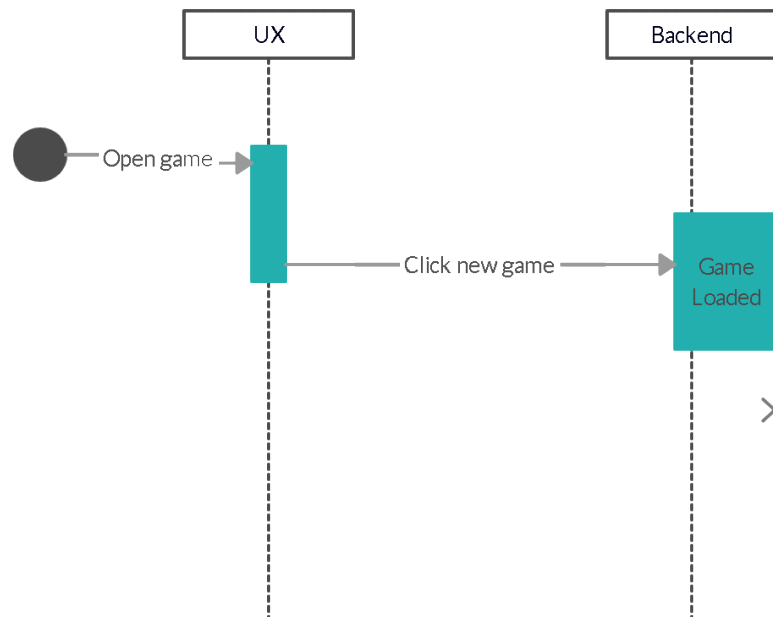


Figure 17 - Start Game Sequence Diagram

### ➤ Select Mode:

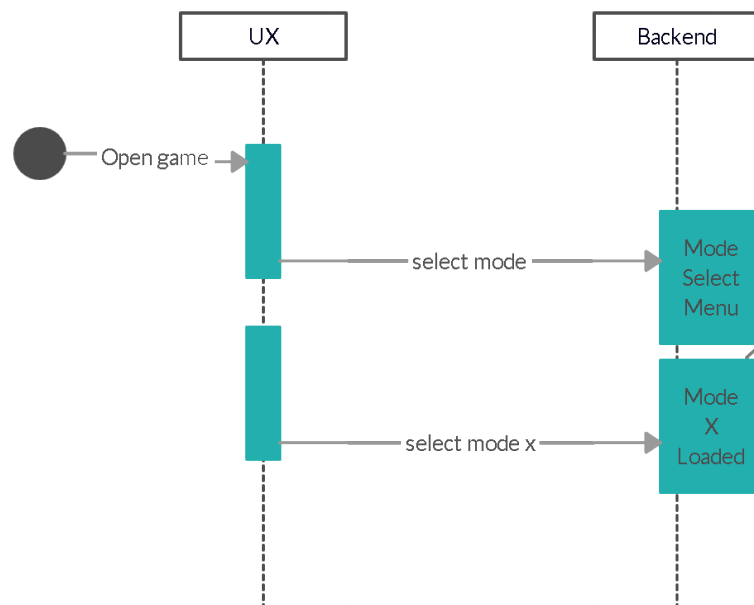


Figure 18 - Select Mode Sequence Diagram

➤ Settings:

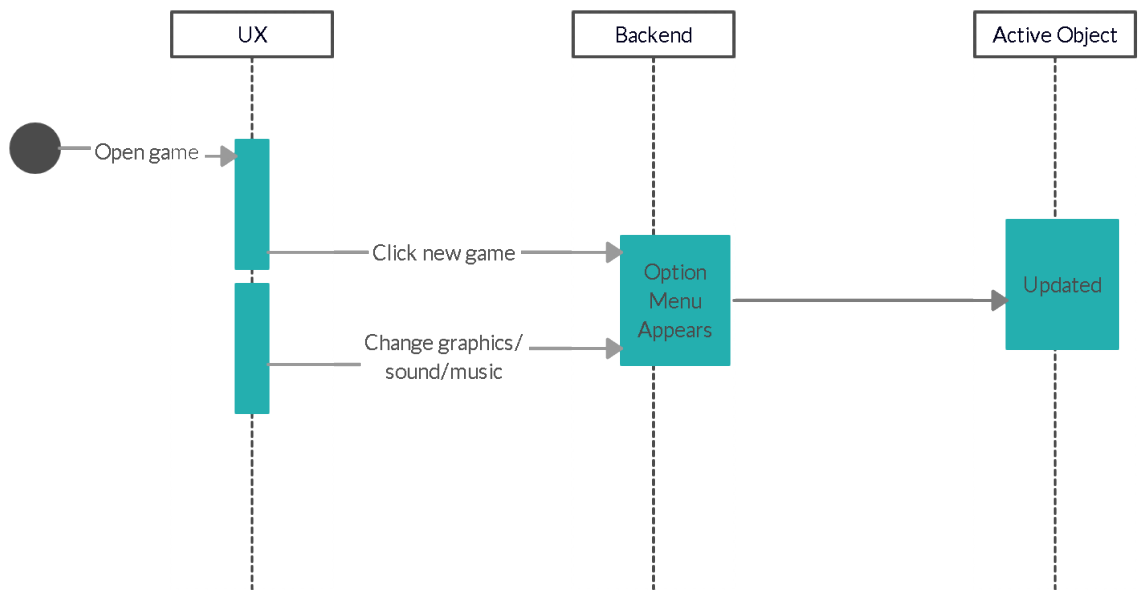


Figure 19 - Settings Sequence Diagram

➤ Exit:

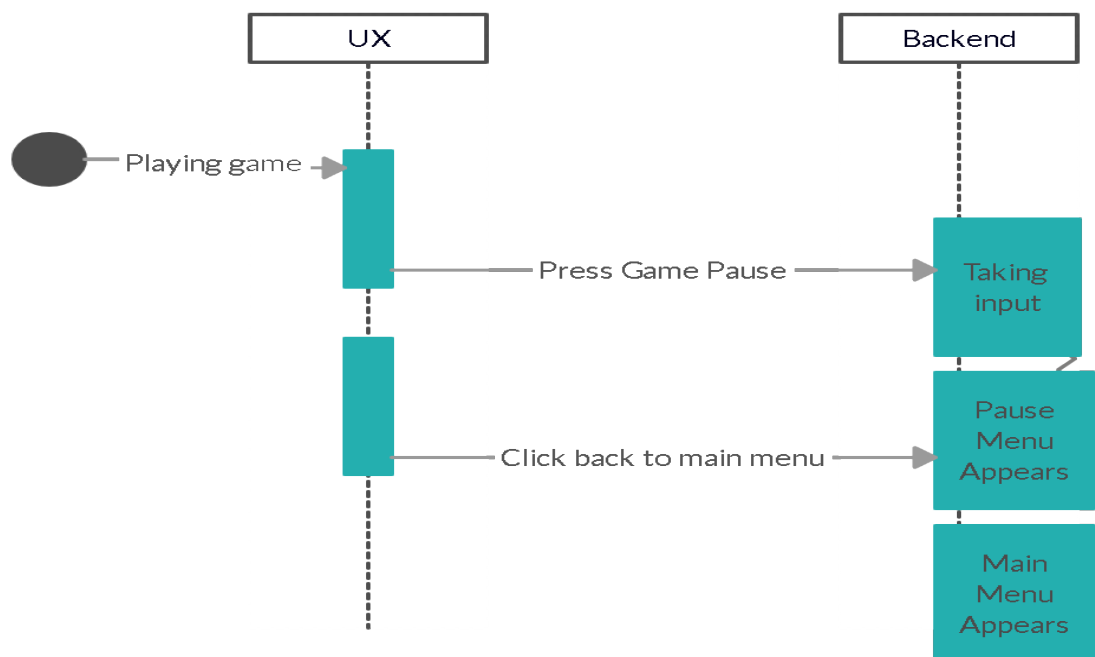


Figure 20 - Exit Sequence Diagram

### 4.6. Game Flow Diagram:

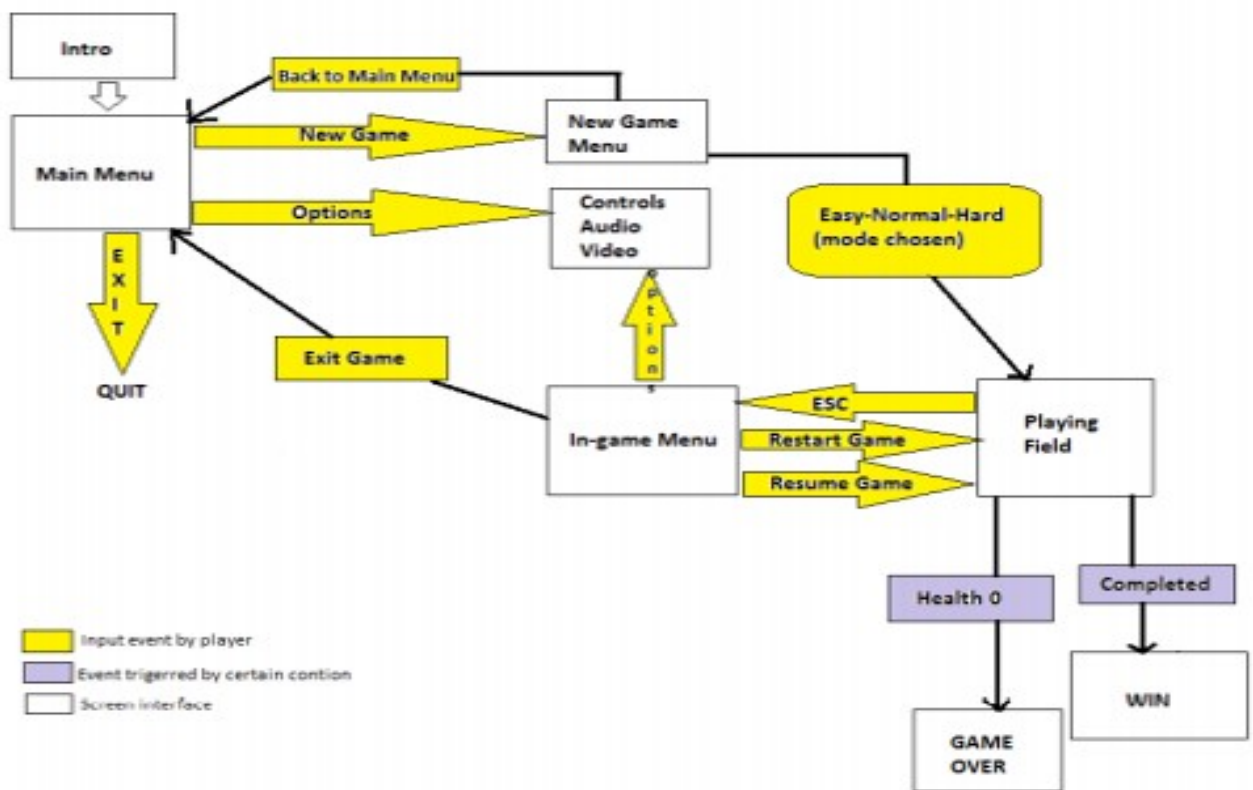


Figure 21 - Game Flow Sequence Diagram

### 4.7. Activity Diagram

➤ Start Game:

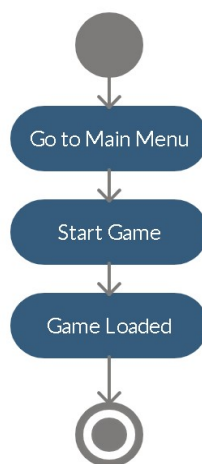
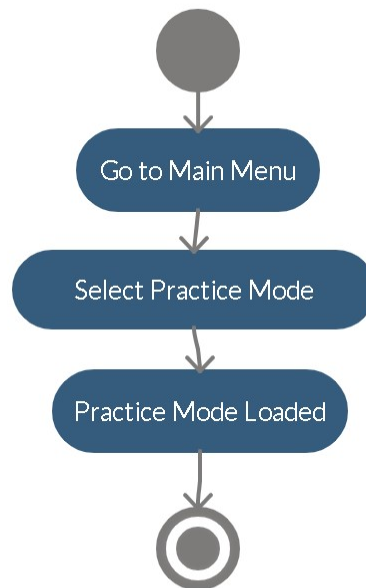


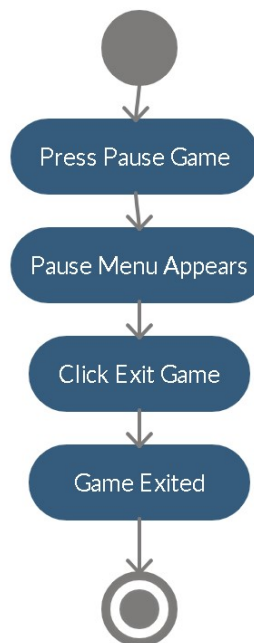
Figure 22 - Start Game Activity Diagram

➤ **Training Mode**



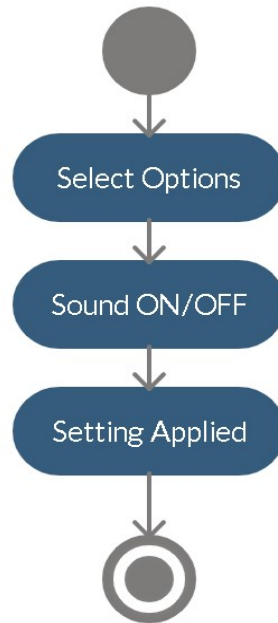
**Figure 23 - Training Mode Activity Diagram**

➤ **Pause and Exit**



**Figure 24 - Pause and Exit Activity Diagram**

➤ **Sound ON/OFF**



**Figure 25 - Options Activity Diagram**

➤ **Quit Game**



**Figure 26 - Quit Game Activity Diagram**

## 4.8. State Transition Diagram

- Select Level:

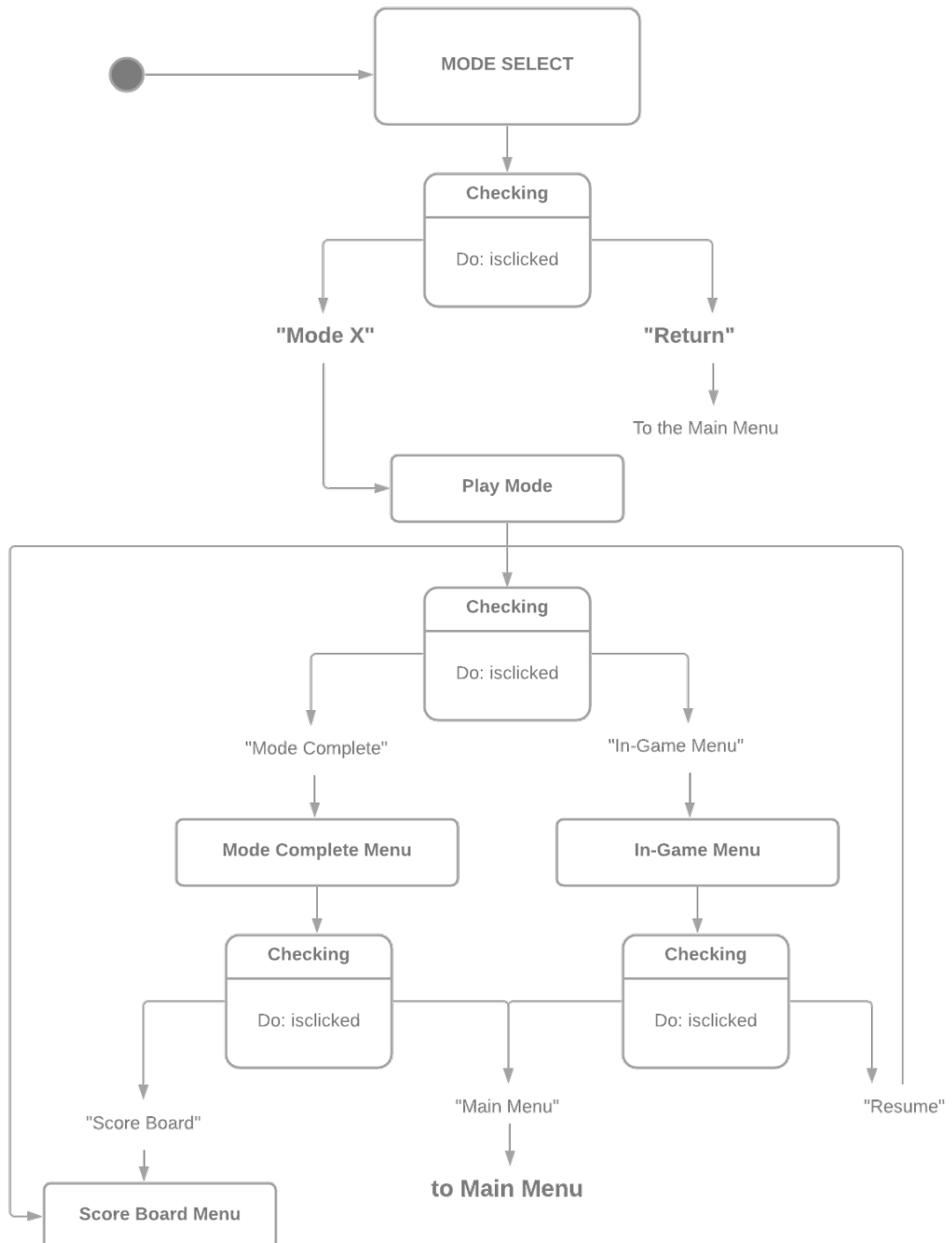
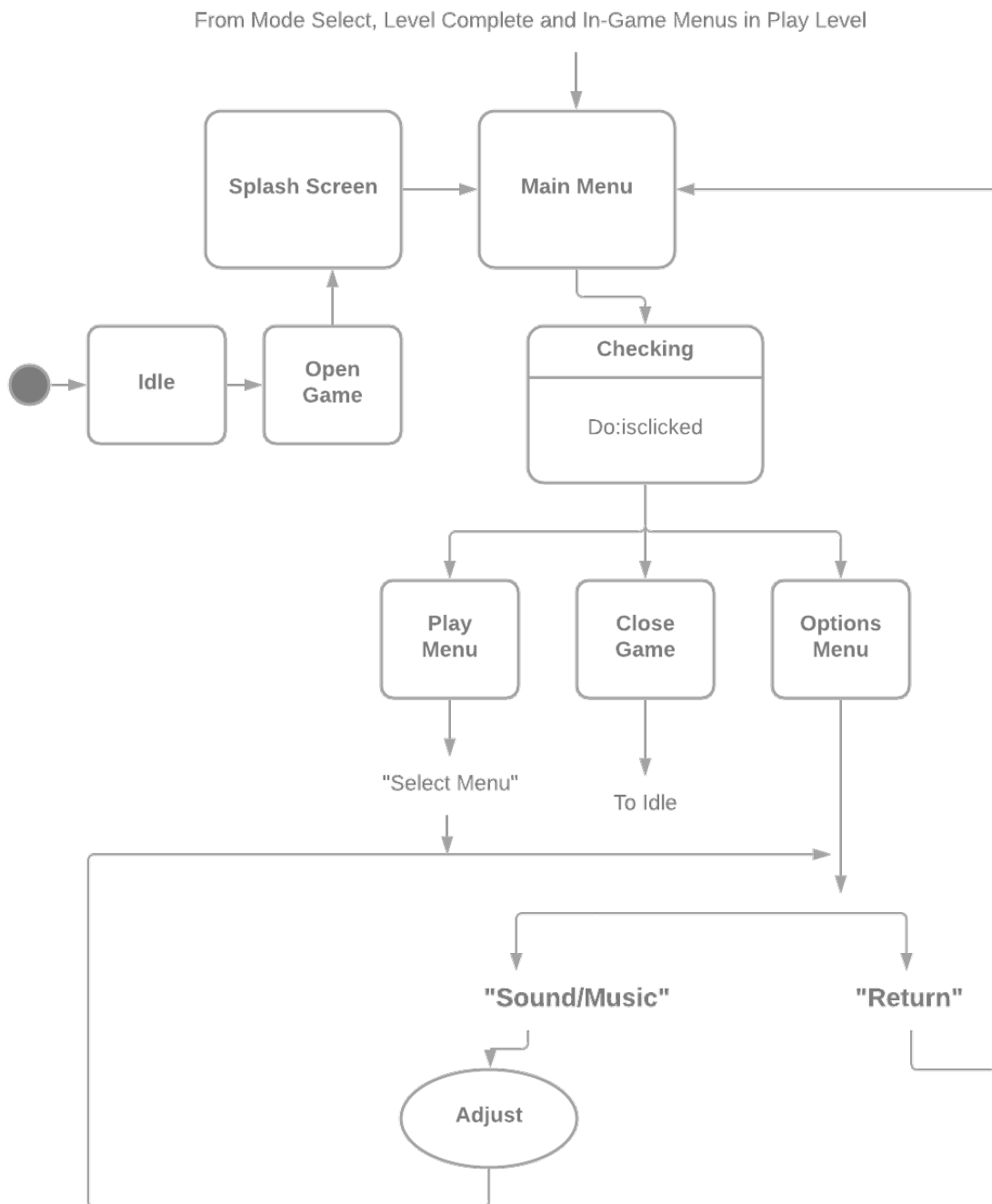


Figure 27 - Select Level State Transition Diagram

➤ Play Level:



**Figure 28 - Play Level State Transition Diagram**

## 4.9. Component Diagram

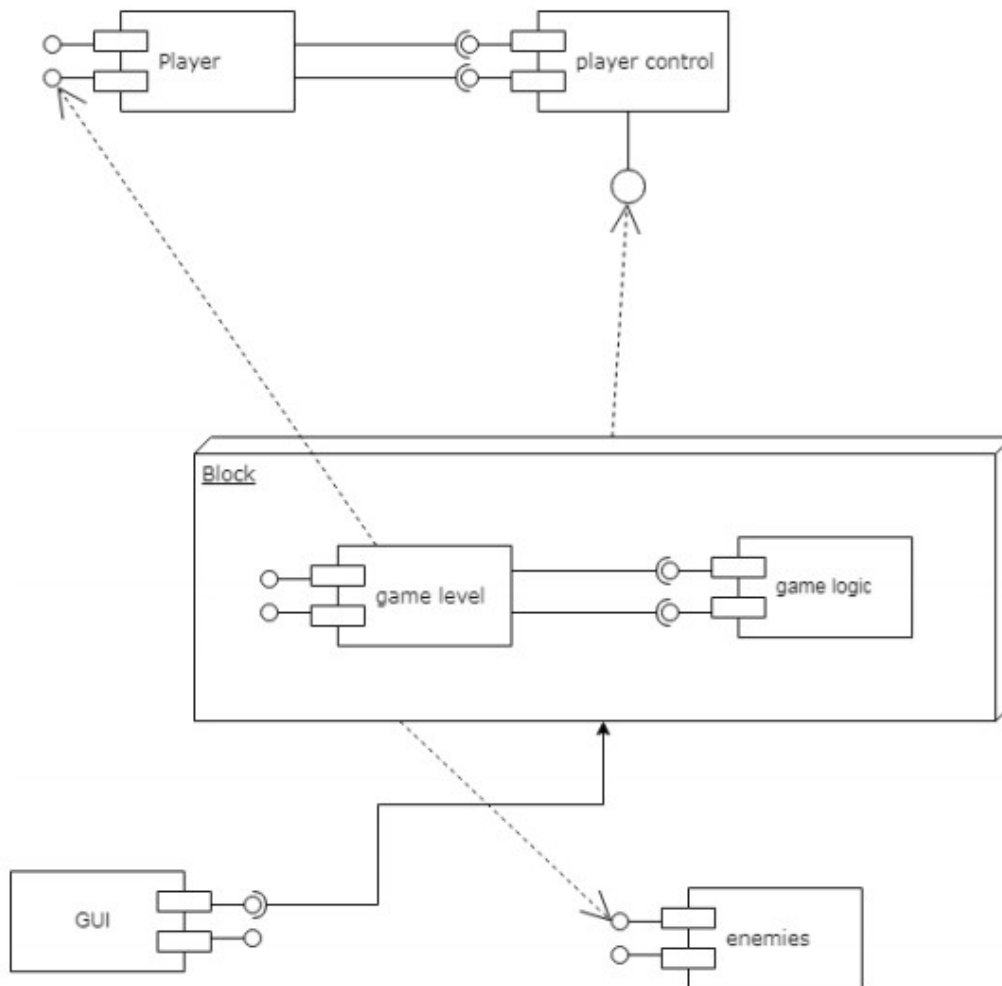


Figure 29 - Component Diagram

### 4.10. Deployment Diagram



Figure 30 - Deployment Diagram

### 4.11. Data Flow diagram

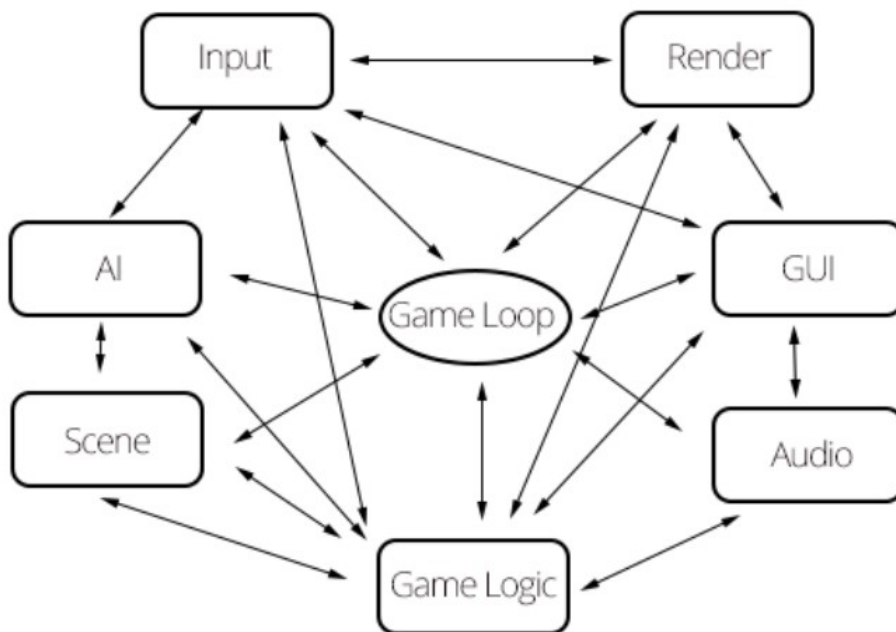


Figure 31 - Data Flow Diagram

# Chapter 5

## Implementation

## Chapter 5: Implementation

This chapter includes the important flow control, Components, Tools and Techniques and best practices used in the development of the game.

### 5.1. Important Flow Control/Pseudo codes

- **Title Screen:**
  - The player launches the game on the system.
  - The title screen loads up and displays on the screen prompting the player to press “Enter” key to start.
  - The player presses “Enter” key which triggers its function taking the player to the main menu.
- **Main Menu:**
  - The player presses Enter key from the title screen.
  - The main menu comes up displaying the required options.
- **Start Game:**
  - The player presses the start game option by selecting it.
  - The game will load and start.
- **Training Mode:**
  - The player presses the Training Mode option by selecting it.
  - The training mode will load and start.
- **Settings:**
  - The player presses the Settings option by selecting it from the main menu.
  - The system will open the settings menu that are available.
- **About:**
  - The player presses the About option by selecting it from the main menu.
  - The system will open the About tab.
- **Exit:**
  - The player presses the Exit button by selecting it from the main menu.
  - The system will close the game.
- **Pause Menu:**
  - The player presses the Esc during gameplay to open the pause menu
  - The options available in pause menu are displayed
  - Resume option resumes the game returning the player to the gameplay.
  - Settings option opens the setting menu in which the user can change the settings of the game
  - Exit option stops the game and returns the player to the title screen.

## 5.2. Components, Libraries, Web Services and stubs

### ➤ Components:

- Camera Component.
- Transform Component.
- Script Component.
- Light Component.
- GUI Layer Component.
- Flare Layer Component.
- Audio Listener Component.
- Rigid Body Component.
- Collider Component.
- Particle System Component.

### ➤ Libraries:

- Using System;
- Using UnityEngine;
- Using UnityEngine.UI;
- Using UnityEngine.AI;
- Using UnityEngine.Animations;
- Using UnityEngineParticleSystemJobs;
- Using UnityEngine.UIElements;

## 5.3. Tools and Techniques

### ➤ Tools:

- Unity.
- Visual Studio Code.
- Blender 3D.

### ➤ Languages:

- C#

## 5.4. Best Practices / Coding Standards

- Avoid branching assets.
- Put your world floor at  $y = 0$ .
- Make the game runnable from every scene.
- Establish links between instances automatically.
- Use extensions to make syntax more convenient.

# Chapter 6

## Testing and Evaluation

## **Chapter 6: Testing and Evaluation**

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*[Between 4 to 8 lines describe what is this chapter all about]*

### **6.1. Use Case Testing**

### **6.2. Equivalence partitioning**

### **6.3. Boundary value analysis**

### **6.4. Data flow testing**

### **6.5. Unit testing**

## **6.6. Integration testing**

## **6.7. Performance testing**

## **6.8. Stress Testing**

# Chapter 7

## Summary, Conclusion and Future Enhancements

## **Chapter 7: Summary, Conclusion & Future Enhancements**

### **7.1. Project Summary**

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### **7.2. Achievements and Improvements**

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### **7.3. Critical Review**

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### **7.4. Lessons Learnt**

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## **7.5. Future Enhancements/Recommendations**

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# Appendices

## **Appendix A: User Manual**

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*[Between 4 to 8 lines describe what is this appendix all about]*

## **Appendix A: Appendix Title**

### **[Appendix Heading 1]: [20 pt, Calibri, Bold, Left aligned]**

Text in 12-Point Size, Times New Roman, 1.5 Line Spacing.

#### **A.1. First Level heading [16 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

##### **A.1.1. Second level heading [14 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

###### **A.1.1.1. Third level heading [12 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

## **Appendix B: Administrator Manual**

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*[Between 4 to 8 lines describe what is this appendix all about]*

## **B.1. First Level heading [16 pt, Calibri, Bold, Left aligned]**

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### **B.1.1. Second level heading [14 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

#### **B.1.1.1. Third level heading [12 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

## **Appendix C: Information / Promotional Material**

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*[Between 4 to 8 lines describe what is this appendix all about]*

## **C.1. Broacher**

## **C.2. Flyer**

## **C.3. Standee**

## **C.4. Banner**

## **C.5. First Level heading [16 pt, Calibri, Bold, Left aligned]**

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### **C.1.1. Second level heading [14 pt, Calibri, Bold, Left aligned]**

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#### **C.1.1.1. Third level heading [12 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

## **Appendix [no.]: Appendix Title**

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*[Between 4 to 8 lines describe what is this chapter all about]*

### **A.1. First Level heading [16 pt, Calibri, Bold, Left aligned]**

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### **A.1.1. Second level heading [14 pt, Calibri, Bold, Left aligned]**

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### **C.1.1.2. Third level heading [12 pt, Calibri, Bold, Left aligned]**

[Paragraph Text 12 pt, Calibri, 1.5 Line Spacing, Justified]

# Reference and Bibliography

## **Reference and Bibliography**

- [1] M. Sher, M. Rehman, "*Title of the Paper*" Conference name/Journal Name, Edition, Volume, Issue, ISBN/ISSN, PP, Publisher/City-Country, Year.
- [2] .....

# Index

## Index

[A]

[B]

[C]

