

**DESIGN AND DEVELOPMENT OF A 2D GAME-DUNGEON GUNNER**

**BY**

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This Report Presented in Partial Fulfilment of the Requirements for the Degree  
of Bachelor of Science in Computer Science and Engineering

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## APPROVAL

This Project/internship titled “**DESIGN AND DEVELOPMENT OF A 2D GAME-DUNGEON GUNNER**”, submitted by **Md. Javed Hossain**, ID No: **152-15-5578** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on July 8, 2020.

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## DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Mr. Gazi Zahirul Islam, Assistant Professor of Department of Computer Science and Engineering, Daffodil International University**. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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## **ABSTRACT**

Dungeon Gunner is a 2D computer-based shooting game which have the feature of Roguelike game. Roguelike (or rogue-like) is a subgenre of RPG (role-playing game) game characterized by a dungeon crawl through procedurally generated levels, turn-based gameplay, tile-based graphics, and permanent death of the player character. Most roguelikes are based on a high fantasy narrative, reflecting their influence from tabletop role playing games such as Dungeons & Dragons. Dungeon Gunner is such of a Roguelike game where the player is fighting with the enemies in a Dungeon and trying to find the path to exit from the dungeon. It is containing different types of dungeons for the player to fight with the enemies and try to find out a way to exit from there. It has many procedural levels, weapons collection and switching system, tile-based maps, a shop system of character and weapons and switching in game, coin pickup, health pickup, computer controlled intelligent enemies both Melee and Boss, Boss battle with boss and other interesting objects like spikes, character cage, exit level, breakable box, tile set and so more. It also has interesting audio track for different stance and using animation for both player and enemies. It is very interesting to play. The simplicity of this game is it simply aims to bring fun.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Dungeon Gunner is a fun and cool Roguelike game, which have some features of RPG game. Players play as a shooter to adventure in a dungeon, challenge unknown creatures, and dig for treasures. The game is rich in content and has multiple game elements, including, computer controlled intelligent enemies, guns, weapons etc. Their reasonable combination will make the game fun and diversified. Hope it makes to find out own fun in the game.

This project depicts the procedure engaged with making a 2D Roguelike game with the game making engine specially Unity3D. This game is PC Independent and it also can play in web by using Unity WebGL technology.

### 1.2 Game Overview

The main target of the player is to achieve competence by killing the enemies. The player only can accomplish that if he disposes the whole dungeons that he has been to assigned. In the whole area of the dungeon there are different kinds of enemies, obstacles, harmful and health killer spikes. Every laps of the dungeons there has different kinds of enemies with various wellbeing and harm. The player can possibly go further on the off chance that he clears the present zone that he can enter and exit.

### 1.3 Motivation

Nowadays game industry is one of the biggest industries in the world. Game making company makes a lot of game every year because there are approximately 2.2 billion people in the world who are playing game in pc and mobile phone. That means almost a third of people on this planet are gamers. Out of those 2.2 billion gamers, 1.2 billion of those who are playing games on a PC. Moreover, the market size of game industries about \$230 billion US\$ by 2022 all over the world. So, learn to making of video game is a good option as career. Moreover, in our country there is minor number of organizations who works for game developing. My fantasy is to make my selves as a game developer and established a game company and make working environment in our nation on game advancement stage.

## 1.4 Objective

The objectives of this project are:

- Try to entertain the people.
- Gather skill by making of own game.
- Bring inspiration in this field.
- Learn to make and design game development asset for making of game.

## 1.5 Game Objective

The game is developed for only Computer platform, the major objectives of this game are:

- To make a Roguelike game that will have all the usefulness of conventional Roguelike game.
- To execute numerous weapons with various slugs and force.
- To implement a Money system and making a shopping system for individual character upgrading and weapon upgrading system also restore and upgrade health system.
- To execute different kinds of enemies which goal is only attack the player until the player death.
- Add sound effects in game from the beginning at the game, when player fires the enemies, when enemies attack the player, when the player is death, when collecting coin, when the game is finished and so more.
- Making menu and menu system.
- Generating procedural levels, that will be simple yet beautiful.
- Add animation to player and enemies.
- Make a beautiful User Interface.

## 1.6 Game Description

This game includes a solitary player entering an arbitrary dungeon which has many kinds of cell and each cell is lockdown with an obstruct. The player enters there with a firearm as the weapon subsequent to choosing a character from the beginning scene of the game. The dungeon is occupied by different enemies and obstacles in each cell that will attack the player on the off chance that he goes into the zone that the enemies occupying. The goal of the player is to find out the way and try to exit. In the event that the player effectively overcomes the enemies and the obstacles then a cell is unlocked it's obstructed and the player picks up to the next cell. The player gets advanced and the procedure goes on until he is the maximum evaluation explorer. In maximum evaluation there is an enemy which is more powerful than the other. This enemy is called boss enemy. There occurs a battle with the boss enemy and this battle is called boss battle in that stage. If the player can defeat that all enemies successfully in the battle then he will reach in his destination. In any case, he doesn't altogether turn into the maximum evaluation explorer inside a solitary prison; he needs to crush enemies by transporting to various cells. The player can likewise change the weapon on the off chance and can restore and upgrade his health in the shop system by his gained coin during the game. There is map above the scene by which the player can track himself during the game play.

For the player to set aside a ton effort to clear the whole cell in this manner it will just take 5-10 minutes on normal without stopping the game.

## 1.7 Expected-Outcome

- Generate the full concept of Roguelike Game and RPG (Role Playing Game) Game.
- Recognize with how to play a shooting or fighting game.
- Become acquainted how can save life from the attack of enemy.
- Acquainted with the game asset store which is used for making the game.
- Utilize the basic principles of computer science, mathematics, physics and other technical skills necessary for the design of computer games.
- Adapt the new technologies and environments, and quickly learn new skills and methodologies.

## 1.8 Report Layout

My project report consists of 6 chapter.

1. 1st chapter contains the Introduction, Game Overview, Motivation, Objectives, Game description, Expected-outcomes.
2. 2nd chapter contains Introduction, Related works, Comparative Studies, Features, Challenges.
3. 3rd chapter contains BPM, Requirement collection and Analysis, Use case modelling and Description.
4. 4th chapter contains Introduction, Game design and development process, Character description, Level design, User Interface design.
5. 5th chapter contains Introduction, Implementation and Testing.
6. 6th chapter contains Discussion and Conclusion, Limitation, Scope for future development

## **CHAPTER 2**

### **BACKGROUND**

#### **2.1 Introduction**

In our country, there are a few amounts of game making company or organization who are creating game. Preparing Centre and instructional exercise are not accessible here. Yet at the same time various individual's student inspired by game creating from their pastimes and own initiative. Greatest number of students of computer science and engineering and software engineering is fears to create game since they don't get enough supportive asset for this stage. In our educational system there is no institute who offer any gaming related subject or course. In view of that point I attempt to make some unique and expel the dread of built up the game.

#### **2.2 Related Works**

There was developed a video game project which is called Top-Down Shooter. This game is also a tradition RPG (Role Playing Game) game. This game was developed by Code Monkey (A YouTube Channel) who is a youtuber where he teaches how to make a professional game.

There was also developed another video game project which is called Dying in Dungeon game. Dying in Dungeon is an action/RPG game set in a fantasy dungeon. This game was developed by Thoof.

There was also a similar game called Infinity Dungeon. Infinity Dungeon is a turn-based pixelated RPG set in a multi-level dungeon. This game is made by dlodz.

#### **2.3 Comparative Studies**

Making of video game is not so easy because it is a full combination of science, math, physics, computer, program, art, fashion, design, graphics, knowledge, idea and so many things. Therefore, it is not like other application that which can be use without complete the full idea, on the other hand it is a full pill package of software development. So, making a video game is not easy to anyone. I have studied basic game development project from some website specially from unity3d website, follow some video tutorial and also read many books on game development. I try to establish a such game so that I can learn many things and can established myself as a professional game developer.



## 2.4 Why Play this Game

Challenging 2D platformer with simple graphics and great chiptune soundtrack. Try to get out of dangerous dungeon full of enemies and traps.

## 2.5 Features

- Minimalistic graphics
- Hardcore gameplay
- Powerful enemy
- Quick loading and sublime play
- Pretty map design
- Great original soundtrack
- Many levels
- Coins! Who does not like a coin?

## 2.6 Challenges

During the time of developing the project I had to face a lot of challenges. Hopefully I was capable of effectively defeated the challenges. The challenges I faced are:

**Game Assets:** First of all, I faced with the collecting of asset problem. The game asset is not available in our country that's why collecting of game asset was a big challenge in this game, but I overcome this.

**Game Engine:** I use unity game engine for making my game. In the first instance the use of unity game engine was not so easy, there are lots of game engine available for making game, choosing the unity was the right decision to make my game properly.

**Programming Language:** Nowadays many programming languages are using as a script for developing game as like C++, C#, JAVA, PYTHON, JAVASCRIPT, among of them C# is the most popular programming language for game script. So, learning the programming language was a big challenge.

Some other regular challenges were time scheduling, excellence of code, user friendly representation and proficiency. Moreover, Planning and actualizing was also a big challenge.

## CHAPTER 3

### REQUIREMENTS ANALYSIS

#### 3.1 Business Process Model

Business Process Modelling (BPM) is a digestion that is a procedure of business arrangement and process of an association or industry. Business process demonstrating in business process affiliation and structures orchestrating is the progression of keeping an eye on systems of an endeavour with the objective that the current method may be bankrupt, overhauled, and automated. Nearby business process divulgence, process showing is extensively observed as a fundamental fragment in productive business process the administrators (BPM). It is used to layout an affiliation's current (or "as-is by all accounts") strategies to make an example for strategy redesigns and to structure future (or "to-be") structures with those upgrades joined. Method exhibiting every now and again uses Business Procedure Displaying Documentation (BPMN), a standard system for plotting structures with flowchart-like diagrams that can be successfully fathomed by both IT and business boss.

Dungeon gunner is a solo player off line game so there is no anxiety of hosting charge, in the event that it created to be a web game utilizing WebGL, it will just expend web data to stack the advertisements there. It is totally free to play, the main potential explanation that it might consuming web data despite the fact that it is an off line game is the advertisements that this game may have sooner rather than later which is viewed as generally low.

Furthermore, on the off chance that I include some top-notch weapons or player skins in future the player may need to pay to secure them which is a decision for the players and can't.

## 3.2 Requirement Collection and Analysis

In my project there exist so many technical requirements and these requirements are divided into two parts-

Hardware Part:

- a. Desktop/Laptop (High Configured).

Software Part:

- a. Game Engine (Unity 3D)
- b. Script writing software (Visual Studio)
- c. Image Editor and animation (Adobe Photoshop CC)

These used technologies are fully free for making a video game. This project can be fully complete by these tools no other tools don't be needed to make this game. Most of the time to make this game are required in the game engine, Unity and code editor, visual studio.

Unity itself also has animation editor which can be used to make simple animations that is related to moving objects, animating objects, making character, customise tile set, changing sprites, and sprite editor which can separate sprites which is good enough for this game.

### 3.2.1 Principle of Unity 3D Game Engine

Unity 3D is now in a position of number one ranked all over the world among game development engine. Unity technologies provide built in Integrated Development Environment with cross platform game engine. It has thousands of tools for development and design game. It is usually used to develop video games and for web plug-ins, desktop platforms and consoles also for mobile devices. It supports Java Scripts, C Sharp and Boo as scripting language.

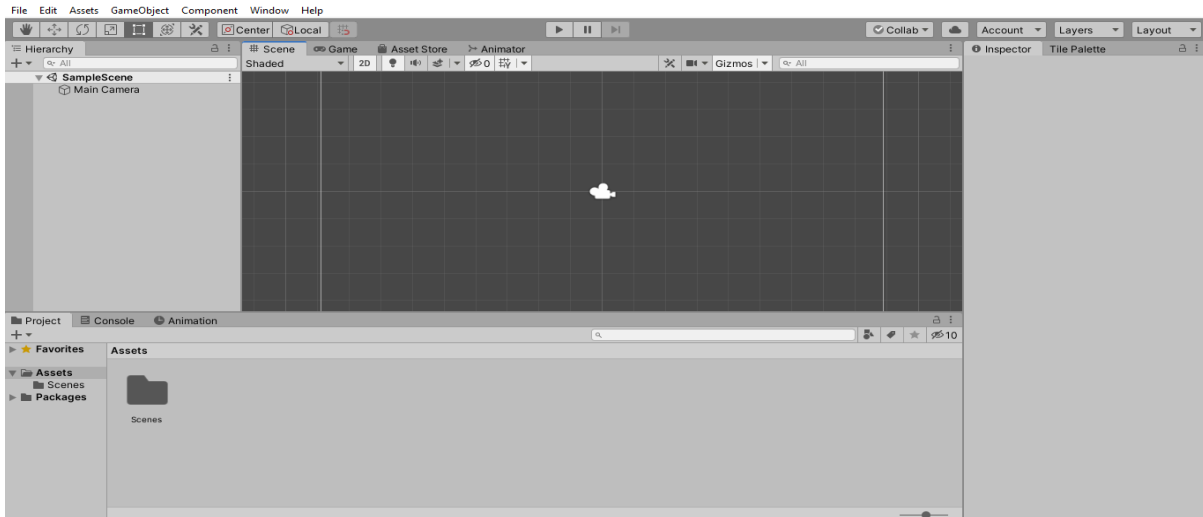


Figure 3.1: Default Project View of Unity 3D Game Engine

### 3.2.2 Visual Studio

Microsoft Visual Studio is well known (IDE) for develop computer program. It used in this game for scripting purpose. C# is the scripting language for this game.

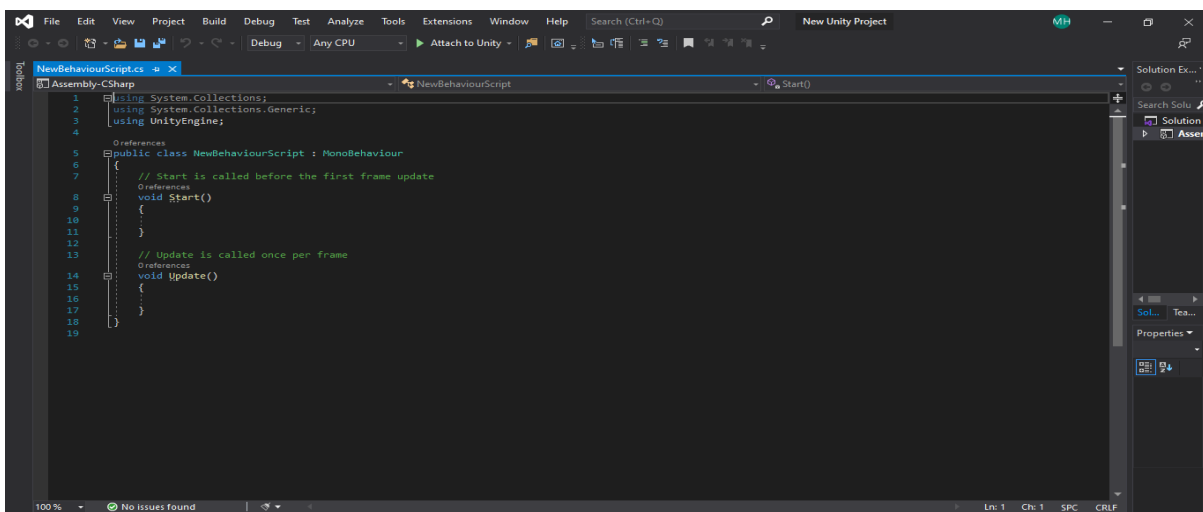


Figure 3.2: Default View of Visual Studio

### 3.3 Use Case Model and Description

In this section I will show the use case model and their description perspective of gamer or player site.

#### 3.3.1 Use Case Model

A use case model is a graphical depiction of how different types of users interact with the system to solve a problem. A use case is a single unit of meaningful work to identify, clarify and organize system requirements. The most important elements are: use cases, association, actors and the relationship between them. The actor can be a human or an external system. Use case diagrams are the blueprints for a system. A standard notation for modelling of real time objects and systems is known as UML (Unified Modelling Language) in which use case is deployed.

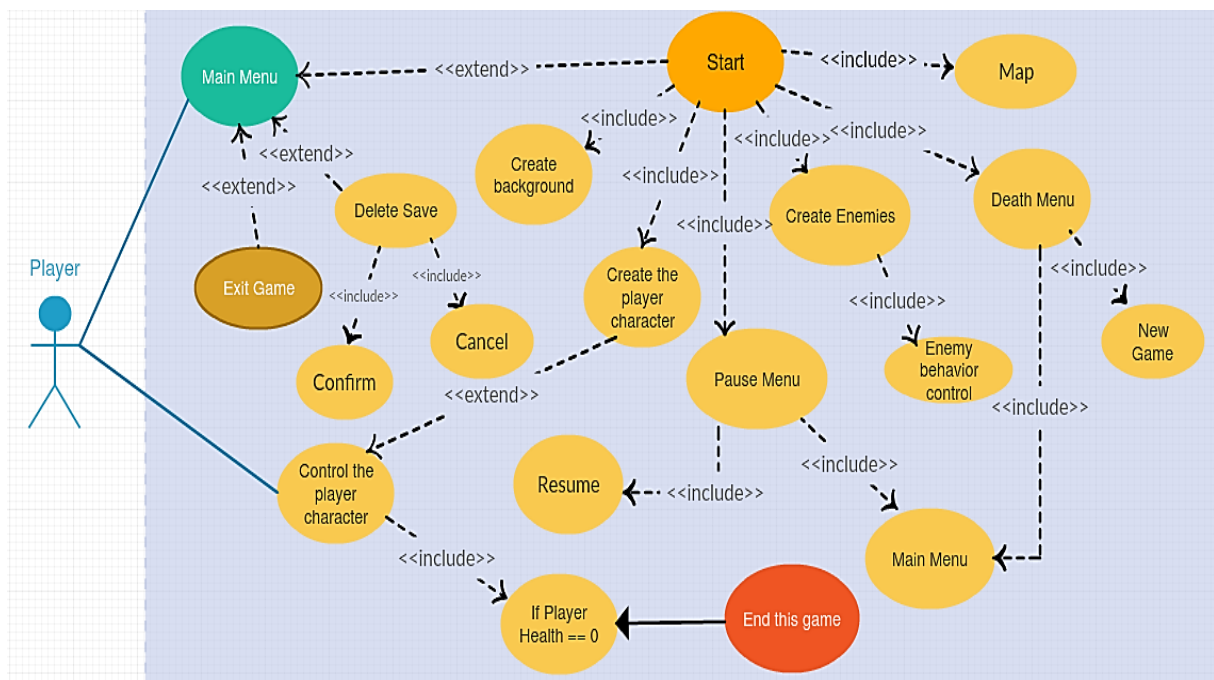


Figure 3.3 Use Case Model

### 3.3.2 Use Case Description

Here I will describe cases from use case model of user:

**Table 3.1: Description of Use Case of Main Menu**

Use Case Name	Main Menu
Actor	Player
Pre-condition	None
Primary Path	<ol style="list-style-type: none"><li>1. Select Start</li><li>2. Select Delete Save</li><li>3. Select Exit</li></ol>
Exceptional Path	Start not selected, Select Ok

**Table 3.2: Description of Use Case of Start**

Use Case Name	Start
Actor	Player
Pre-condition	None
Primary Path	<ol style="list-style-type: none"><li>1. Create Background</li><li>2. Create the Player Character</li><li>3. Create the Enemy Character</li><li>4. Choose Character</li><li>5. Press E for Unlock Character</li></ol>
Exceptional Path	Selected Character is not Unlocked, choose another.

**Table 3.3: Description of Use Case of Delete Save**

Use Case Name	Delete Save
Actor	Player
Pre-condition	None
Primary Path	<ol style="list-style-type: none"><li>1. Select Delete Save from menu</li><li>2. If save the unlock character the select the confirm option.</li><li>3. If don't save the unlock character then select cancel option.</li></ol>
Exceptional Path	None

**Table 3.4: Description of Use Case of Death Menu**

Use Case Name	Death Menu
Actor	Player
Pre-condition	Player must die.
Primary Path	<ol style="list-style-type: none"> <li>1. Select New Game</li> <li>2. Select Main Menu</li> </ol>
Exceptional Path	If Player win the game then press any key to return to main menu.

**Table 3.5: Description of Use Case of Map**

Use Case Name	Map
Actor	Player
Pre-condition	<ol style="list-style-type: none"> <li>1. Load the game</li> <li>2. Play the game</li> </ol>
Primary Path	<ol style="list-style-type: none"> <li>1. Enter M for view the full Map</li> <li>2. Enter M for exit full Map</li> </ol>
Exceptional path	None

**Table 3.6: Description of Use case of Pause Menu**

Use Case Name	Pause Menu
Actor	Player
Pre-condition	Pause the game
Primary Path	<ol style="list-style-type: none"> <li>1. Select Resume</li> <li>2. Select Main Menu</li> </ol>
Exceptional Path	If not resume select Main Menu

**Table 3.7: Description of Use case of Exit**

Use Case Name	Exit
Actor	Player
Pre-condition	None
Primary Path	<ol style="list-style-type: none"> <li>1. View Main Menu</li> <li>2. Select Exit</li> </ol>
Exceptional Path	None

## CHAPTER 4

### DESIGN AND DEVELOPMENT

#### 4.1 Introduction

In this chapter I describe the design and development process of my game development. In my game I use different types of player character, enemy character, different types of spikes, chest, room, different dungeon scene, a beautiful user-friendly interface which are very interactive and carry functionality. This chapter discusses about the characters: main character, enemies, cage, and finally other objects like chests, breakable boxes, spikes, cage and so many more.

#### 4.2 Game Design and Development Process

Dungeon Gunner is a rogue-like game which is an RPG (Role Playing Game) style game. Player can play the game from the perspective of RPG game. I used Unity3d game engine for

- Scene creation
- Character design
- Object collaboration
- AI of enemy behaviour and friendly user interface

#### 4.3 Character Description

##### 4.3.1 Character (Main)



Figure 4.1: Main Character

The player can use the above characters in the game, there is a default character in the scene. Player can change the character at the beginning scene of the game. There also have some character which are locked by a cage. Player can purchase the character by collecting pick up gold coin in game play mode. The player need purchase them from in game shop system.



### 4.3.2 Character (Selector)

When the player starts the game, then at the beginning of the game player is play game with a default character but there is have an option to change the character from character selector scene. And these characters are:



Figure 4.2: Character Selector

### 4.4 Enemy

There have the following two types of enemy in this game, these are:

**Melee Enemy:** Normal enemies chase and attack the player till the player go out of their inhabitant area.



Figure 4.3: Melee Enemy

**Boss Enemy:** Boss enemy it is like an eye. It is most powerful enemy among all enemy. When player reached to it range or its area it is fire lots of bullet randomly. It is not easy to defeat the enemy.

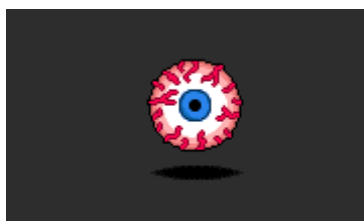


Figure 4.4: Boss Enemy

## 4.5 Player Weapons

There are total three weapons or guns are used in this game and their names are Machine gun, Pistol, Revolver. Except the Pistol all other weapons are locked and them can be use by can be acquired from chests during the game play and they are randomized. They can be upgraded individually from the character shop; each have different sounds effect and bullet to distinguish with different bullet speed.



Figure 4.5: Player Weapons (Machine gun, Pistol, Revolver)

## 4.6 Other Objects

This section explains about the objects which are make the game more flexible and more fun and these are:

### 4.6.1 Box, Character Cage, Level Exit, Spikes



Figure 4.6: Box, Character Cage, Level Exit, Spikes

The above objects do the following activities when player come in contact:

- **Box:** It is breakable, it contains with gold coin and player can collect this gold coin by destroy the box with the weapons bullet.
- **Spikes:** It does not do anything when player come in contact but it is an obstacle and player can destroy it when come in contact.
- **Character cage:** Character cage is an object which is used for lock a character and which can unlock with the help of pickup of a coin.
- **Level Exit:** It is used for when a level is complete.

## 4.7 Pickups

### 4.7.1 Coin Pickup, Health Pickup

**Coin Pickup:** With the help of a breakable box coins are remaining hidden in the dungeon scene. Player can destroy the box with the help of bullet of his weapon and he can pick up this coin. When this coin is collected by the player it stores and save in the gold bar and the number of collecting coins are shown in the gold bar.

**Health Pickup:** It is very important in this game. When player is attacked by the enemy and enemy hit the player with its bullet then the player loss his health and life at that time. Player can save his life by gather the health Pickup object and player must pick up the health increaser object before he dies. Player health position is shown in the corner of the health bar and by this health bar he can understand that what amount he damages his life.



Figure 4.7: Coin Pickup and Health Pickup Object

## 4.8 Bullets

In this section I described about the bullets which are used for both players guns and for enemy. There are use different bullet object for weapons and enemies.

### 4.8.1 Player Bullet

In this game player can use different types of weapon in different states when he needs. Player can kill the enemy with the help of weapons bullets. When he starts fire with his weapon to kill the enemy then bullets are appearing from his weapon until he continues the fire. When the bullet hit the enemy continuously then the enemy being destroy or die. Different weapons are used different colour of bullets in this game.

The following bullet objects are used for the player bullet:

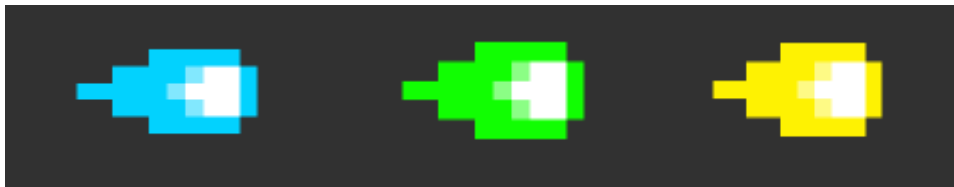


Figure 4.8: Player Bullets

### 4.8.2 Enemy Bullet

Enemy can also destroy or kill the enemy with his bullet. Enemy do not use any weapons to throw his bullet to kill the player. He can attack the player automatically. When player is contact with the area of the enemy the enemy start attacks certainly. When they attack the player, bullets are appearing automatically from his body with continuously.

In this game there are used two different types of enemies which are Boss enemy and Melee enemy. Two different enemies are use different colour of bullet to attack the player.

The following bullet objects are used for enemy bullets:

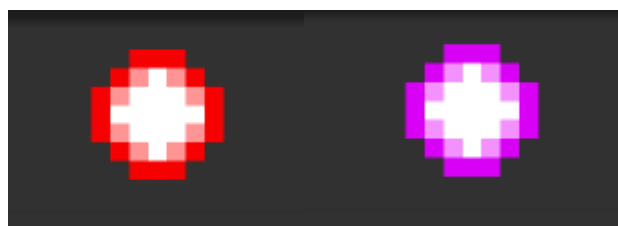


Figure 4.9: Enemy Bullets

## 4.9 Splatter

Splatter is an effect which is happened when the player can able to kill an enemy. It is like blood. When an enemy is death or destroy then this effect is happened. This is also called bullet impact effect because its happened when the bullet is hit the enemy and destroy the enemy. This bullet impact effect happened for both Melee enemy and Boss enemy.

### 4.9.1 Melee Enemy Death Splatter

The following splatters are used for Melee enemy bullet impact effect:

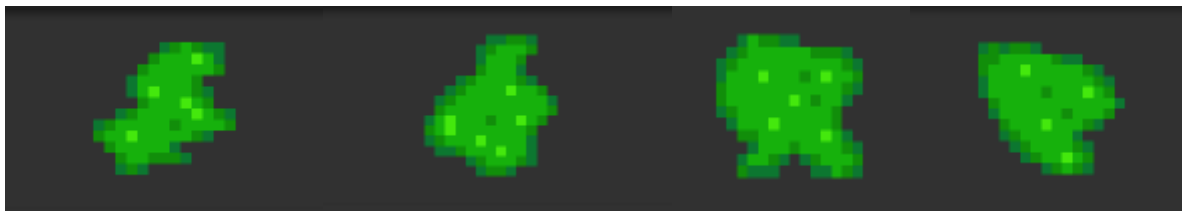


Figure 4.10: Melee Enemy Death Splatter

### 4.9.2 Boss Enemy Death Splatter

The following splatter is used for Boss Enemy Death Splatter:



Figure 4.11: Boss Enemy Death Splatter

## 4.10 Design of Level / Level Design

Level design is the most important part of this game design. Level design includes with dungeon scene and room design. In the dungeon there are many rooms are created and these rooms are included with enemy, doors, obstacles and many other things. This level design can create with the help of Unity Tile Map System.

I used the following Atlas for the purpose of room design for the dungeon scene:

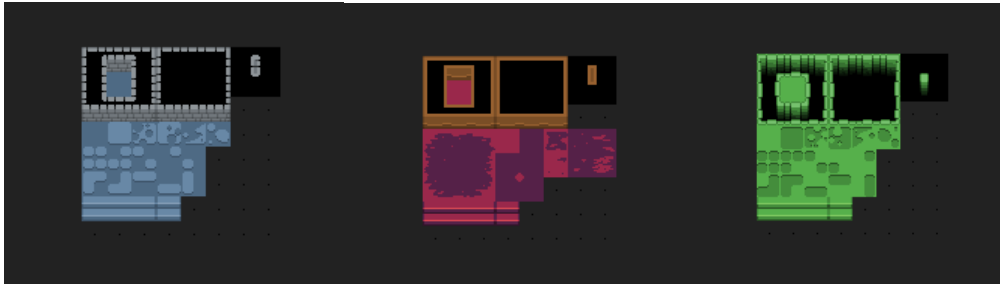


Figure 4.12: Level Tiles

The tile set are using with 2D box collider which confirm that player and enemies are stay within the game level.

## 4.11 Room Design

The following sample room design scene is created with the unity tile map system.



Figure 4.13: Sample Room Design

### 4.11.1 Dungeon Scene\_1



Figure 4.14: Dungeon Scene\_1

### 4.11.2 Dungeon Scene\_2



Figure 4.15: Dungeon Scene\_2

### 4.11.3 Dungeon Scene\_3



Figure 4.16: Dungeon Scene\_3

### 4.11.4 Dungeon Scene\_4



Figure 4.17: Dungeon Scene\_4



### 4.11.5 Dungeon Scene\_5



Figure 4.18: Dungeon Scene\_5

### 4.11.6 Dungeon Scene\_6



Figure 4.19: Dungeon Scene\_6

## 4.12 Boss Battle Room Scene

The final major system in this game is it having a boss battle. Players play through the game play to a few levels in a row and then after a few levels' player jump into a boss level. So there set up the boss room that the game is going to use. The boss has a health system bar. The player has the ability to keep track of his health and obviously win the battle by defeating the boss.

The following figure show the boss battle room scene with the boss enemy and its character.



Figure 4.20: Boss Room



Figure 4.21: Boss Battle Scene

The Following scene is appearing when player can defeat the boss or when the boss is death.



Figure 4.22: Player Defeat the Boss

### 4.13 Shop System

Player have many ways to get coins appearing in the game. Player need something to actually spend those coins on. So, in this game there have a nice little simple shop for the player to use in the game and it'll appear as a random room in game level generation.

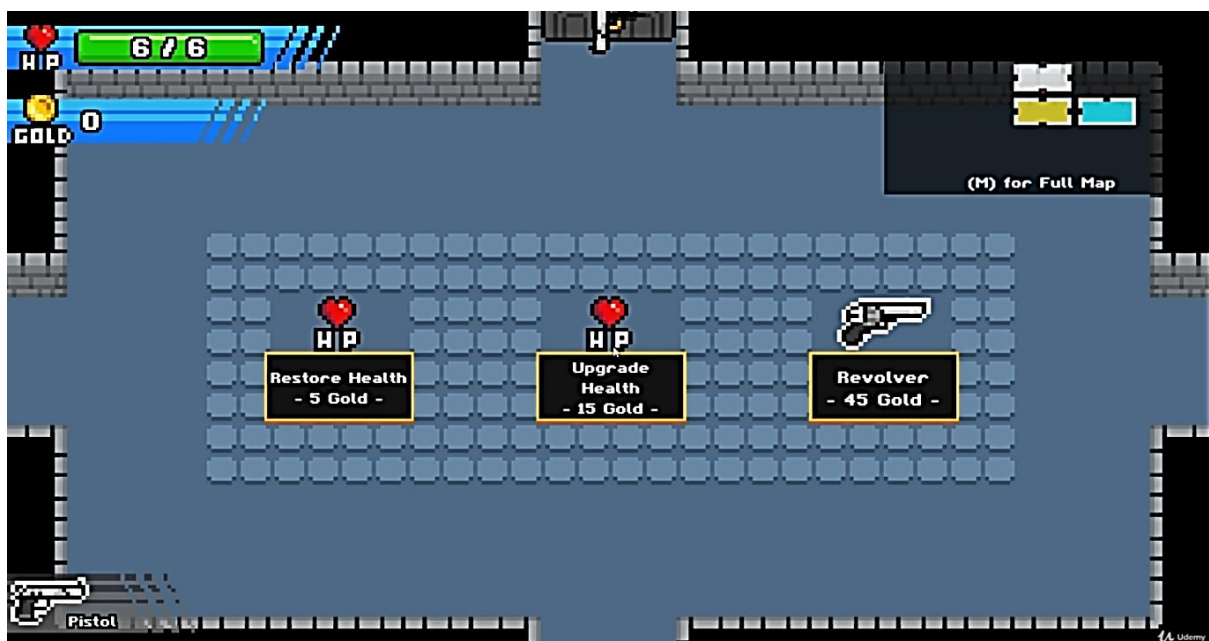


Figure 4.23: Shop System

## 4.14 Map System

It'll be really helpful to be able to have a map for the player to see so the player doesn't have to memorize the whole entire level off by heart. In this game there have a little bit of a wander around and just have a map to rely on to be able to find where the player wants to go. Player can see the full map by pressing M only and also exit the map by pressing M from the keyboard.

The following figure show the map:



Figure 4.24: Map System

## 4.15 User Interface Design

In this section I will describe about the user interfaces which are used in this game. These user interfaces are making the game more interesting to play and increase the functionality of the game. These user interfaces are very friendly to use.

### 4.15.1 Home Screen

The home screen show the game name and it includes with menu option; the menu includes with: -

**Start Button:** When player click to start button then the game start to play

**Delete Save Button:** When player click to delete save button the game deletes the save character and it show a popup window which include with confirm and cancel button.

**Exit Button:** To exit from the game player should select the exit button.

The following figure show the Home screen: -

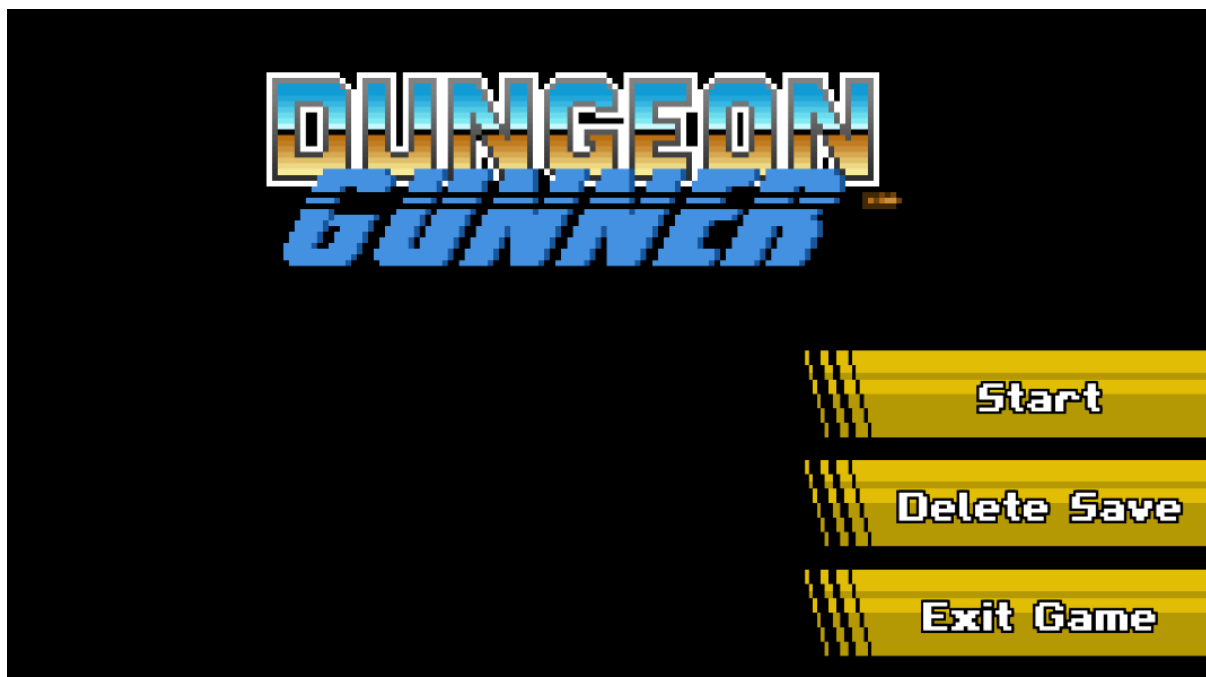


Figure 4.25: Home Screen

### 4.15.2 Pause Menu

Pause menu simply pauses the game from which the player can continue or reply the game, can also go back to main menu.



Figure 4.26: Pause Menu

### 4.15.3 Death Menu

In death menu a message is shown that you died try again. From Death Menu the player can restart game or can go back to main menu.



Figure 4.27: Death Menu

#### 4.15.4 Delete Save Menu

When player click to delete save button the game deletes the save character and it show a popup window which include with confirm and cancel button.

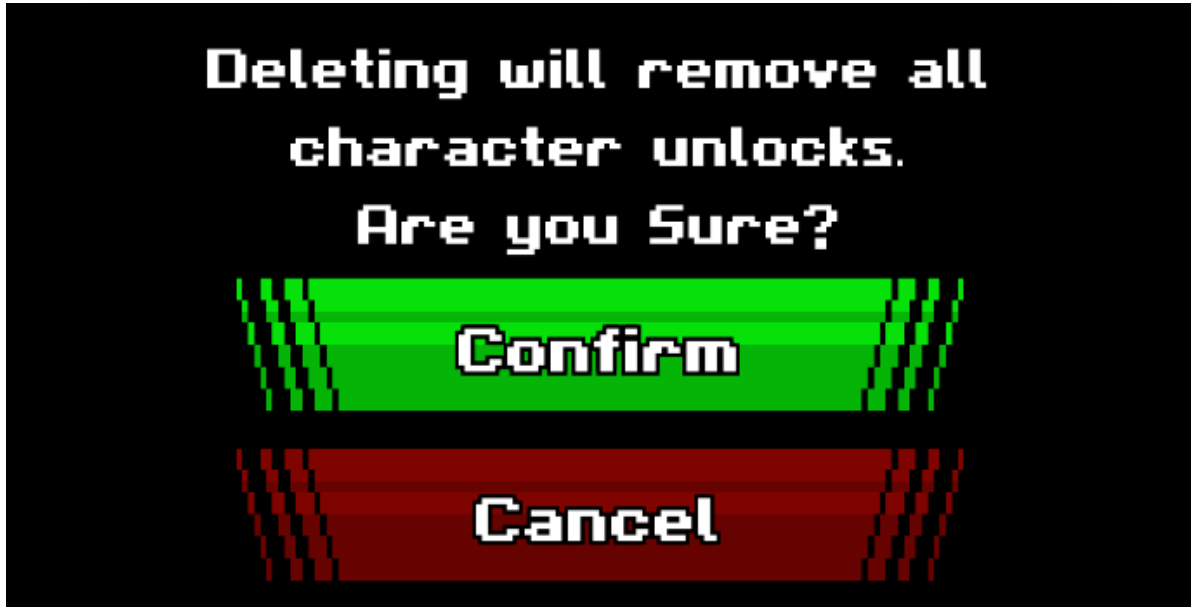


Figure 4.28: Delete Save Menu

#### 4.15.5 Win Menu

When player can successfully defeat the enemy then a popup window is appearing which includes that you win press any key to return main menu. Player can also go back to main menu.



Figure 4.29: Win Menu

## 4.16 Game Control

The following figures illustrates the inputs to control the player. For PC we are using keyboard keys to move the player and mouse to shoot and switch weapons.

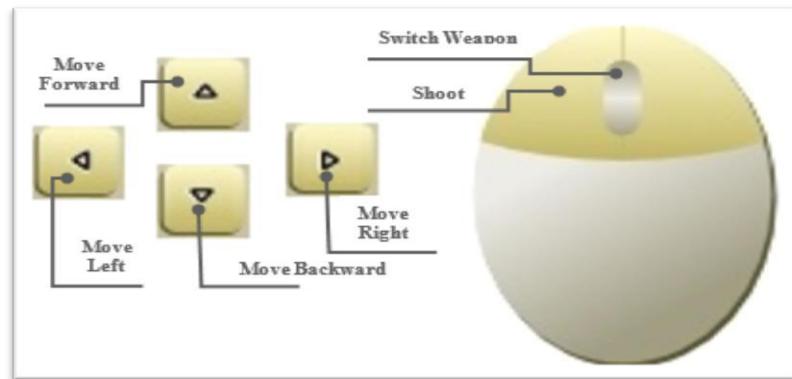


Figure 4.30: Keyboard Input

## 4.17 Try to Make Game Funny

Although regular mechanics can make the game practically functional however that is insufficient for entertainment purpose, to entertain the users I have to focus on different parts of the game. With keeping that mentality, I have included the following features in the game to make the more fun.

- **Background Music:** Instead of playing a single BG music I have added multiple BG music that we usually get to hear in car racing with the order being totally randomized.
- **Sound Track:** Instead of playing same sound clip when player is shooting, I have added different sound clips for each of them, which helps us to distinguish the weapons, and added other sounds effects that have been playing as player hurt, enemy hurt, victory, game over clip.
- **Enemy Death Effect:** A simple death effect instead of enemy vanishing suddenly outspokenly better.
- **Health Bar:** There are use health bar for both player character and boss enemy. There is not use health bar for normal enemy.
- **Popup Text:** This is a must have feature for all the 2D RPG games, and thus added in my game.



## CHAPTER 5

### IMPLEMENTATION AND TESTING

#### 5.1 Introduction

In this section I talked about how to implement and testing game environment for unity game development. My objective with this game was to make a rogue-like and RPG PC games. My concern is that my CPU utilization is practically boundless RPG 100% wrenches. I comprehend that it is wanted (equipment however much as could reasonably be expected to it), yet for this game, it's truly a bit much (it's truly simple). In this way, there need to restrain the upper bound of the rogue-like and RPG.

#### 5.2 Implementation Tools

I utilized Adobe Photoshop CC expanded release for pictures structure for improvement the game utilizing Unity 3D 2018 versions. I built up my game in 2D's. C# is a powerful programming language has been decided for coding. This Programming Language created by Microsoft. This programming language was utilized for coding the vital classes to execute the program. I additionally utilized numerous devices in Unity 3D game engine which are required in this game development.

#### 5.3 Implementation of Game

Unity technology is the noticeable IDE (Incorporated Improvement Condition) for creating game for various stages, for example, android, iOS, windows, Work area and so forth. It produces essential objects in backend consequently which are generally fundamental for the game development. At the point when produced a C sharp for gaming conduct shows this figure.

Below the figure 5.1 (Unity game development engine default C# view) shows the default C# Sharp view screen.

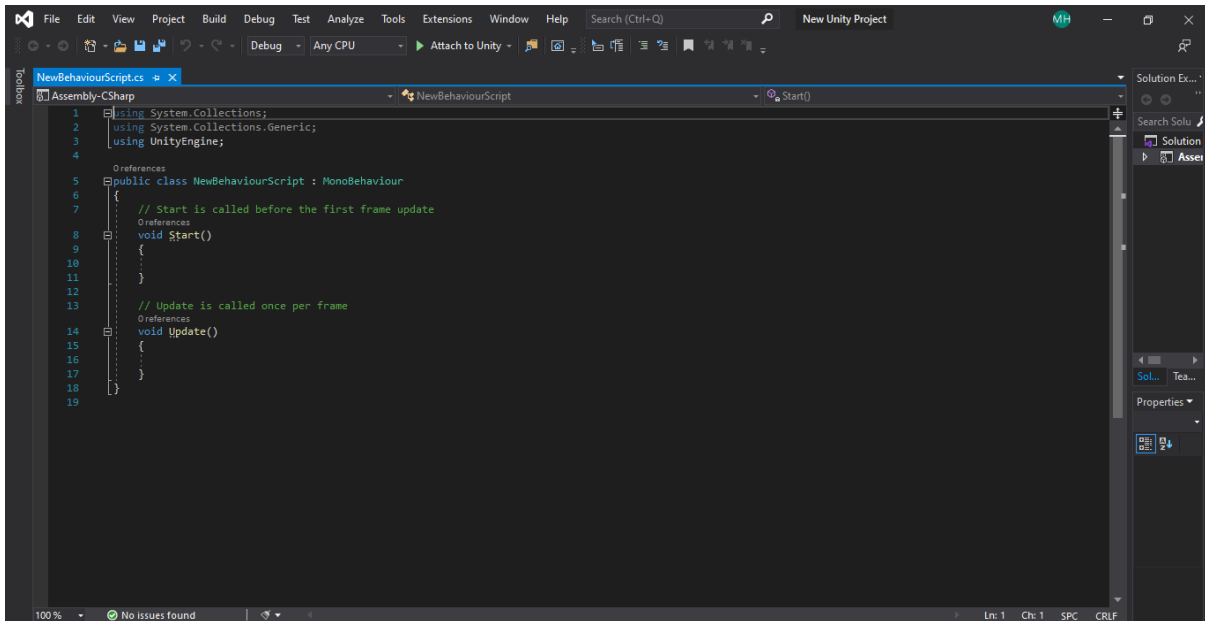


Figure 5.1: C# View

The following figure 5.2 (Default project view in unity), when a new project is open it seems to be is like as below.

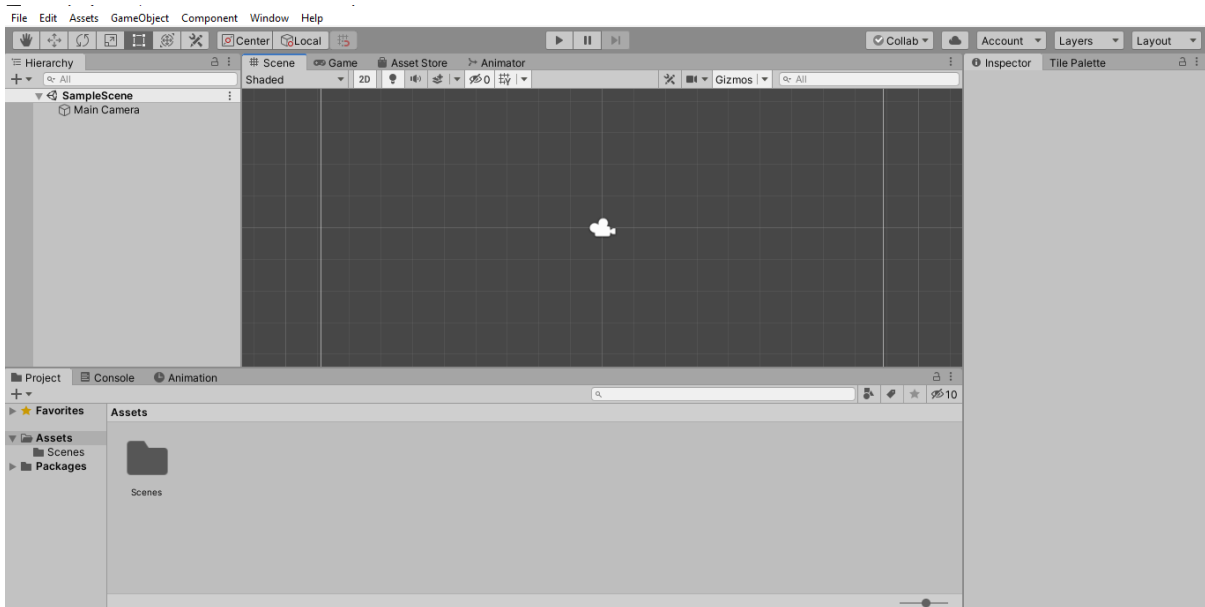


Figure 5.2: Default Project View in Unity

Below the figure 5.3 (Dungeon Gunner game development view with Unity) shows the development process of my Dungeon Gunner game.

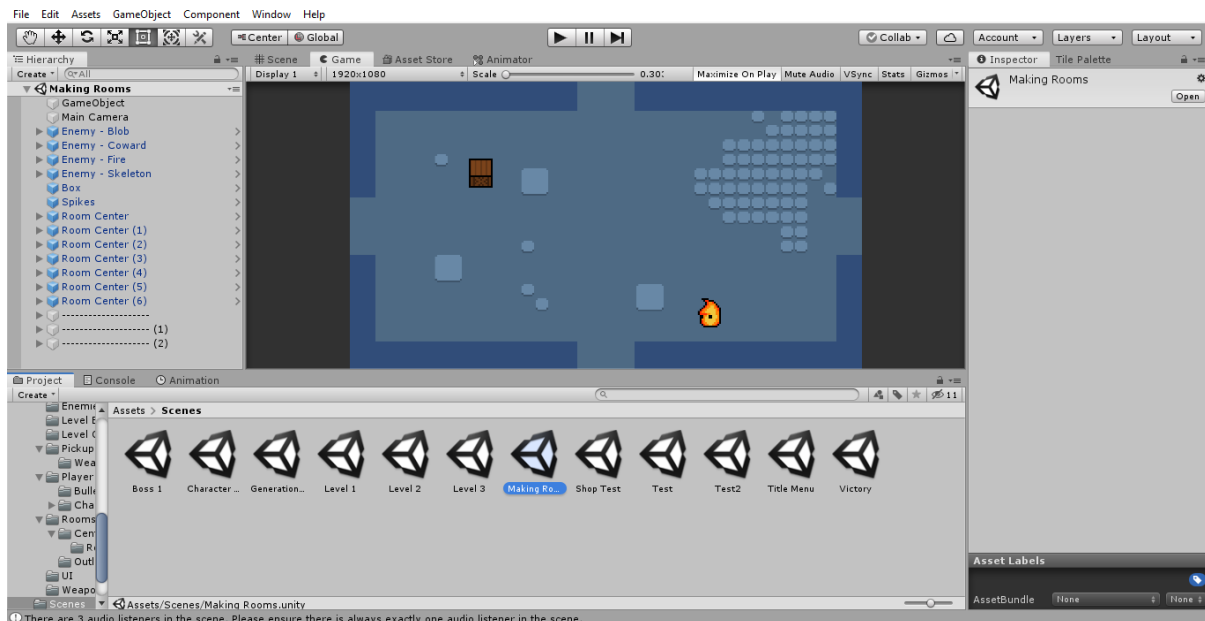


Figure 5.3: Development View in Unity

## 5.4 Testing

### 5.4.1 Assessment Models

Like some other game application, the assessment rules framework relies upon how to create framework which legitimizes the primary idea of Shooter game. This project following arrangement of standards

### 5.4.2 Fulfilling Necessity Determination

If the task fulfils all the prerequisites, for example, practical and non-useful necessities and give positive outcome then we can comprehend that the test is fruitful. To put it plainly, it ought to be equipped for guaranteeing the necessity determinations.

### 5.4.3 Accuracy

Accuracy is one of the incommodious necessities of programming improvement. The most vital purpose of the game arranged programming is perfectness. Every part of the product needs to work appropriately and effectively.

#### **5.4.4 Compatibility and Integrity**

To check whether the project is effective or not the compatibility and integrity are the most noteworthy conditions. The game was made to be perfect with any versatile Working Framework, for example, Android, Windows, iOS, Blackberry and so forth. Also, Work area PCs, for example, Windows, Linux and so on.

#### **5.4.5 Ease of Use**

One of the most significant point in game application improvement is ease of use. Client would not go through over one moment subsequent to opening the game, If the application interface isn't winsome. In the event that application interface is winsome and the game activity will be straightforward. Indeed, increasingly potential prerequisites can be included future, yet in the current case these are very little important. This application will be progressively perfect, quicker and smoother to execute on the device.

#### **5.5 Testing Methodology**

Typically, software testing is utilized to discover the framework blunders. A product test can be done by looking at codes, plan and execution of the entire framework. Testing is fundamental to improve the nature of the framework. It is vital for the check and the approval (V and V) of a framework. In this project, I used Unity 2018 for testing purposes. The setups of the analyser machine were as per the following.

##### **Developers PC**

Windows Edition:	Windows 10 Pro
Processor:	Intel® Core (TM)i5 CPU M480@2.2GHz
Random Access Memory (RAM):	4.00 GB
System Type:	64-bit Operating System

##### **Testing PC**

Windows Edition:	Windows 10 Pro
Processor:	Intel® Core (TM)i3 CPU M480@2.2GHz
Random Access Memory (RAM):	3.00 GB
System Type:	32-bit Operating System

## **5.6 Result and Analysis**

Here I will discuss about result of testing and analyse it.

### **5.6.1 Unit Test**

Unit tests are generally utilized in a point by point structure and stage usage of a project. The ethics of the unit test were to discover the errors in this product. Such kind of test can be finished in two different ways, they are white box and black box tests. In our task, a black box test framework was utilized to discover the errors and the possible solution of this error. Each piece of the code module for the discovery test, was utilized to check if the framework worked accurately.

During program testing two sorts of mistakes happened in particular, syntax errors and logical errors.

- Before the program is executed, syntax errors have to be corrected
- Handling of data, improper sequence of program statement etc.

Also, the following are the various stages in the testing process.

### **5.6.2 Black Box Test**

In this testing I give input to the system and test the output. Here I do not go for watching the internal variable in the system and what are the changes made on them for the required output, any invalid input for the above leads to failure in establishing the connection between the front end and back end.

- I tried to the system without authentication, but the system does not respond.
- I tried to use incorrect data, but it is not responding. When get correct answer then the system responds.

### **5.6.3 Functional Test**

Functional testing is additionally performing on this project known as Discovery Testing. Here I test the usefulness of the program. In functional testing, I saw a specific yield to include esteems and creates positive outcomes.

## CHAPTER 6

### CONCLUSION AND FUTURE SCOPE

#### 6.1 Conclusion

During the development of this project I have studied the working principle of Unity3D manual guide. I have also studied the how Unity3D game engine works and can be functional with another scripts and modelling scripts from Blender software 3D modelling tools. The proposed system is developed with the combination of above stated tools which will lead the users to hassle free smooth enjoyable game play environment.

#### 6.2 Limitation

Though my project is about game development, it has some shortcomings like other projects.

- Dearth of resource: A game development project needs huge resources which is not available in this project.
- Scarcity of time: A game development project needs a lot of time but there don't get enough.
- Insufficiency of team member: A game development project need a big team but I have only one member in my project.

To develop a game is very expensive in our country because the resources to build a game is very costly even most of needed resources are not available in the internet. For these type of problem Developer of our country hardly choose game development project.

#### 6.3 Future Scope

This game is made for PC at the present. There are many scopes available for the improvement of this game including the additions of other functionalities.

Some of the plans for the future of this application could possibly be:

- To make a mobile version.
- To change the game art entirely since for now I'm using free assets to design the levels.
- To add more dungeons and increase player grade's system.
- Add more different enemies in the game.
- Adding mission giver NPC's.

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