DESIGN AND DEVELOPMENT OF A FIRST PERSON SHOOTER GAME- MAN FROM W'71

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

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APPROVAL

This Project titled **Design And Development Of A First-Person Shooter Game - Man From W'71**, submitted by **Md. Shahadat Hossain** and **Most. Sohana Mehbuba** 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 05 May 2018.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Dr. Sheak Rashed Haider Noori, Associate Professor and Associate Head** and co-supervised by **Md. Zahid Hasan, Assistant Professor,** Department of Computer Science and Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.
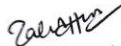
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 Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

This project is about one of our freedom fighters character which is a kind of First Person Shooter Game. The new generation people give so much attention in playing online game for entertain and there is remarkable tremble in the all type of generation to plays Action of game, most of the young people expend a lot of time on playing game. We tried to do something more valuable and more attractive to gamers and our new generation who almost going to forget about our liberation war. This is a FPS game and we named the game is: **"MAN FROM W'71"**. Where player can play as a Freedom fighter as first-person view. Where enemy are Pakistani Military. Player mission is to keep their country secure from Pakistani Military. Hope this will be a massage to our new generation via our game. We used Unity 3D game engine for develop game. We also used Blender software to implement the whole 3D model of our game like the houses, trees, characters and so on, we have chosen C-sharp as a programming language for scripting language. Moreover, this report also gives a direction to examine and test a Unity 3D 2017 platform.

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INTRODUCTION

1.1 Introduction to Man From W'71

Day by day we are going to forget our history about our Freedom Fight. Our new generation is almost don't have any idea about it. After one or two more generation we are actually going to forget about our Freedom Fight. We are getting digitalized day by day. Actually, we want to make our life easier and faster. Today we are going to forget to play on playground. For lack of playground we actually taking PC Game as our main platform for play. Actually, our kids also like to play games on their device. So, we tried to make our game more valuable or meaningful by developing our game "Man from w'71". We tried to focus on our Freedom Fight in this game. So that, we can learn not only about our history of freedom fight but also, we can save our history for our new generation. But here we have not been able to put graphical view of our country as user interface in the game scene yet, we have prepared a shooting here by two groups, where there will be a hero and his group of people from our country and the other people will be Pakistan Army.

1.2 Inspiration

We like to play First Person Shooter game and enjoy very much. In our country there is tiny number of company develop game. Our dream is to make ourselves as a game developer and make workplace in our country on game development platform.

1.3 What is FPS Game?

FPS is short for first-person shooter, a game genre. FPS games are ones that are in the first-person perspective where the gamer can only see the character's hands holding a weapon on the screen.

1.4 Goal and Objective

Here we have defined our goal and object for develop our game.

1.4.1 Goal

The main goal of this project is to achieve a good skill in the game development site and to showcase how to make a game in the next generation, we also tried to highlight the history of our liberation war through the game.

1.4.2 Objective

This game is developed for PC only and it has following objective –

   i.   Entertain people.
   ii. Making of own game to get skilled.
   iii. Make interest in game development.
   iv. Make resource of game development assets in our country.

1.5 Report summery

This report has been arranged as follows:

Chapter one includes the introductory parts of the project. Chapter two includes the review of the background. Chapter three discusses the game overview. Chapter four contains the Design and development part. Chapter five discusses the part of game progression architecture with flowchart. Chapter six includes the part of game implementation.

The developed application has been tested and evaluated which is described in Chapter seven. Chapter eight describes the whole idea and gain of the project and ends with concluding remark.

CHAPTER 2

BACKGROUND

2.1 Introduction

In our country, here is limited number of organization who develop game. Training Center and tutorial are not available here. But still a number of people interested in game developing from their hobbies. Maximum number of student of Computer Science is fears to develop game because they don't get enough helpful resource for this platform. In our Education system there is no University who offer any gaming related subject. Based on that topic we try to make some different and remove the fear of developed the game.

2.2 Related Work

There was a game development project named "Procedural Urban Environments for FPS Games." The project was developed by Jan Kruse (Auckland University of Technology), Ricardo Sosa (Auckland University of Technology), Andy M.Connor (Auckland University of Technology),published it at 2-5 February in 2016.They made the First person shooter game by using unity 3D game engine. They applied HBGA (human-based Genetic Algorithm) in their game.[3]

There was another game development project named "Escape from Tarkov" is a first-person shooter video game which is developed by Battlestate Games. It is a story-based game where challenge is coming to escape the city with their lives. Player can join his squad of friends for ultimate action.[8]

There are millions of video gamers so, competitive gaming has been the talk of the 21st century. But the truth is, there is no one can say the same for Bangladesh. In our country so many talented gamers are existing who has ability to participate in international platform. They can't grow their self as game developer because here huge lake of investment. They believe Bangladeshis don't have what it takes to compete at an international level due to the lack of quantity in terms of competitive gamers. Some of local sponsor companies provide the little facilities such as clothing

and entry fees to local teams.

There are many gaming zones where a huge number of device are connected together through LAN, Wi-Fi and players are able to compete with each other to prove their skills but they cannot play properly since the devices, even though high in quantity, lack in terms of insufficiency.

The other main issue that is the internet connectivity even though mobile phone companies are always trying to provide the cheapest connectivity rates, this source of internet use is invalid with in Comes to online gaming, it's provide the low signals in any game would require to play online like a broadband line could. There are many of local broad band companies in Bangladesh.

They buy the cheapest routing that the market has to offer which creates a sort of lag and instability resulting in unable to compete internationally online.

Even though all hopes seem to be lost, Bangladesh has not been sitting idle while the rest of the world reached out towards e-sports. The enthusiasm, dedication and the unity of Bangladeshi gamers have kept the fire of the gaming scenario alive and burning. Local players sometimes assisted by small time companies hold tournaments for all competitive gaming providing the opportunity to unravel their hidden talents and prove their skills for a small prize pool.[8]

2.3 Conclusion

In above we can see that the FPS (first person shooting game) is exist. Now we enhance our game development project by using their concept but our game story and characters are totally different. We made the game under the story of a freedom fighter of liberation war 1971.It not only give entertain to the gamer but also give knowledge about our freedom fighter.

CHAPTER 3

GAME OVERVIEW

3.1 Appearance

In our game we develop three different scenes with name Village, Mountain, Lake with proper objects, environment and characters. In this game we try to show western unique environment which is fully natural and colorful.

3.2 Story Abstract

The freedom fighter is the hero and the Pakistani militaries are the enemies of our game. The game is about the clash between the two groups, the all-out gun battle. The enemies (Pakistani militaries) have occupied a village, a mountainous region and a lake lane. Our hero (the freedom fighter) of the game is taking some of his friendly warriors with him. They search for enemy location, then find out the position of the Pakistani militaries. When our hero and his team got highlighted on enemy eye range, Pakistani military start to fire at our hero. Then our hero defend himself and kill them one by one to secure the enemy affected area.

3.3 Frequently Asked Questions

Here we'll try to answer some common queries.

3.3.1 What is the game?
"Man From W'71" is a first person shooting game. Here one hero which is the main player of this game, he will kill all the enemy.

3.3.2 Why create this game?
We've made these games to raise our game development skills. It's a project of Unity3d Game Engine so we've done this game to know the Unity3d game engine wisely.

3.3.3 What does the player control?
The whole game has control over the gamer, he can run, he can walk, jump, use firearms as he wants, and he can go to his wish-and-go action.

3.3.4 What is the main focus?

- Find the enemy.

- Kill them before they kill you.

- Support the friendly.

- Secure the area.

- Save the life.

3.3.5 What's different about other FPS?

In this game we used character based on people of our country, Pakistani military and the gaming environment developed as like as western location. These things differentiate another FPS game from ours.

3.4 System Requirements

The minimum requirements for a computer system to play this game must meet:

- OS: Windows xp / vista / 7
- RAM: 2 GB
- VIDEO CARD: NVIDIA GeForce 8800 GS or Higher
- SOUND: DirectX compatible Soundcard
- HARD DRIVE: 6 GB Free Hard Drive Space
- Minimum screen resolution: HD

CHAPTER 4

REQUIREMENT SPECIFICATION

4.1 Introduction

Engineering requirement also known as analysis of systematic requirement. It also referred to requirements of capture, gathering or specification. So, here in this section we bring up the technical requirements for develop our game.

4.2 Requirement Collection and Analysis

In our project there are so many technical requirements exist, here we divided those requirements into two parts.

- Software part:
    a. Game Development Engine such as Unity3D
    b. Visual Studio for script write.
    c. Graphics and Object Modeling tools such as Blender, Maya.
- Hardware part:
    a. High Configured Desktop and Laptop computers.

Another important requirement is we needed to build a structure the game. These things are fulfilling the requirement of game model:

- Use Case Model.
- Use Case Model Description.

4.2.1 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. [4][5]

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The following figure 4.1(Default project view in unity), when a new project is open it seems to be is like as below.[4]
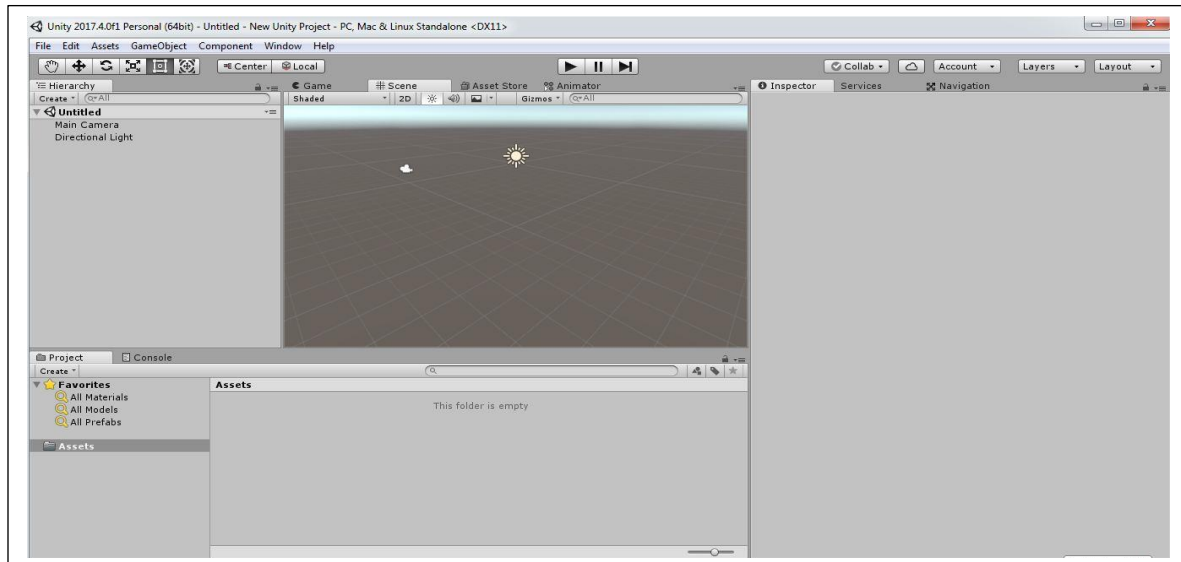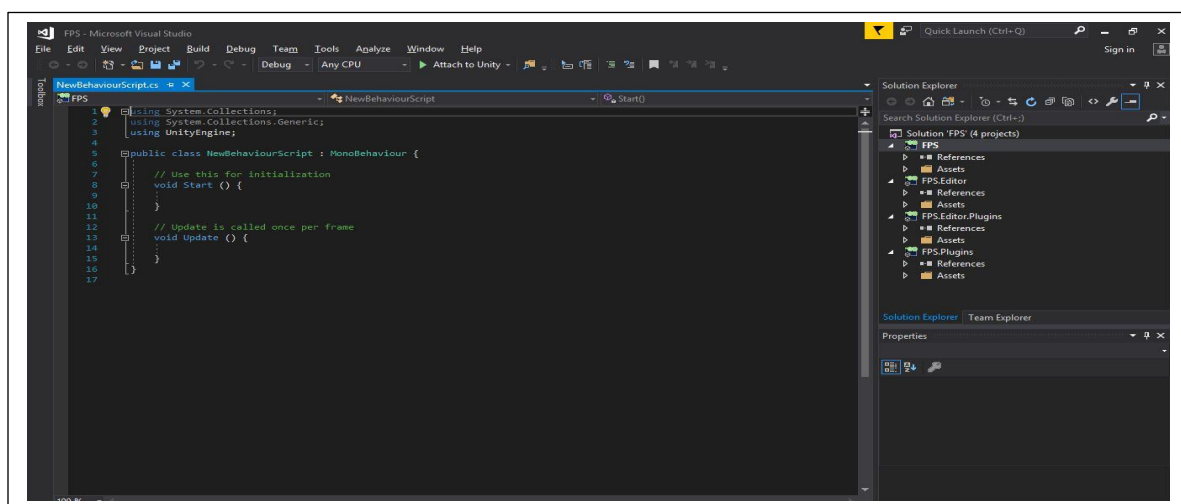

Figure 4.1: Default Project View In Unity

4.2.2 Visual Studio

Microsoft Visual Studio is well known (IDE) for develop computer program. We will use it in our game for scripting purpose. C sharp is our scripting language.

Below the figure 4.2 (FPS game development engine default C# view):

Figure 4.2: C# Default View

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4.2.3 Blender for modeling

Blender is open source 3D creation suite and its totally free for everyone. It supports the entirety of the 3D pipeline, animation, modeling, motion tracking, rendering, rigging, compositing and even game creation, video editing and simulation also.

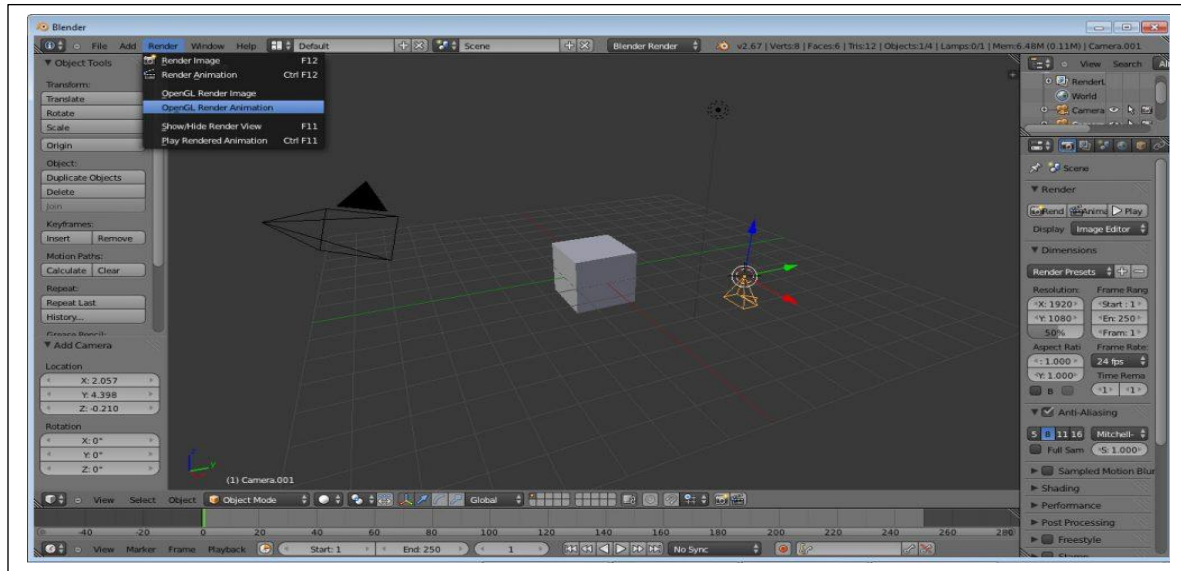Below the figure 4.3 (default object modeling view of Blender software):


Figure 4.3: Blender Default View

4.3 Use Case Model and Description

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

4.3.1 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 modeling of real time objects and systems is known as UML (Unified Modeling Language) in which use case is deployed [2].

Below the figure 4.4 (Use Case Model of Player):
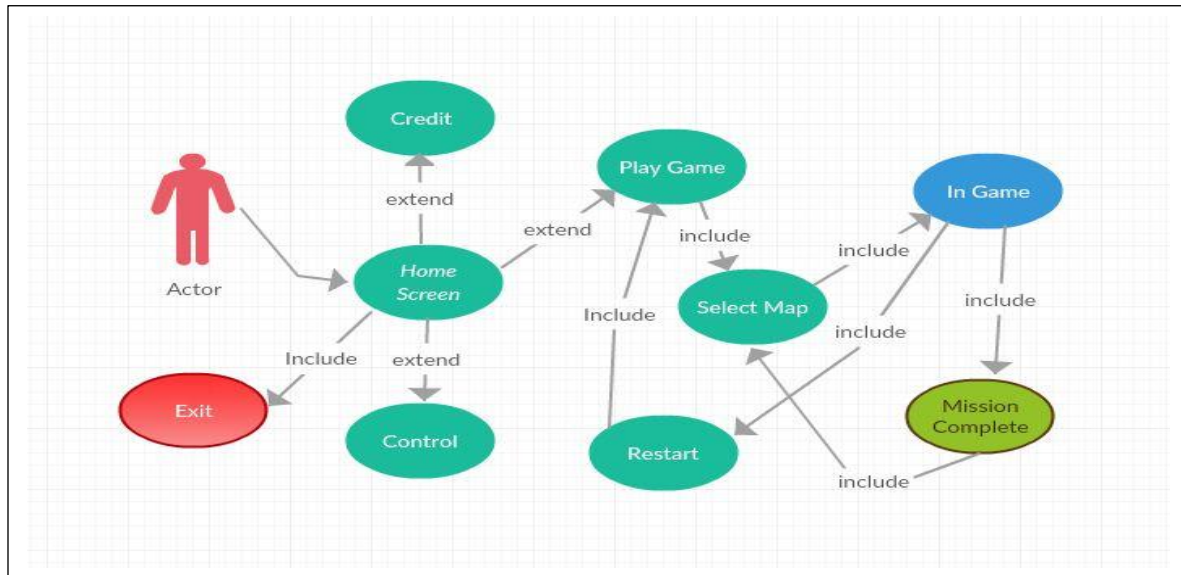
Figure 4.4: Use Case Model Of Player

4.3.2 Use Case Description

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

i) **Home Screen**

Use case: Home screen

Actor: Player

Pre-condition: None.

Primary path:

1. View game name.

2. View menu.

3. Select play game.

4. Select map.

5. Click ok.

Exceptional path:

1. Play game not selected, select ok.

ii) **Play game**

Use case: Play game

Actor: Player

Pre-condition: None.

Primary path:

  1. View map.
  2. Select mission.
  3. Click ok.

Exceptional path:

  1. Selected map is not unlocked. select another.

iii) **Select map**

Use case: Select map

Actor: Player

Pre-condition: None.

Primary path:

  1. View maps.
  2. Select one.
  3. Wait for load.
  4. Click ok.

Exceptional path:

  1. If load fail, select go back.

iv) **In-Game**

Use case: In-Game.

Actor: Player.

Pre-condition: None.

Primary path:

  1. View environment.
  2. Search enemy.
  3. Complete mission objective.

v) Restart

Use case: Restart

Actor: Player.

Pre-condition: None.

Primary path:

1. View main menu.
2. Select Play game.
3. Select Map.
4. Click Ok.

Exceptional path:

4. Go back not selected, select ok.

vi) Control

Use case: Control

Actor: Player

Pre-condition: None.

Primary path:

1. View main menu.
2. Select control.
3. View control.
4. Click go back.

Exceptional path:

1. Go back not selected, select ok.

vii) Credit

Use case: Credit

Actor: Player

Pre-condition: None.

Primary path:

1. View main menu.
2. Select credit

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3. View developer details.

4. Click go back.

Exceptional path:

1. Go back not selected, select ok.

viii) Control

Use case: Control

Actor: None.

Pre-condition: None.

Primary path:

1. View main menu.

2. Select control.

3. View control.

4. Click go back.

Exceptional path:

1. Go back not selected, select ok.

ix) Exit

Use case: Exit

Actor: Player

Pre-condition: None.

Primary path:

1. View Go Back button.

2. Select exit button.

3. Click ok.

Exceptional path:

1. Go back not selected for quit, select it again.

4.4 Conclusion

We must be able to develop our Man from W'71 by implementing our project properly. We can also reduce any kind of occurrences which are harmful for our project development.

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CHAPTER 5

DESIGN AND DEVELOPMENT

5.1 Introduction

The system of our proposed project which is an integration of so many small designs, characters

modeling, scripting.

5.2 Game Progression Architecture Design

Here are some flow charts are set to illustrate the key features of the game and how it fits into the

game flow.

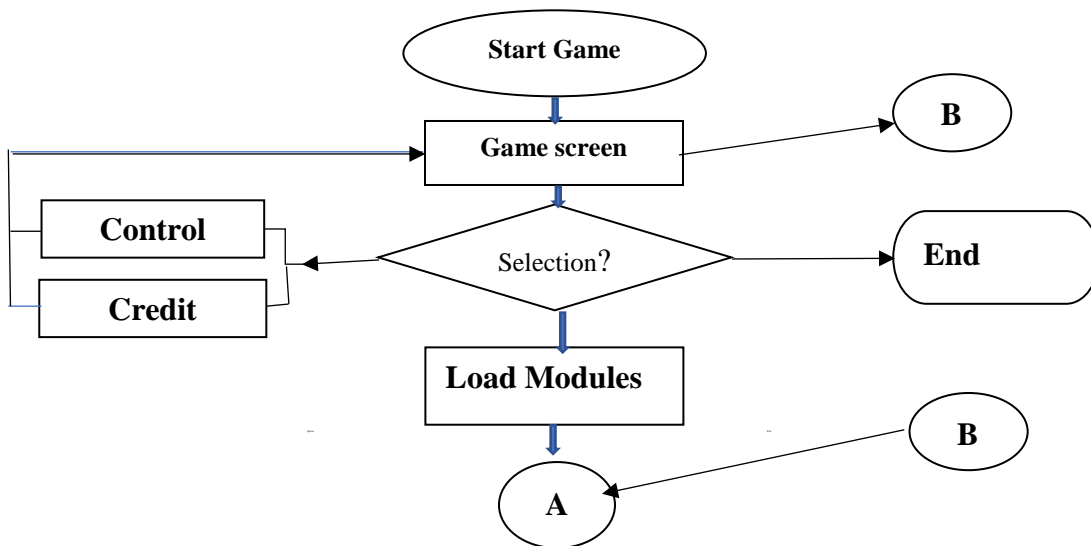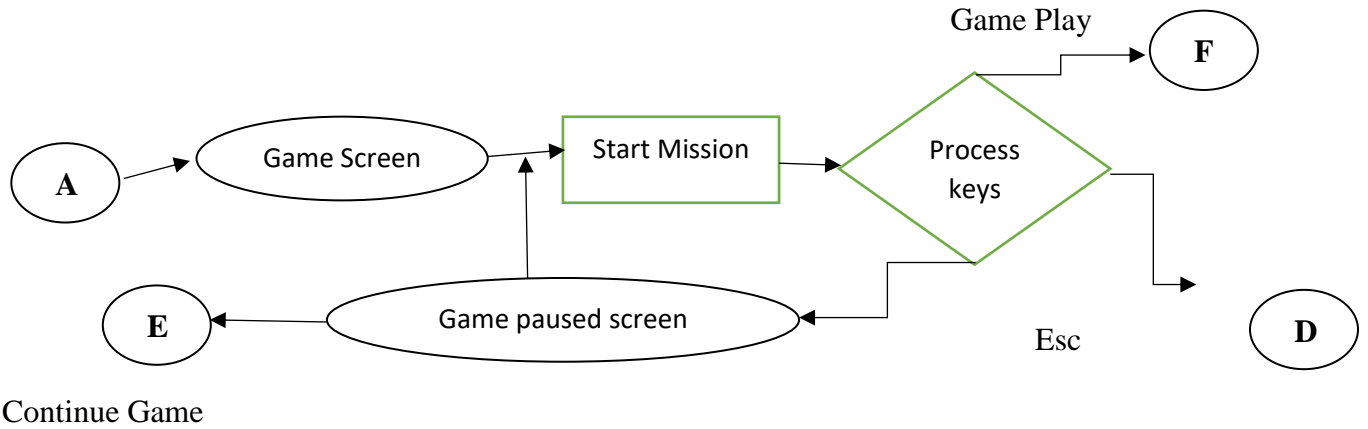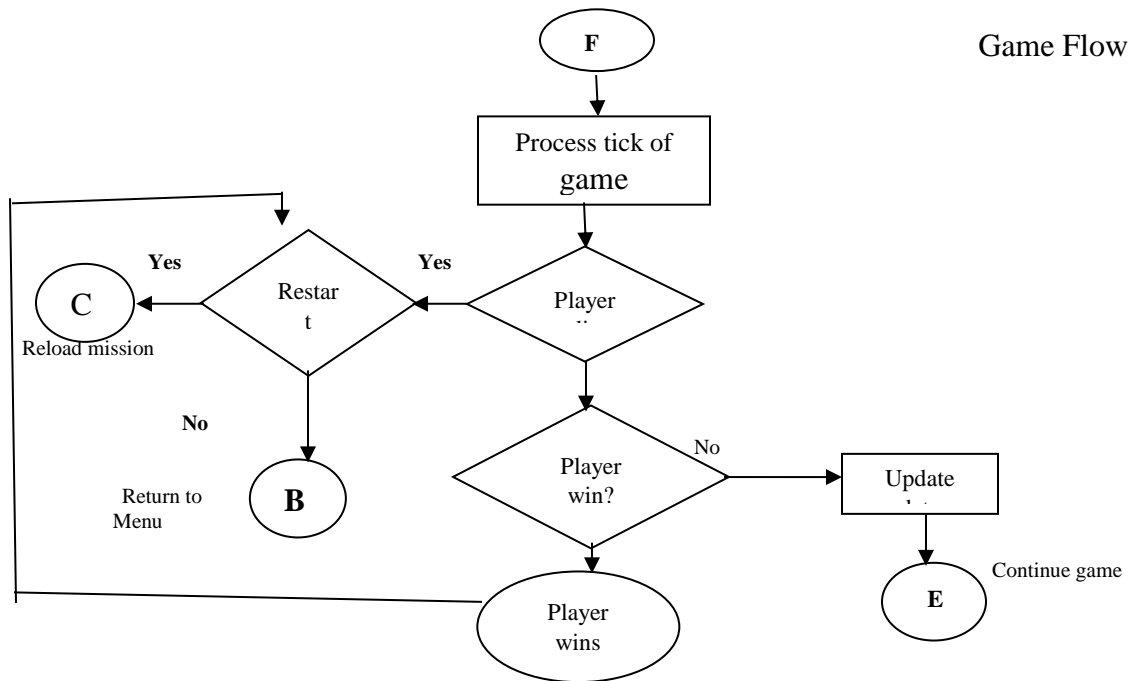**Main flow:** The following figure（5.1） shows the game main flow process.

Figure 5.1: Game Main Flow

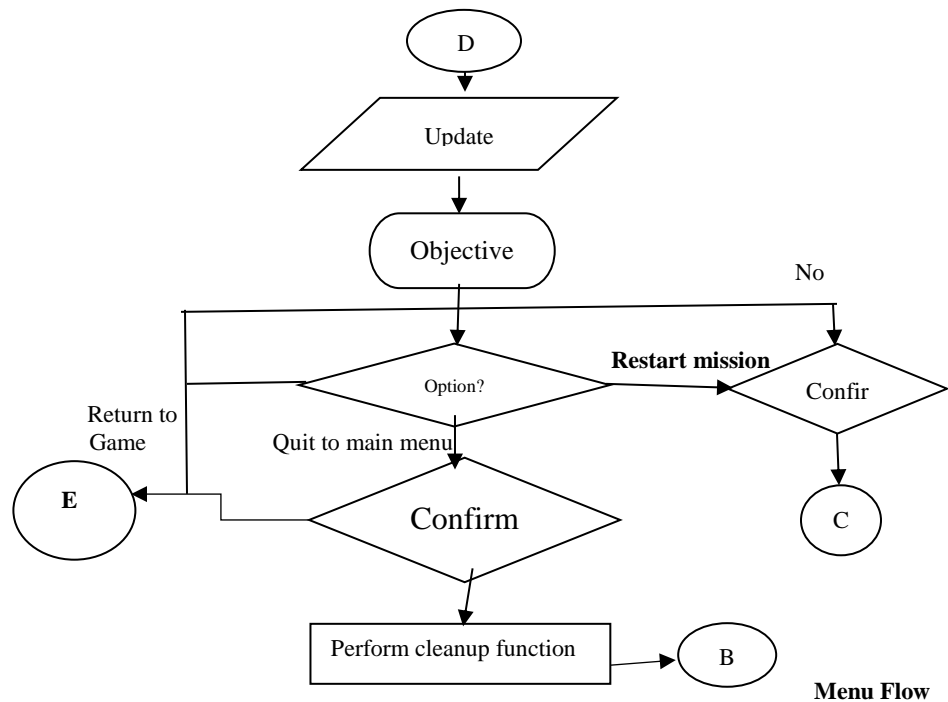**Game Flow:** The following figure（5.2） shows the game flow process.

Figure 5.2: Game Flow

Game Flow: The following figure (5.3) shows the game flow (Continue) process.

Figure 5.3: – Game Flow (Continued)

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Mission Objectives: The following figure (5.4) shows the game mission objective


Figure 5.4: – Mission Objective

5.3 Design and Development Process

"Man From W'71" is a FPS –style game, the player will play the game from the perspective of first‑person. Here, our purpose of this game is highlight the character of our freedom fighter of our liberation war. We used Unity3D 2017 game engine for:

- Scene creation,
- Trainee creation.
- Object collaboration.
- With scripting language C Sharp, we set the behavior of objects.
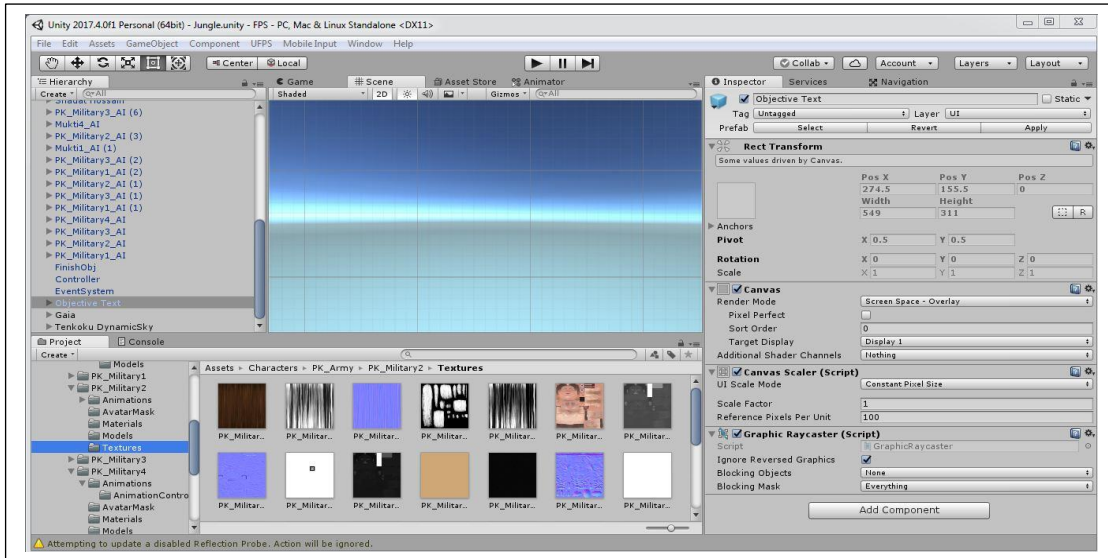- AI of enemy behavior and friendly squads.

To view default view of unity game engine, see the Figure 4.1.

Trainee: The following figure（5.5）shows the game trainee creation．
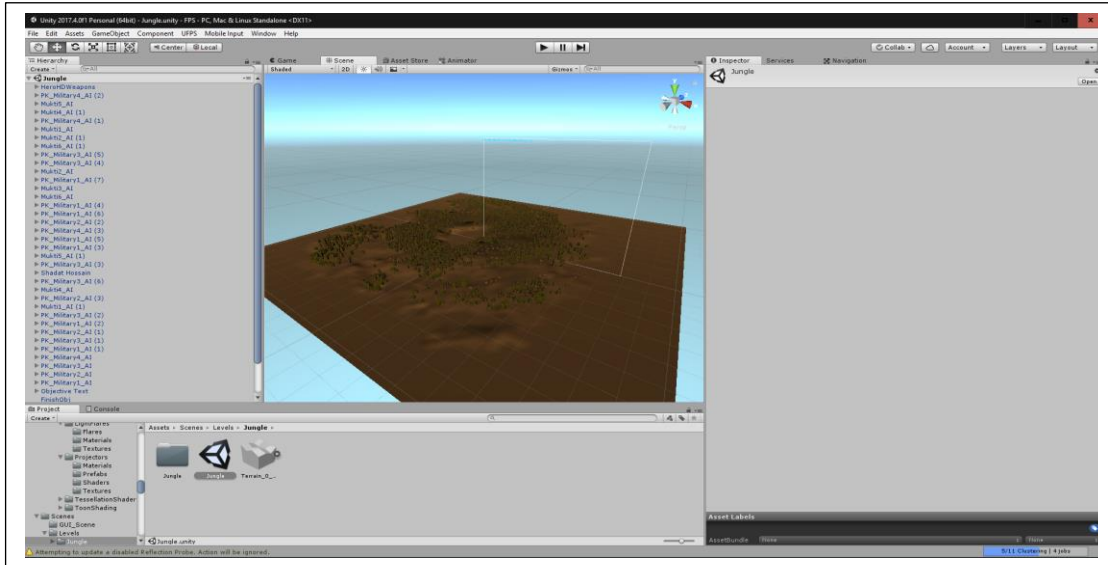
Figure 5.5: Trainee Creation

**Texture:** The following figure（5.6）shows the texturing on object．

**Figure 5.6: Texturing On Objects**

5.4 Environment Design

We used Blender for modeling and design （Graphical User Interface） images and texture design in our FPS game．For lake of time, team member and minimum skill we didn't make animation．For development, we choose Unity 3D with C# programming language．Because Unity 3D is well known and most popular cross platform supported by game engine all around the world．

Pakistani Military: The following figure （5.7）shows modeling of PK Military.
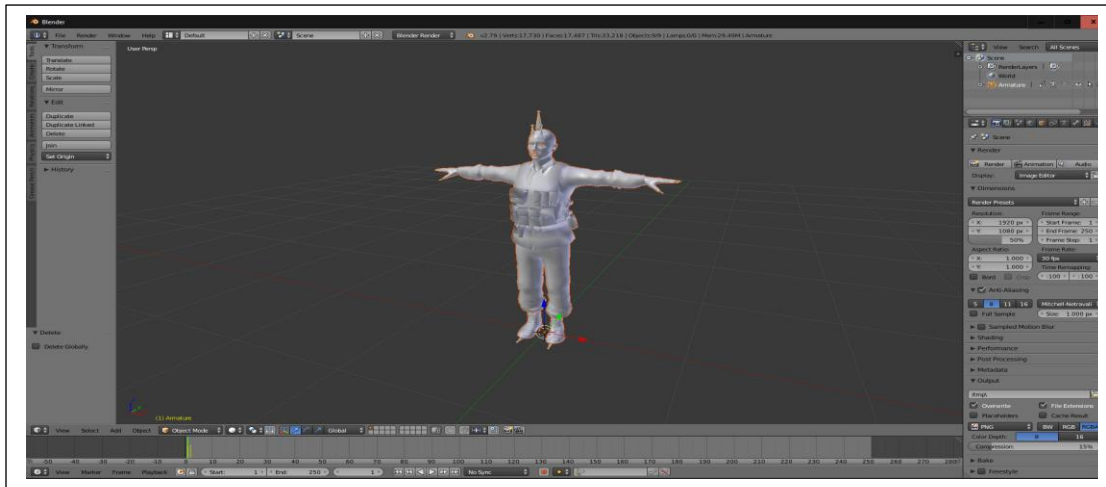
Figure 5.6: Pakistani Military Modeling

Mukti Bahini: The following figure （5.7）shows modeling of Mukti Bahini.
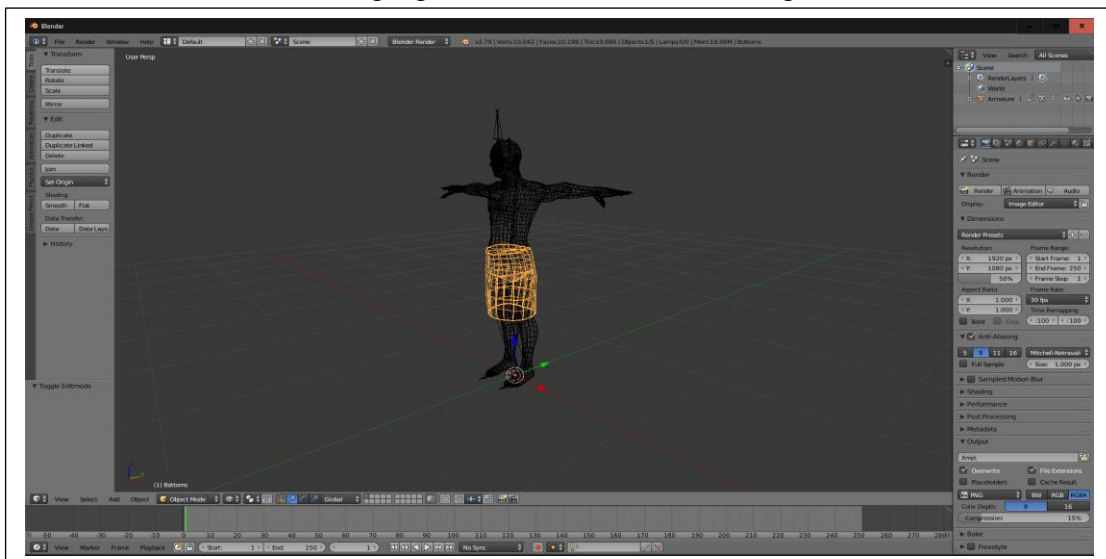
Figure 5.7: Mukti Bahini Modeling

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5.5 Weapons

The user can employ in starter game scene with three weapons, which are useable one at a time by the user. User can change the weapons at any time.

5.6 Movement

The player can move on the ground as like as human. Here we used the standard First Person Shooting conventions. So, here user have every ability like run, walk, jump, rotation. Here we use the architecture which has ability to create a unique way for every time for user.

5.7 Overall Description

In this game we divided user interface into two areas. The user interface will be fairly simple.

- Once the user clicks the "Play Game" button select map on the subsection of main menu.
- "In-game" user interface

After going in-game user interface, player can see the objects ang gaming scene environments. The user can control the player character on game screen by keyboard and using the mouse as eye target. Check out section 4.4.4 to know more about player control. If user want to resume the game then he has to press Esc button on keyboard then he can also restart the game or back to the main menu. In-game interface, a "health bar" will be displayed near the bottom-left corner of the screen and will represent the current health of the player. At bottom-right corner, a icon will represent the weapon and ammos counter that the user can choose from.

5.8 User Interface Design

We develop common, familiar and simple user interface design by keeping similarity to other First Person Shooter game genre. Because this fact ensures the player that they are playing exciting known controllable game. This section contains proposed images for various parts of the in-game user interface.
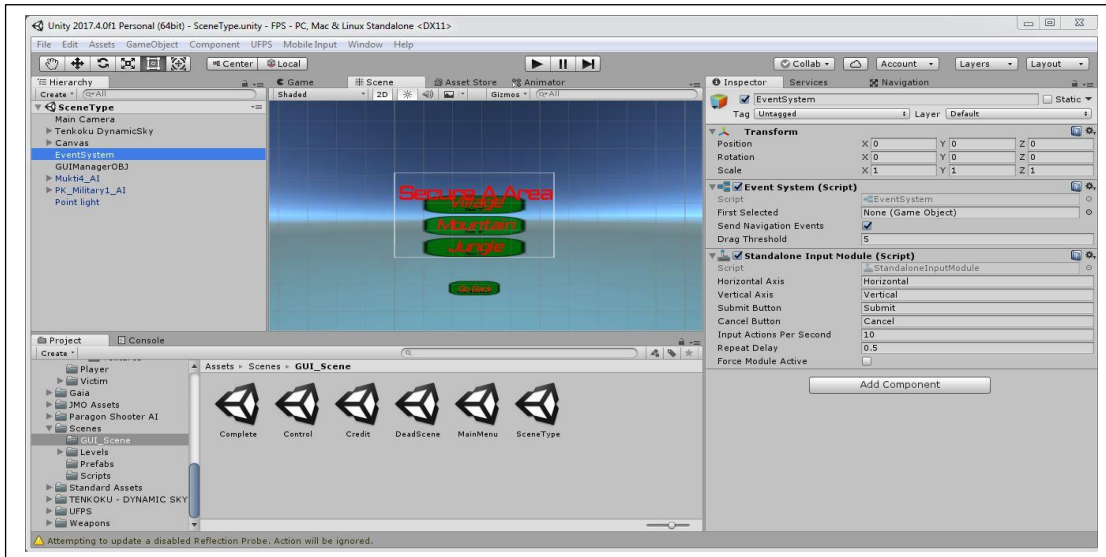
5.8.1 Key Screen Images

Main Title Screen: The following figure（5.8） shows the game main option Screen.
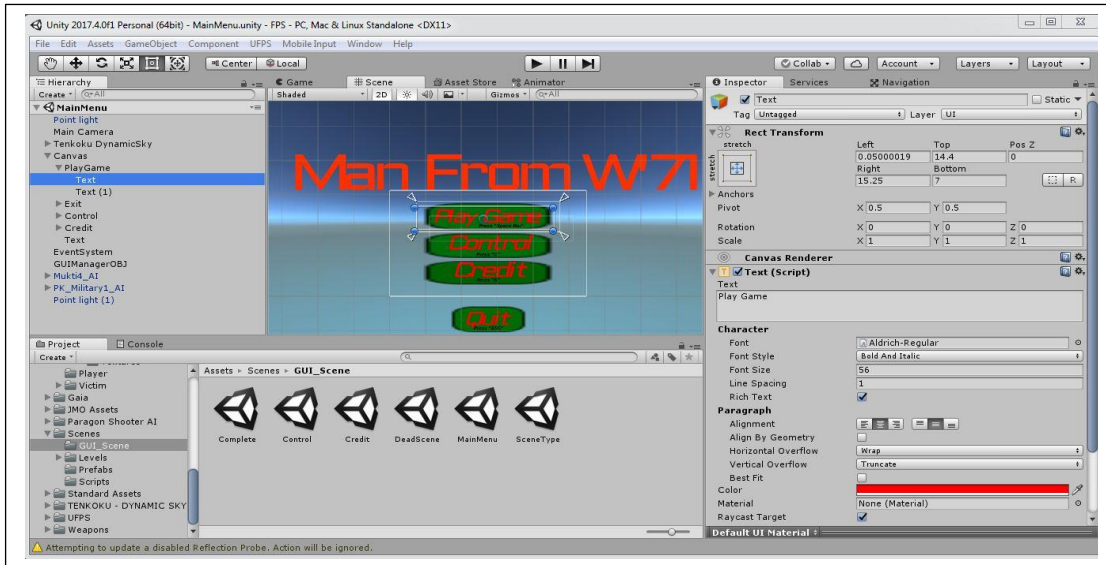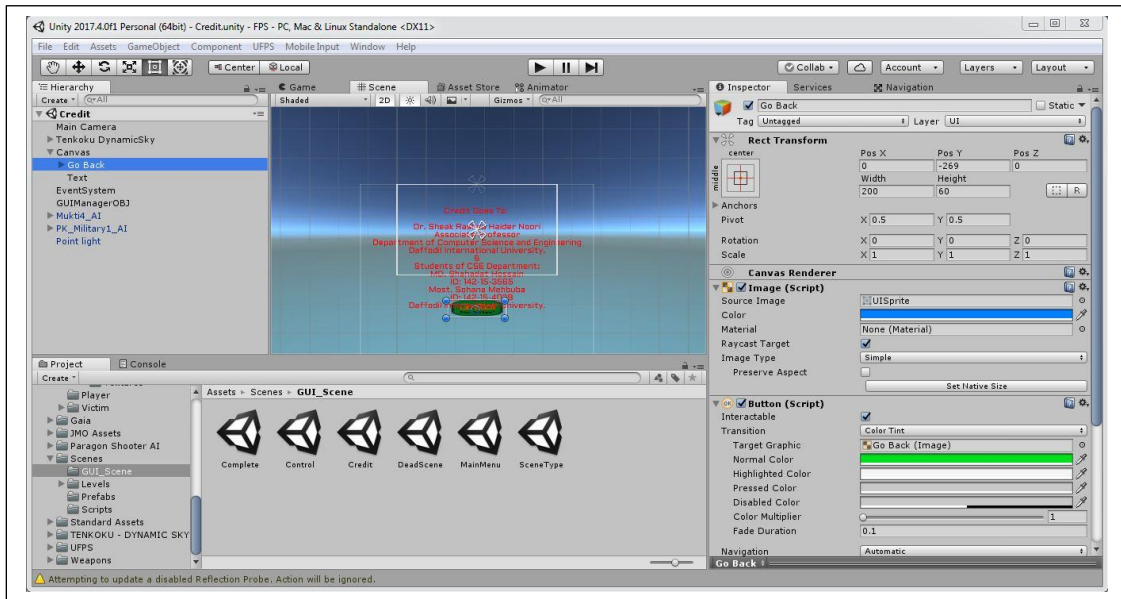

Figure 5.8: Main Title Screen

Map Selection Screen: The following figure （5.9）shows the game option panel Screen.

Figure 5.9: Map Selection Screen

Control Screen: The following figure（5.10） shows the game Control Screen.

Figure 5.10: Control Panel

Shoot mode Screen: The following figure（5.11） shows the game Shoot Mode Screen.
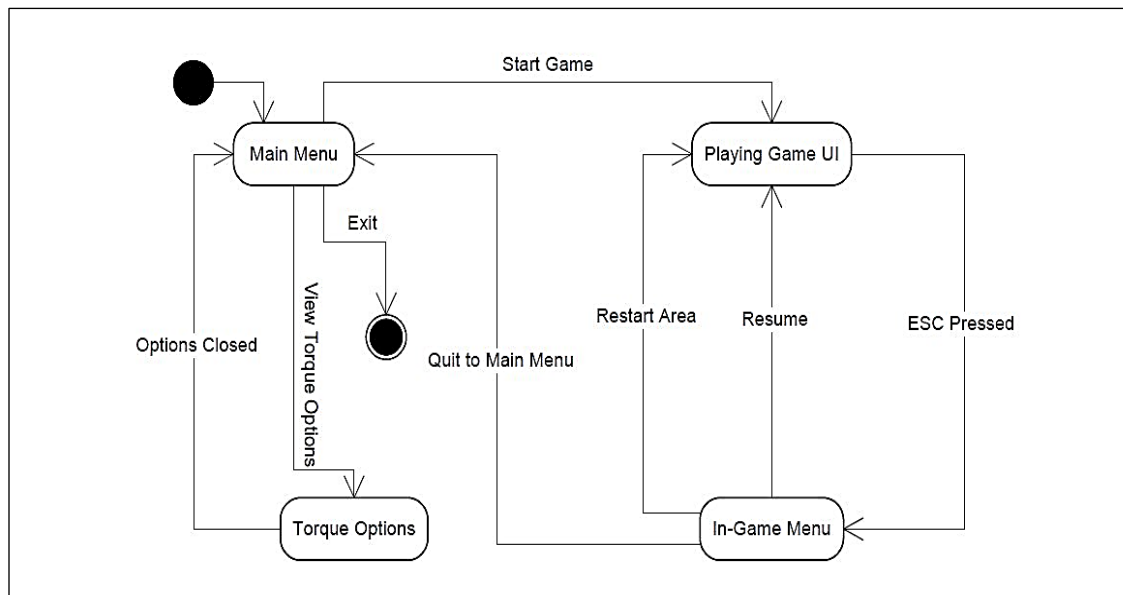

Figure 5.11: Shoot Mode

5.9 State Transition Diagram

Three things are here highlighted:

- User start his game by "Main Menu" option.

- He can choose the "Go Back" option.

- He can choose to completely exit the game by "Quit" option

Figure 5.12 – State Transition Diagram

Specific User Interface Goals:

- Intuitive（easy to learn）

- Consistent

- Easy to learn icon Images

- Easy to learn Labeling for UI Components

- Simple

5.10 In-Game Control Summary

When playing the game, the user will perform various actions as described below:

Player movement through the W, A, S, and D keys

Player Normal Move:

- ❖ Forward: W

- ❖ Left: A

- ❖ Backward: S

- ❖ Right: D

- ❖ Spacebar: Jump.
- ❖ Moving the mouse point: Look.
- ❖ Alternative Fire: Mouse Right Button.
- ❖ Cross: C
- ❖ Reload: R

- ❖ Fire: Mouse Left Button.

- ❖ Activation of the in-game menu by pressing ESC.

These control choices are intended to match the "standard" FPS control set.

CHAPTER 6

IMPLEMENTATION AND TESTING

6.1 Introduction

In this chapter we discussed about how to implementation and testing our environment for unity game development. Our goal with this project was to create a FPS, PC games. Our problem is that my CPU usage is almost unlimited FPS 100% cranks. We understand that it is desired (hardware as much as possible to it), but for our game, it's really not necessary (it's pretty easy). So, we want to limit the upper bound of the FPS.

6.2 Implementation Tools and Environment

We used Adobe Photoshop CS6 extended edition for images（Textures, buttons, menus） design for development the game using Unity 3D 2017 versions．We developed our FPS game in 3D's．C# is a dynamic programming language has been chosen for coding．This Programming Language developed by Microsoft．This programming language was used for coding the necessary classes to execute the program．We also used many tools in Unity 3D game engine which are required in our FPS game development．

6.3 Implementation of the Application

Unity Technologies is the prominent IDE（Integrated Development Environment） for developing game for different platforms such as android, iOS, windows, Desktop etc．It generates necessary objects in backend automatically which are most necessary for the game development．When generated a C sharp for gaming behavior shows this figure:

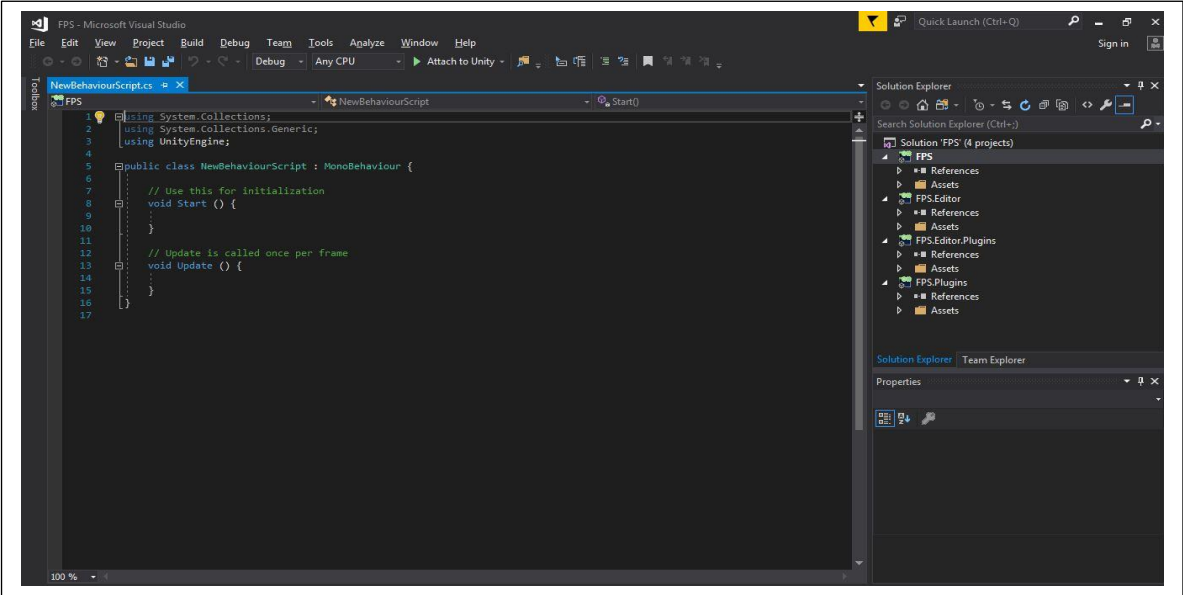Below the figure 6.1（FPS game development engine default C# view） shows the default C Sharp view screen.

Figure 6.1: C# View

The following figure 6.2（Default project view in unity）, when a new project is open it seems to be is like as below.[1]
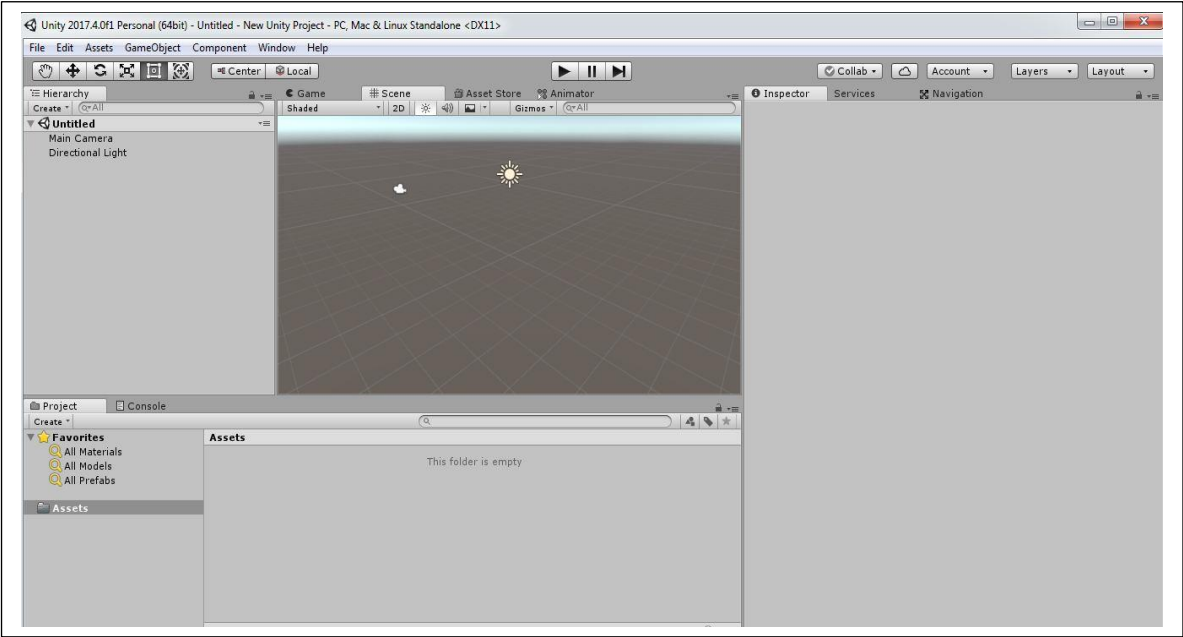

Figure 6.2: Default Project View In Unity

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Below the figure 6.3（FPS game development view with Unity） shows the development

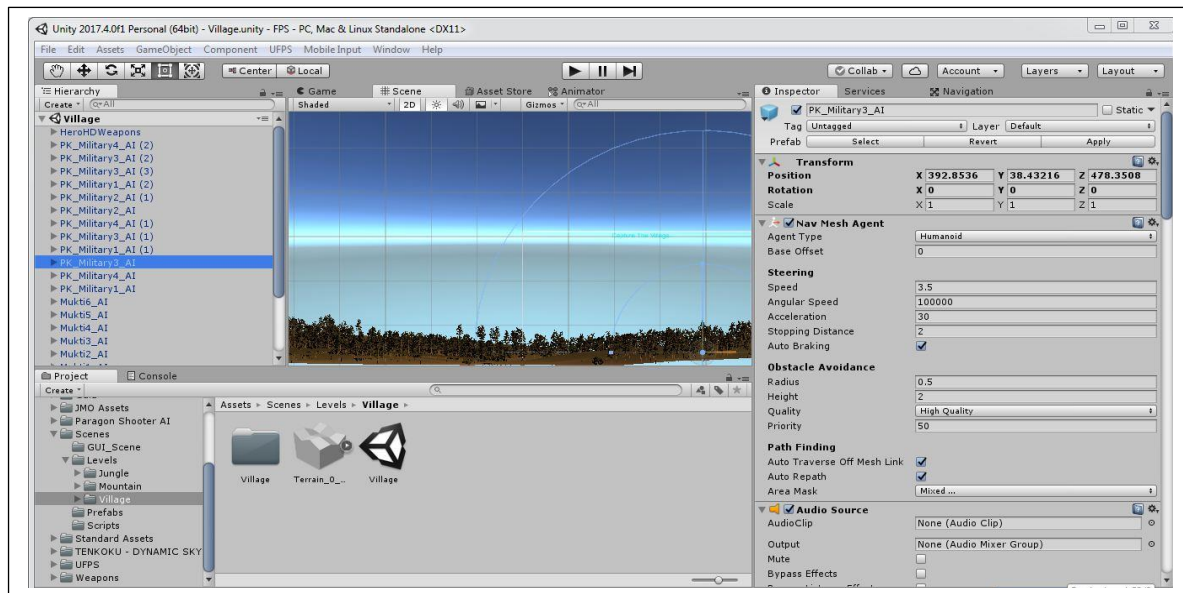process of our FPS game

Figure 6.3: Development View In Unity

CHAPTER 7

TESTING

7.1 Evaluation Criteria

Like any other game application, the evaluation criteria system depends on how to develop system which justifies the main concept of First Person Shooter game.

This project following set of criteria:

7.1.2 Satisfying requirement specifications: If the project satisfies all the requirements such as functional and non-functional requirements and give positive result then we can understand that the test is successful. In short, it should be capable of ensuring the requirement specifications.

7.1.3 Correctness: Correctness is one of the incommodious requirements of software development. The most necessary point of the game oriented software is perfectness.Every part of the software have to work properly and correctly.

7.1.4 Compatibility and integrity: To check whether the project is successful or not the Compatibility and integrity are the most significant conditions. The FPS game was created to be compatible with any mobile Operating System such as Android, Windows, iOS, Blackberry etc. And Desktop PCs such as Windows, Linux etc.

7.1.5 User friendliness: One of the most important point in game application development is user friendliness. User would not spend more than one minute after opening the game, If the application interface is not winsome. If application interface is winsome and resourceful user will be able to have a proper guideline to play the game and the game operation will be easy to understand.

In fact , more possible requirements can be added in future, but in the existing case these are not much important.This application will be more flawless, faster and smoother to execute on the device.

7.2 Testing Methodology

Normally, software testing is used to find out the system errors. A software test can be carried out by examining codes, design and execution of the whole system. Testing is essential to improve the quality of the system. It is necessary for the verification and the validation（V & V） of a system. In this project, we used Unity 2017 for testing purposes.

The configurations of the tester machine were as follows：

Developer's Laptop：

Windows Edition：	Windows 7 Ultimate
Processor：	Intel® Core（TM）i5 CPU M480@2.67GHz
Random Access Memory（RAM）：	4.00 GB
System Type：	64-bit Operating System

Test on Desktop：

Windows Edition：	Windows 7 Ultimate
Processor：	Intel® Core（TM）i5 CPU M480 @ 2.67GHz
Random Access Memory（RAM）：	3.00 GB
System Type：	32-bit Operating System

7.3 Results and Analysis

Here we will discuss about result of testing and analyze it.

7.3.1 Unit Testing

Unit tests are usually used in a detailed design and phase implementation of a project. The morals of the unit test were to find out the errors in this software. Such kind of test can be completed in two ways, they are white box and black box tests. In our project, a Black Box test system was used to find out the errors and the possible solutions of those errors. Each part of the code module for the black box test, was used to check if the system worked correctly.

During program testing two kinds of errors occurred namely, 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:

7.3.2 Black Box Testing

In this testing we give input to the system and test the output. Here we 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.

- We tried to the system without authentication, but the system does not respond.
- We tried to use incorrect person's name, but it is not respond. When we get correct answer then the system responds.

7.3.3 Functional Testing

Functional testing is also performing on our project known as Black Box Testing. Here we test the functionality of the program. In functional testing, we noticed a certain output to input values and produces positive results.

7.4 Screen Shots

Below the figure 7.1 shows the game environment of our FPS game.

Figure 7.1: On Game

Below the figure 7.2 shows the game environment with finding enemy of our FPS game.

Figure 7.2: On Environments

CHAPTER 8

CONCLUSIONS

8.1 Conclusion

During the development of this project we have studied the working principle Unity3D manual guide. We have also studied the how Unity3D game engine works and can be functional with another scripts and modeling scripts from Blender software 3D modeling 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.

8.2 Limitations

Though our 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 our project.
- Scarcity of time: A game development project needs a lot of time but we don't get enough.
- Insufficiency of team member: A game development project need a big team but we have only two members in our 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.

8.3 Future Work

Our project "**Man from W'71**" has been developed with future development possibilities, our plan is to give a character wise more realistic story to the game about the liberation war.

- We will release it for commercial purpose.
- In next version, we will develop a great environment view of our country and some specific biography of freedom fighter of War 1971.
- Implement on Android version.

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APPENDIX

Appendix A: GUI Design

1. Main Menu Interface: The following figure A（1） shows the main menu of this game．

Figure A（1）：Main menu

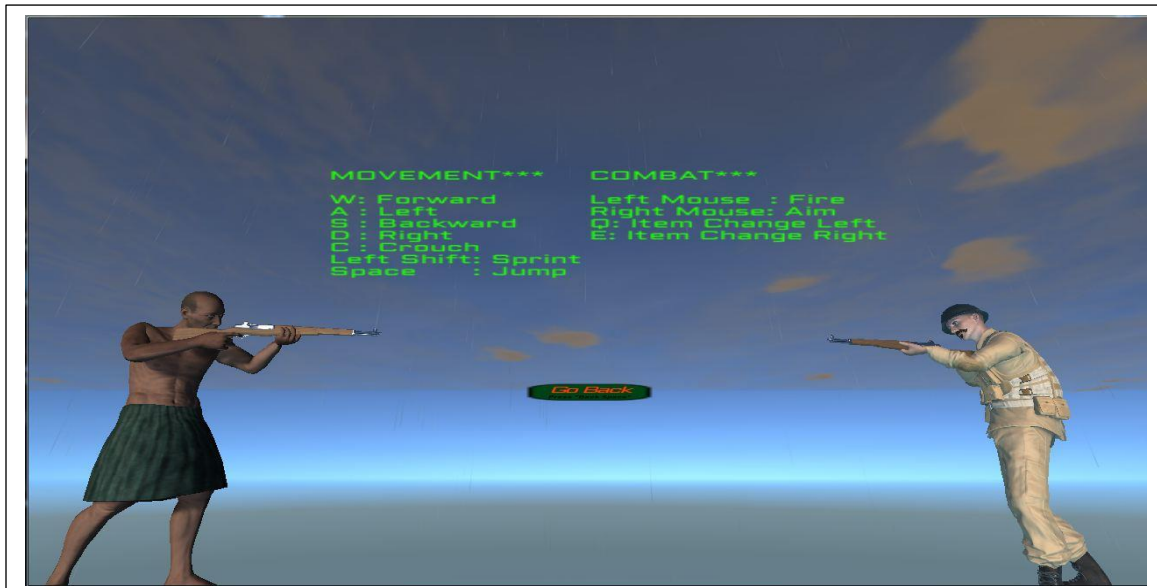**2. Game Controls Interface:** The following A（2） show the game controls interface．

Figure A（2）：Control Keys

3. Game Map Interface: The following A（3） show the game option interface．

Figure A（3）：Game Map Option

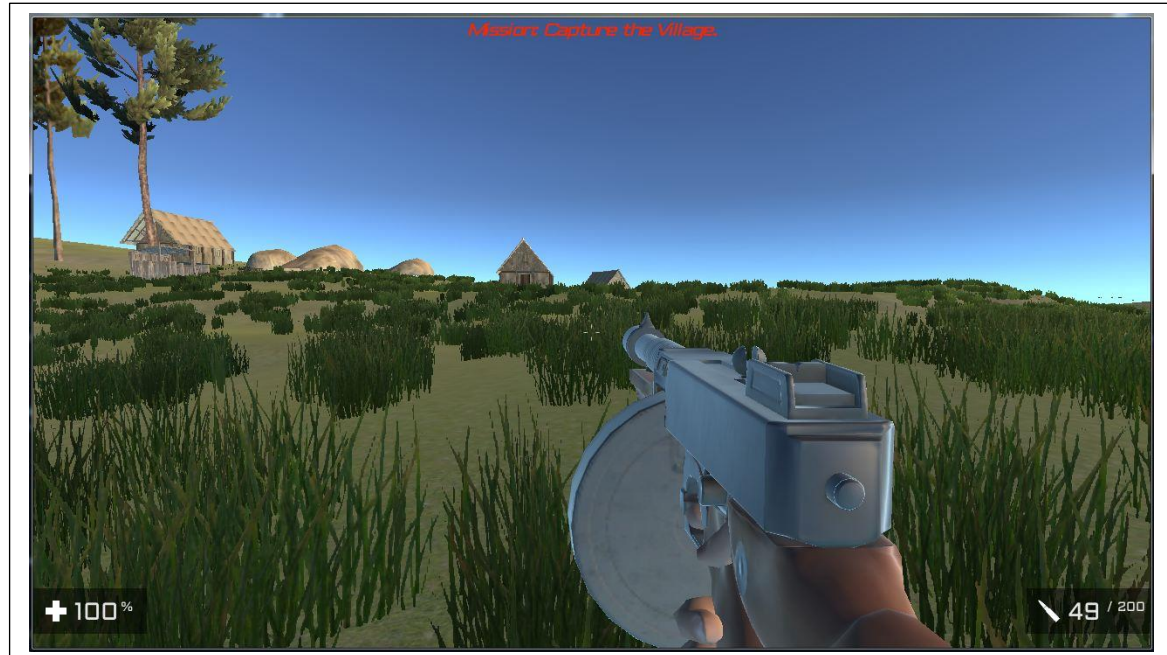4．**Game in (Environment):** The following A（4） show the game environment interface．

Figure A（4）：Game Environment

5. **Mission failed interface**: The following A（5） show the shoot interface．

Figure A（5）: Game Shoot Mode

6. **Mission Complete interface:** The following A（6） show the Quit interface．

Figure A（6）: Game Quit Option

7. **Credit interface:** The following A（7） show the Credit interface.

Figure A（7）: Game Credit Option

PLAGIARISM REPORT