

**RESEARCH AND ANALYSIS ON CHARACTER DEVELOPMENT,
CHARACTER ANIMATION AND OPTIMISED GAME ENVIRONMENT
DESIGN OF ADVENTURE GAME: 'MISSION FREEDOM'**

BY

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Multimedia and Creative Technology

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DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled “**Research And Analysis On Character Development, Character Animation And Optimised Game Environment Design Of Adventure Game: ‘Mission Freedom’**”, submitted by **S. M. Mohaimanur Rahman** to the Department of Multimedia and Creative Technology, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Multimedia and Creative Technology and approved as to its style and contents. The presentation has been held on 7 February 2021.

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ABSTRACT

Video Game is one of the popular entertainment sources of recent days. Video Game Production has many processes of an idea, concept, design, build, test, and release. Character Development and Environment design is one of the most essential part of Video Game Production. Developing asset for a game is challenging when it has to be optimized for fast response. The models, characters as well as the assets has to be lite but keep the small detail of it. It is important to think about the efficiency of environment, game engines, player engagement, and level design while creating a game. A character developer develops various interactive game characters according to the game story and script. Design an optimized environment for large mapped open world game is necessary. Not only developing characters but also animate them is challenging indeed. The desinging includes the detail research and analysis of every element what shoud make more realistic and practical. After applying some interactive technique and process the environment design has been optimized for fast loading. Create awareness against women kidnapping, trafficking and raise voice for Human rights and is the major objective through this adventure game 'MISSION FREEDOM'.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Women kidnapping and trafficking has become the buzzword of recent times. Human trafficking is the to use him or her for pornography, forced labor, or slavery, trafficking is the procurement, transfer, harboring, or receiving of a human Globally about 78% of the victims who are abducted into situations of trafficking are women and 25% of the victims are children. This rate in Bangladesh is also increasing. Government are very strict with this kind of violation of human rights. The story we try to build up through concept, design the game, and make executions and activities to real life. Here we try to tell a story about rescuing kidnapped victims and raise awareness against women and children kidnapping and trafficking. By playing this story based adventurous video game anyone can be a hero by the perspective of nation.

1.2 Objectives

Video game in the one of entertainment sources among young generation. The lack of playground, some choose video games for their entertainment. Our game is a story based first person adventure game. The main character of this game is a female undercover agent who goes to rescue a group of kidnapped girls. This is the first lead role of female character in Bangladeshi game industry. Freedom is the basic needs of human rights This is a representation of girl's equality and could be the inspiration to be a hero in real life. The main mission is to find the bad gang who kidnapped the girls. After finding them following some clue, solving some puzzles and arms escape with girls. This whole rescue mission operated through higher authorities of Army by our lead heroin Agent Tasnim. Raising awareness for Human rights and reducing kidnapping rate is the major objective of this game.

1.3 Inspiration

The motivations for this game development come from childhood and recent field of study inspires more into video game development. Lots of fascinations and interesting games creates an impact in mind and becomes an inspiration for developing new game. A game idea can come from anywhere. There are many open worlds adventures game like Grand Theft Auto Series. This is the main motivation to develop this specific kind of game. Sometimes concepts are traceable to a specific inspiration. Sometimes, we will build a game that we haven't seen, but we wish existed so that we could play and creates our own identity. Alongside there are lots of demand of open world type game in the global market. Open world game is a freedom to do any kinds of activities and actions. Through this game, player can save the victims from kidnapper gang as a special agent. These types of role playing and inspirational game could be a good motivation for the gamers.



Figure 1.3: Gameplay from GTA V

CHAPTER 2: RESEARCH AND ANALYSIS

2.1 Background Study

For the development of this game, I have to observe every detail of story, design and architectural view of these type of game. Lots of research about first person shooting game, explore lots of open world game. In this project I developed one map which is based on city beside of a jungle and hill. There are the main characters, level design various technical stuffs have to keep in mind to develop this game. Having a few knowledges about programming I had to learn the game design and functionality. It is important to calculate the technical limitations, face the challenges and build up concepts. Courses from previous semesters regarding to game development helps most to work on this game, “Mission Freedom”.

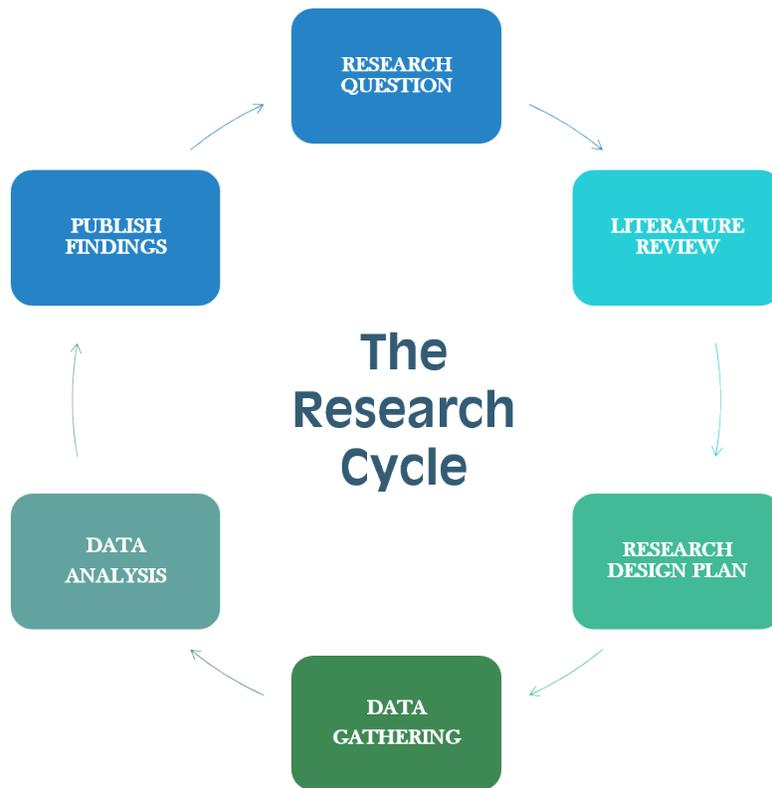


Figure 2.1: The Research Cycle

2.2 Idea and Concept Development

The idea is an inspiration or a spark that comes intuitively from one's subconscious as a result of interactions with the world. A concept, on the other hand, is the product of diligent analysis or arrangement of facts leading to something which may be subject to further consideration or examination. Quite often, an idea has a rougher shape than a definition, since it is usually an inkling about whether something is and what should be achieved. In the other hand, the definition is more of a fine-tuned form as it has generally been through a review process or a sequence of analyses.

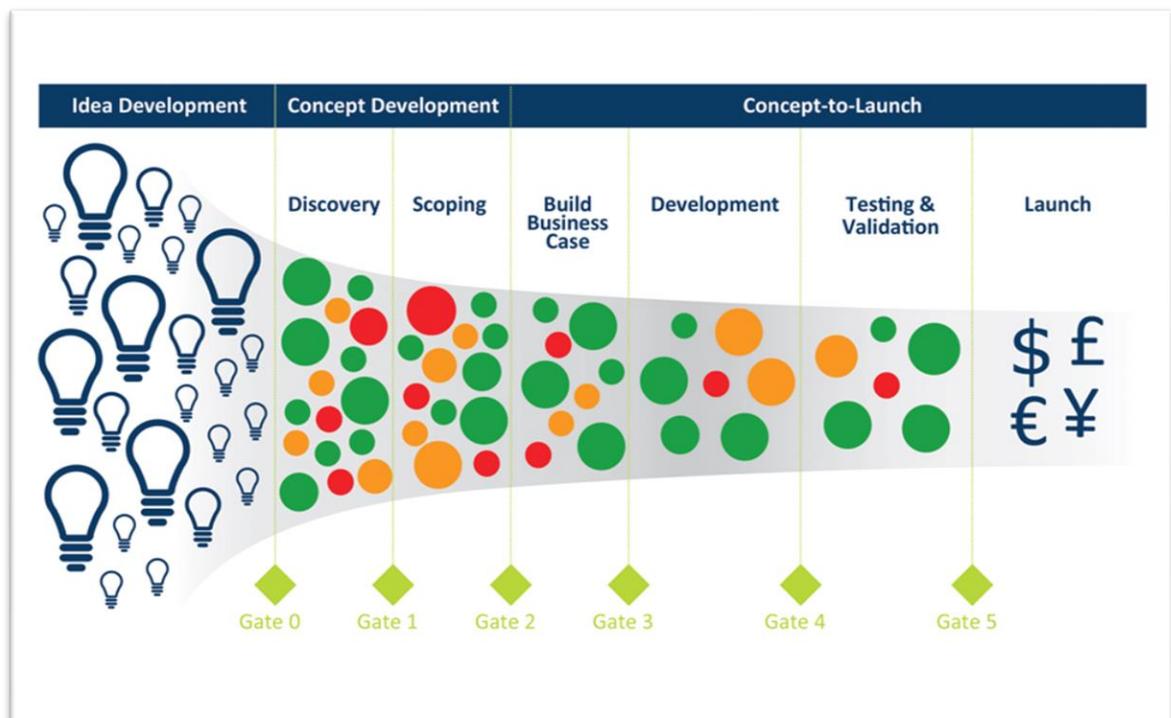


Figure 2.2: Idea and Concept Development Process

2.3 Target Audience

People of age 15 to 48 people who are passionate to play video games, love to explore new worlds, roleplay of different characters is the major target audience of this game. Professional gamers always explore new games and interested in streaming their games to earn revenue. Nowadays online gaming is popular among young generations and in-home streaming options today. The study found that 80% of gamers indicate that they watch others play games. With the competitive gaming industry on the rise, it's no surprise that many gamers watch others play, but these numbers indicate that watching gaming is becoming more mainstream.

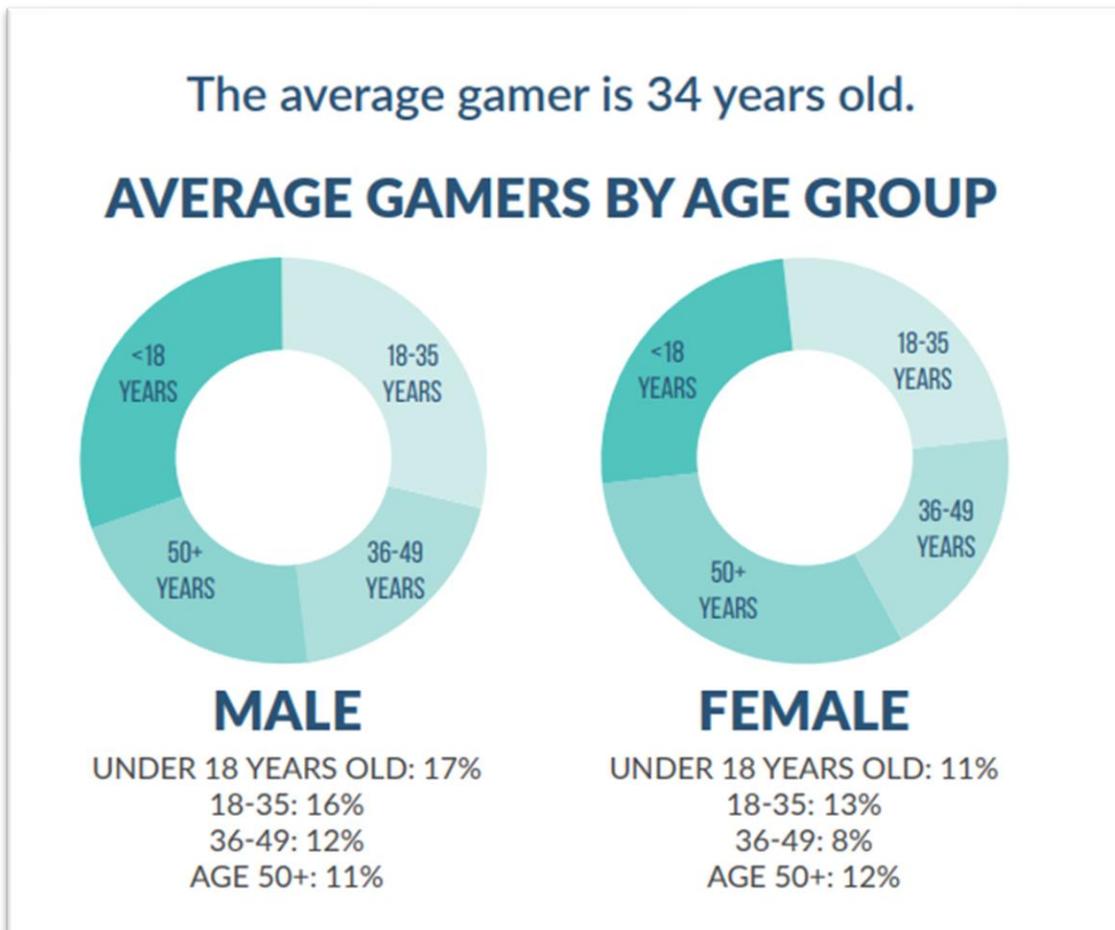


Figure 2.3: Global Target Audience of Video Game

2.4 Global Market Value

Video game industry is the industry involved in the development, marketing, distributions and monetization of video games. It establishes verity of job disciplines and its component parts employ thousands of people worldwide. The game industry employs those experienced in other traditional businesses, but some have experience tailored to the game industry. Some of the disciplines specific to the game industry include: game programmer, game designer, level designer, game producer, game artist and game tester. This statistic determines the average value of video games worldwide from 2012 to 2020 as well as the forecast for 2023. By 2023, the entire computer game industry is expected to be worth upwards of US\$ 200 billion.

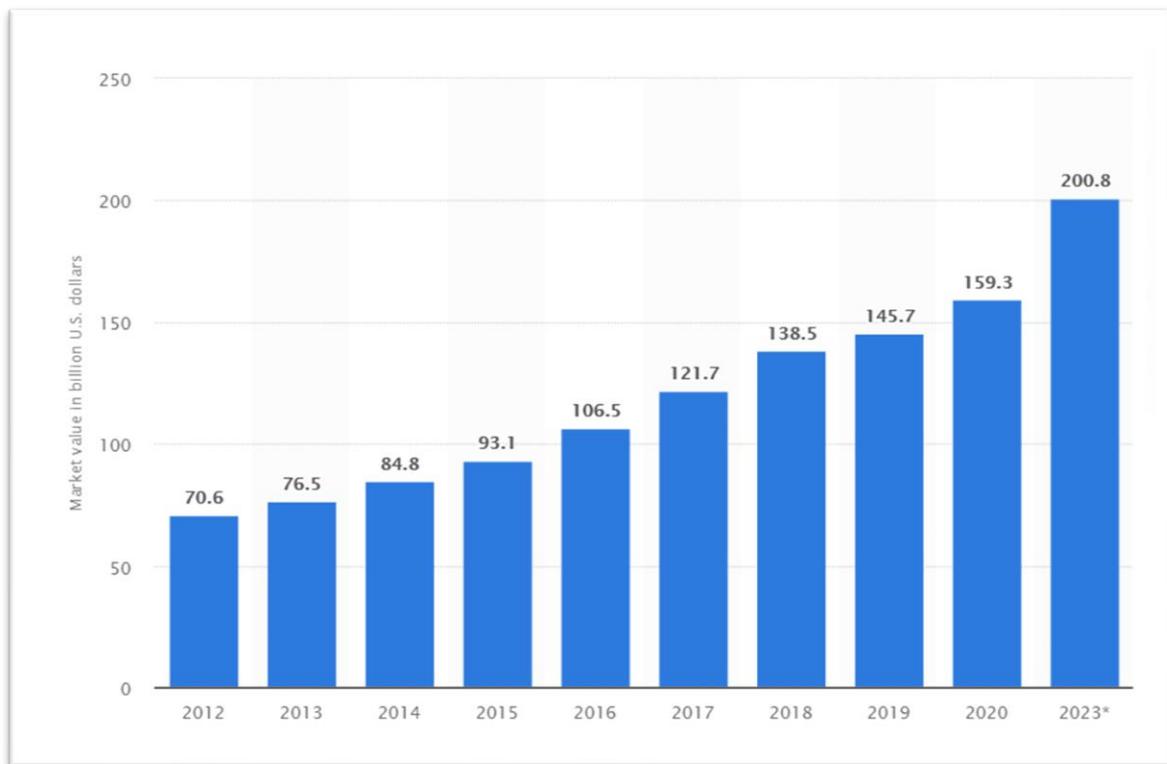


Figure 2.4: Global market value of Video Game

2.5 Professional Video Gaming

Game Development has very bright future in the world. Mobile gaming is an industry that has changed itself many circumstances over and keeps on. Gaming Development is certainly on the ascent. More up to date and better advancements are making game development a significantly more fascinating field to work in. A game developer can be an, Artists, programmers & designers. Artists focus on designing & innovative ideas for the game to be developed. Beside developments there are another role, professional gamer and streamer. Based on the latest survey of Esportsearnings.com, pro gamers earn between \$1,000 to \$5,000 per month. The highest paid professional gamers earn up to \$15,000 apart from the money they get from their other activities like sponsors and prize money.

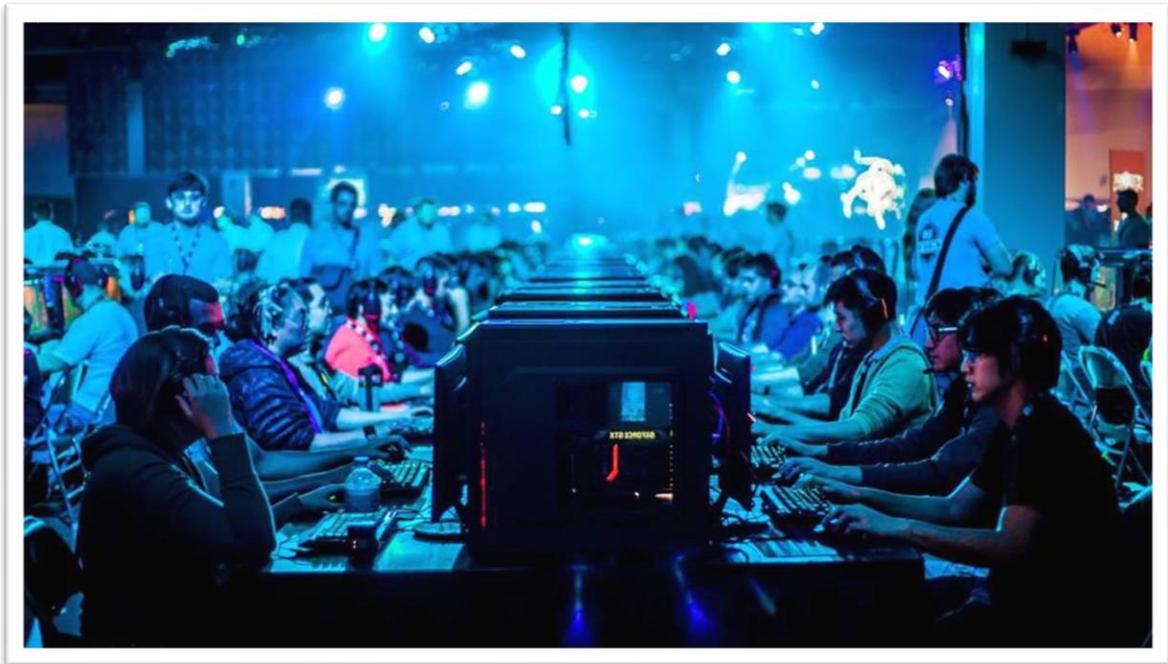


Figure 2.5: International Gaming Tournament

2.6 Video Game in Bangladesh

After the global market game industry is rapidly expanding and creating local as well as national demand. Though Bangladesh is a small country of Asia region but the demand of game development is increasing day by day. Many kinds and types of game has already developed in our country like *Zero Hour*, *Heroes of 71*, *Mukti Camp*, *Hatirjheel: Dream Begins*, *Adommo Ekattor*. Our game industry now contributing word wide by developing our own game. People are also involving in gamming for their entertainment. By the availability of gaming equipment like, PC, Mobile, Console it is easier to play video games.

2.6.1 Bangladeshi Computer Games

PC game development in Bangladesh has come a long way. *Zero Hour* is a tactical FPS with online team-based game play that takes place in a variety of fictional locations interpreted in Bangladesh with Real-life scale & resource management. It brings a grounded, close quarter combat experience to the game.



Figure 2.6.1: Bangladeshi PC game *Zero Hour*

2.6.2 Bangladeshi Mobile Games

A mobile game is a video game that is played on a mobile, smartphone or tablet. Today, mobile games are usually downloaded from an app store as well as from portals, but in some cases are also preloaded in the handheld devices by mobile operators. Mobile games are portable, light, good graphic in small form factor. There is very good possibility for game industries in Bangladesh. Mobile games are doing very good both Android and iOS. Many of us has a smartphone in our hand nowadays. This is the easiest way of entertainment. Lots of Bangladeshi games are available in mobile apps store. *Mukti Camp*, *Adommo Ekattor*, *Meena* are some of them.

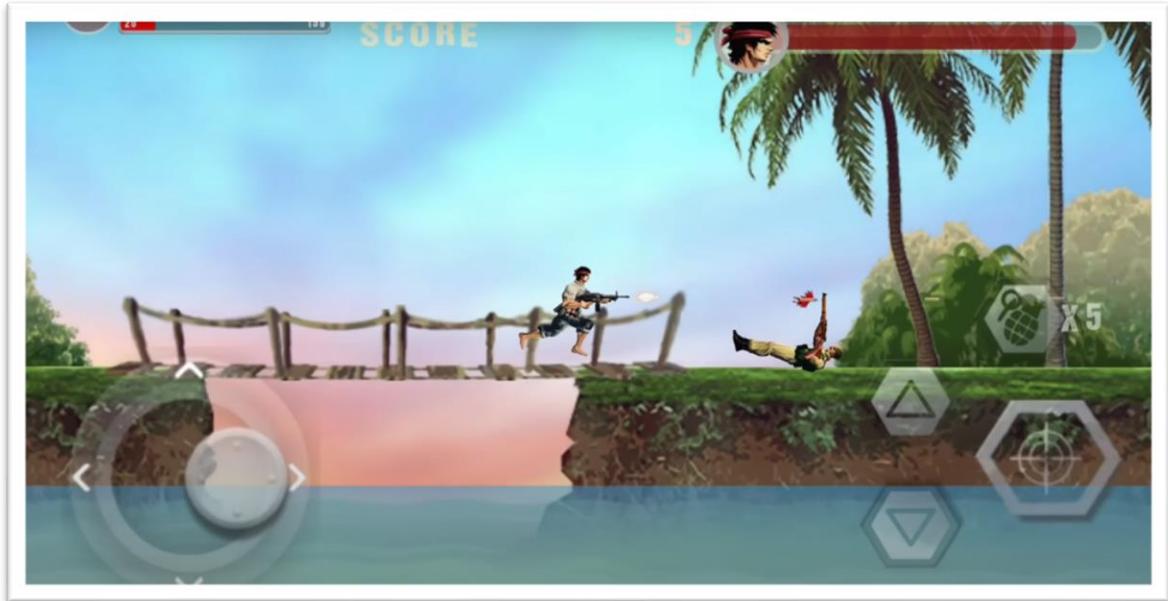


Figure 2.6.2: Bangladeshi Android game *Adommo Ekattor*

CHAPTER 3: PRODUCTION AND WORKFLOW

3.1 Introduction

A Game Development Engine is the first choice for developers. It can make the process of creating a game much easier and enable developers to reuse lots of functionality. It helps rendering 2D and 3D Graphics, scripting physics and collision detection, sound, scripting and much more. The Unity Game Engine is beginner friendly and many popular and commercial games have been built using Unity as we do it here.

Video game production is the process of development and design that starts from an idea or concept. The idea is based on a modification of an existing game concept or maybe a brand-new concept. The game idea may fall within one or several genres. Designers often experiment with different combinations of genres. A game designer generally writes an initial game proposal document, that describes the basic concept, gameplay, feature list, setting and story, target audience, requirements and schedule, and finally staff and budget estimates. Different companies have different formal procedures and philosophies regarding game design and development. There is no standardized development method; however, commonalities exist. Here is the basic development process of game development.

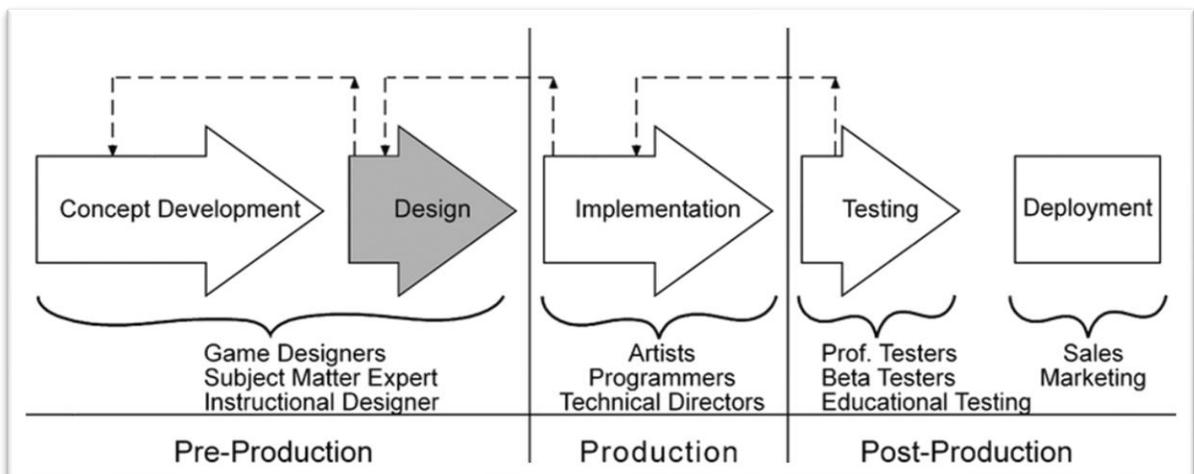


Figure 2.1: Game Production Development Process

3.2 Project Timeline

The production schedule is a project plan of how the production budget will be spent over a given timescale, for every phase of a project. The scheduling process starts with the concept, script, which is analyzed and broken down, scene by scene, onto a sequence of breakdown sheets, each of which records the resources required to execute the scene. A traditional production boards. The strips can then be rearranged and laid out sequentially to represent the order one wants to film in, providing a schedule that can be used to plan the production.

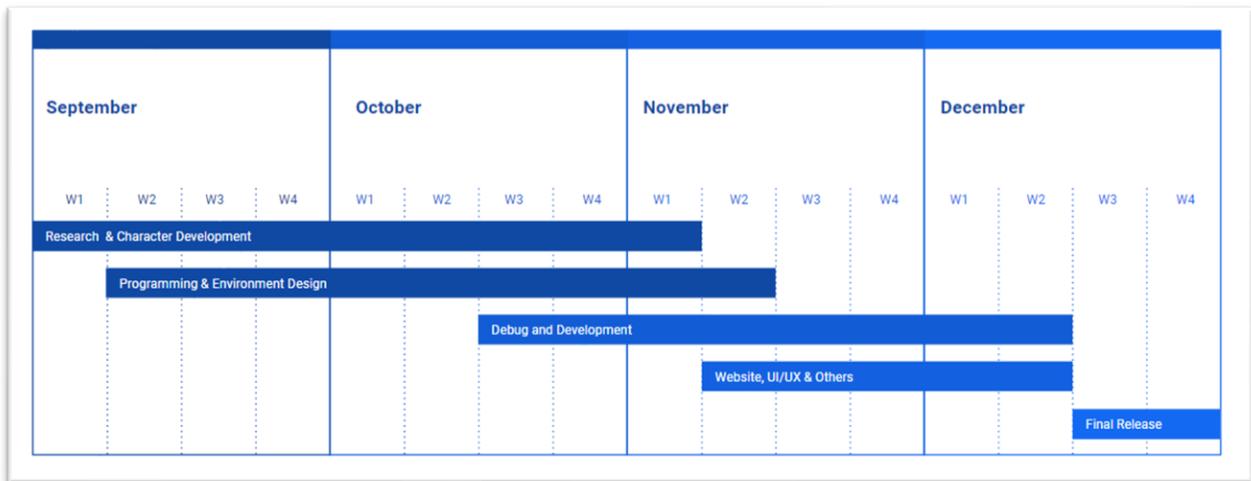


Figure 3.2: Production Development Process

3.3 Game Story

Part 1 (Plot & Intro)

Women are getting kidnapped by a Gang and keeping them to a house which is highly secured area. A lady agent is assigned to rescue them by the Army.

Ref. Max Payne, Hitman

Part 2 (Plan & Form up)

After reaching there. The agent finds the safe house, looks for the gang's weakness, teams up with other girls and plans to escape from there. The agent have to solve some puzzles to get security keys, relate some clues, and get prepared for the escape.

Ref. Puzzle Solving, Sherlock Holmes Franchise

Part 3 (Escape & Rush)

At this stage the agent will escape with victims according to the plan. They will remain undercover from the gang members until they are able to reach the car. In Between this moment, Girls will fight against the gang with or guns stolen from the gang.

Ref. PUBG (Arena), Temple Run, Subway Surfer

Part 4 (Fight for Freedom)

After the successful escape, the gang will try to stop the girls by fighting, chasing, shooting. There will be a car racing and gunfight during the car chasing. In the end, the girl's team will be able to escape with helicopter become a national hero and honored with a gold medal.

Ref. Need for Speed, Road Rush

3.4 Game Video Script

Scene 1

[At the army camp meeting]

[Army officer's brief to officer]

Duration: 40 Second

: Today we called this meeting because of some recent incidents.

: Many women are kidnapping and trafficking to other countries out of the borders.

: This is not acceptable.

: We have information that there is a safe house where the gang are keeping the women.

: We are planning to operate a special rescue mission for rescuing the women.

: And...You are assigned for this mission, Agent Tasnim!

: There will be our men who will provide everything you may need there.

: After landing there you have to explore the city and find the leads.

: Here is the map and plans for this secret mission.

: We have to make it done anyway!

: All the best.

: Dismissed!

Scene 2
[At the Airport]
[Chief army officer and agent's conversation]
Duration: 10 Second

: Sir, I just landed at the airport.

: We have information that the gang is in the industrial area now.

: Copy that!

: Go Search for the gang.

: Okay, Sir!

Scene 3
[At the jungle with victim]
[Agent's brief to the victims]
Duration: 10 Second

: Hello Girls!

: I'm Agent Tasnim from the special force.

: I'm here to rescue you and take back to the country.

: You have to come with me and stay close.

: Let's go...

Scene 4
[At the parking zone]
[Agent reports to chief army officer]
Duration: 10 Second

: Just rescued the girls and reached the safe zone for now.

: Well done, Agent Tasnim!

: We need transport support to take them back to the country.

: We cannot help you unless you reach the seaport. Take a Helicopter and reach the borders.

: Okay!

CHAPTER 4: CHARACTER DEVELOPMENT, CHARACTER ANIMATION AND OPTIMIZED ENVIRONMENT DESIGN

4.1 Character Development

Character development is the way toward building a special, three-dimensional character with profundity, character, and clear inspirations. The process in creating a persona in a story and the changes this persona goes through during the course of the story. Character advancement can likewise allude to the progressions a character goes through throughout the span of a story because of their activities and encounters.

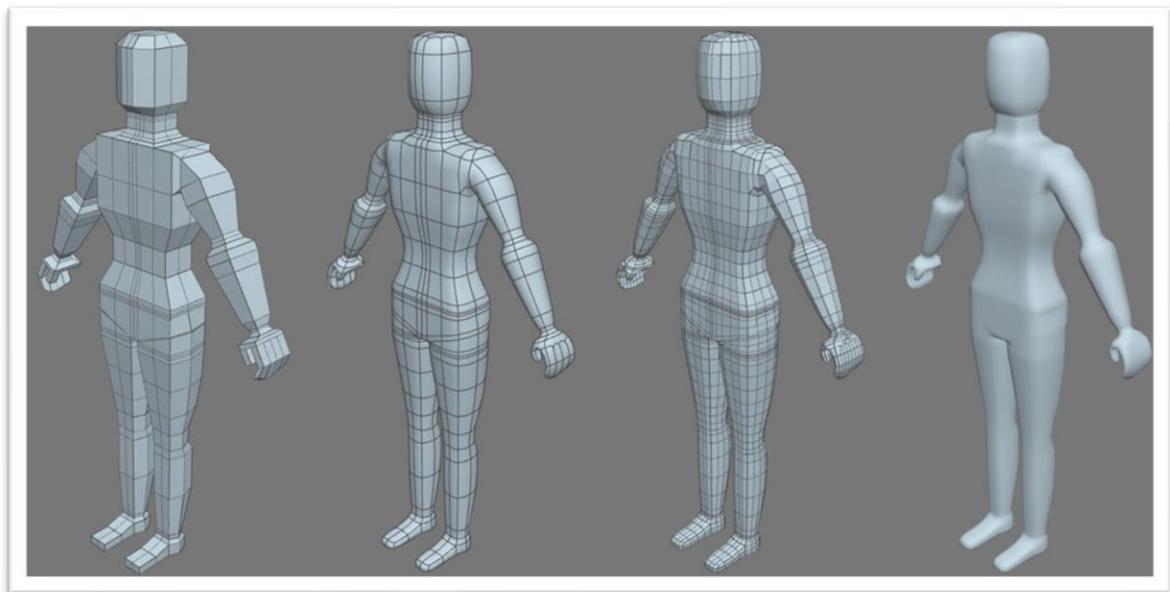


Figure 4.1: Basic character development process

The main character of this game is a Bangladeshi female character. Beside the main character there are many side character for supporting the story. Four victim from different country, army officer and main villens assistant has ganarated through Adobe Muse. Other character, main Boss is collected from the assetstore of Unity game engine.

4.2 Main Character Development

Main characters are usually the people in the book who are central to the story. If you are writing in the first person, the story may be told from their point of view. Without the main character, there would be no story. Main character's objective sets the stakes in the story. It doesn't make a difference whether story stakes are enormous or little, as long as they matter profoundly to heroin.

- Character's Name: Tasnim
- Gender: Female
- Height: 5'6"
- Weight: 117 - 143 lbs.
- Profession: Special Agent
- Physical Look: Bangladeshi
- Hair Style: Unique
- Dress Style: Leather Coat, Denim Pant with boot Shoe

For these types of game there are many ways to develop a character like create our own style, follow others patterns, generate characters. Though it generates the main mesh body of character sometimes with texture but it is not perfect for the story. According to the story after creating the random character into specific characteristics appeal optimized for gameplay is the main challenge. For this game I have to follow many countries' peoples anatomy because of the storyline.

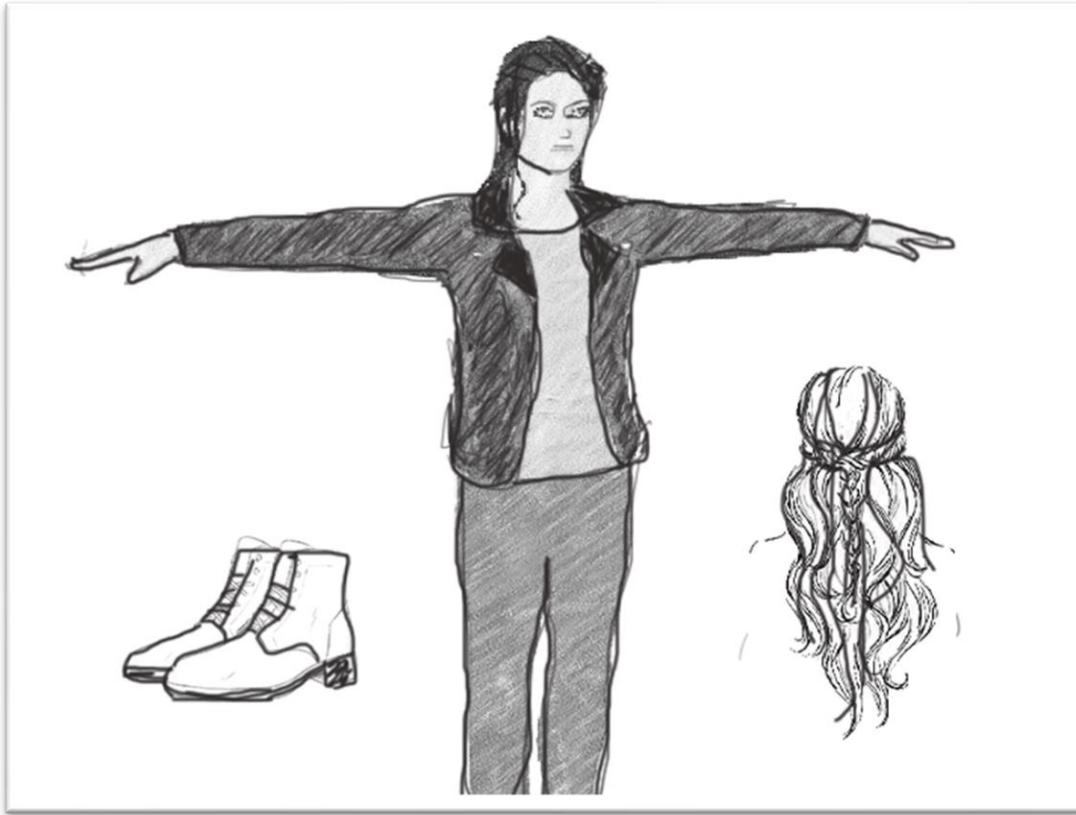


Figure 4.2: Draft Sketches of Main Character and Props

According to game story it is mandatory to maintain some basic and small details. Timeline, Script should lead the story as well as the props and other functionalities of this game. After the concept development the visual have to bring into a demonstration. Design is not only about the placing assets randomly all over the environment. The design includes the research and analysis of everything what should make more realistic and practical. Focusing into each and every detail to the story brings the game production into a complete playable game.

4.3 Main Character's Hair Style Development

A hairstyle is the way the hair is cut and decorated. A haircut may just be practical, but a hairdo suggests an expert styling. Hair style is an element of fashion and cosmetics, especially for women. Practical, cultural and popular considerations also influence hairstyles. Here, our main character is a female agent. She is smart and intelligent women. After trying various hairstyle one unique style has been selected for the main female character.

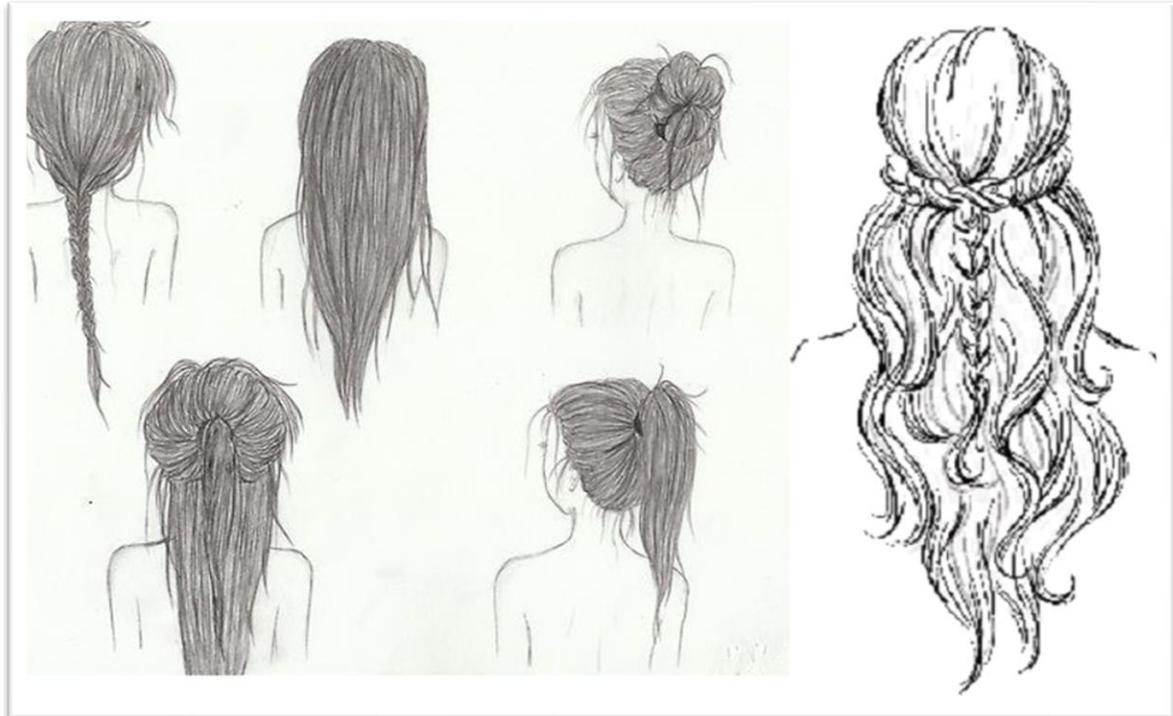


Figure 4.3: Draft hairstyle sketch and Final (right) of main character

4.4 Main Character's Dress and Prop Development

Dressing up has proven to have the ability to boost character mood and overall confidence. It makes a good impression relevant to the story. As a lady agent our female main character agent Tasnim has given these following dress ups. a semi-formal outfit and walk out that door feeling confident. With a positive attitude and a bold appearance character looks more realistic for the appealing. As our main character is a female agent her outfit has to be compact for actions like walking, running, fighting and other movement compatible.



Figure 4.4: Main Character's Dress and Props

4.5 Main Character's Facial Look Development

As a Bangladeshi lady agent, the facial look has generalized to Bagnoli women who is our female main character agent Tasnim as the story demand. From a base female face mesh, it has been developed.

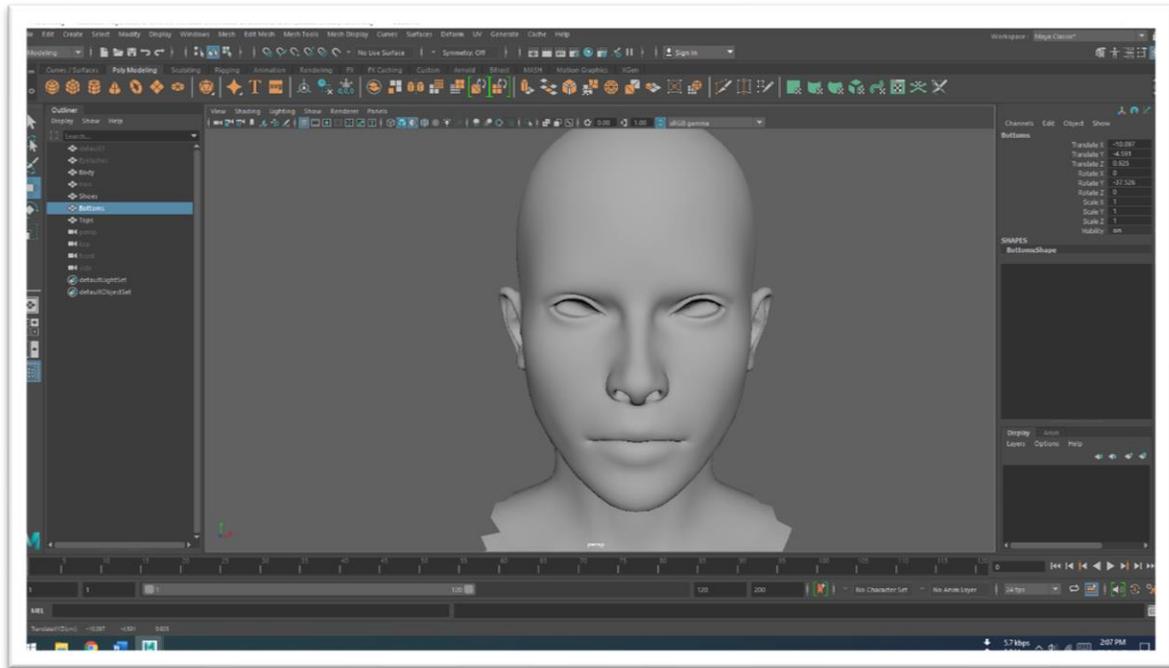


Figure 4.5.1: A base female face mesh

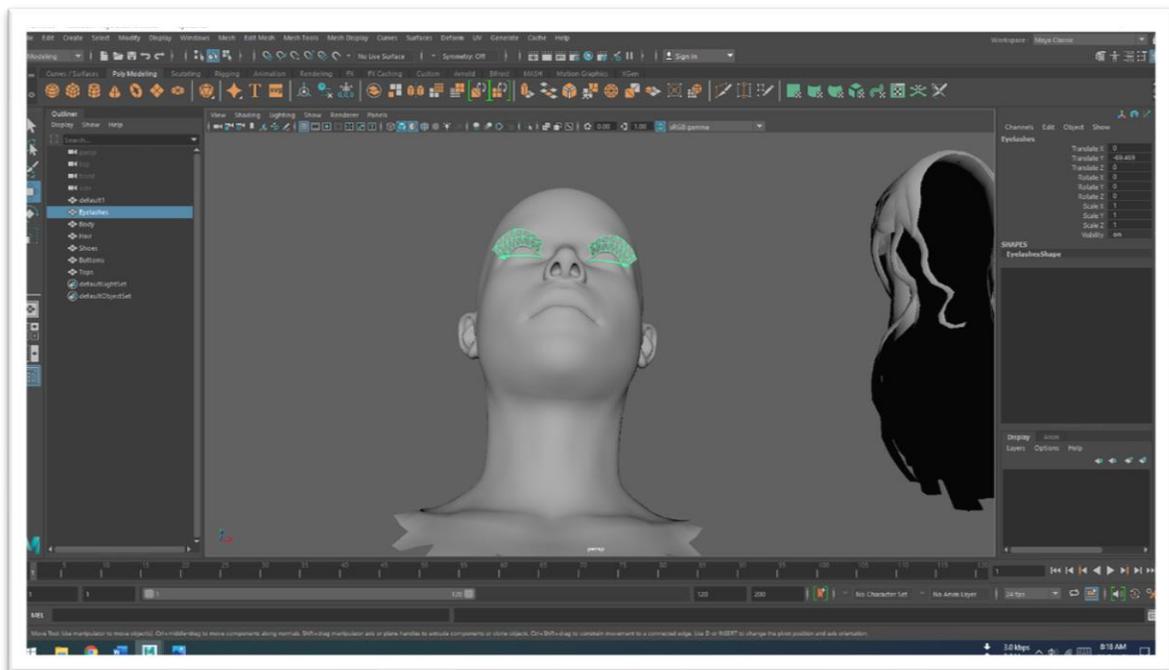


Figure 4.5.2: Eyebrow implementation in base female face

Step by step development process of main character from a base mesh is given bellow:

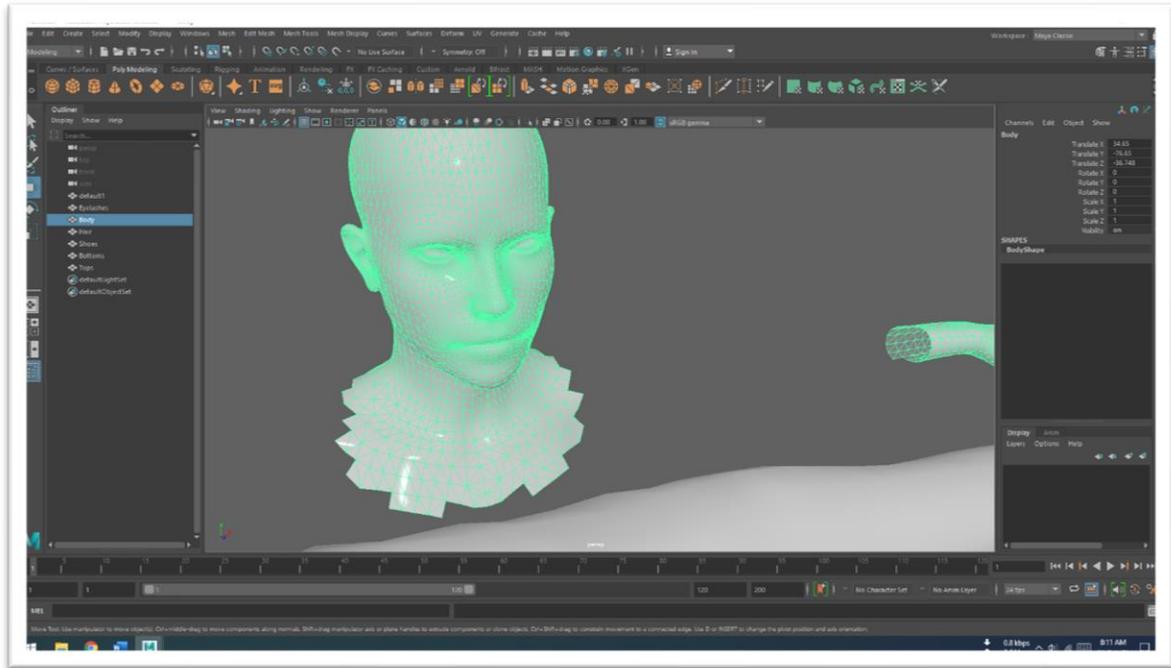


Figure 4.5.3: Base female mesh head selection with eyeball

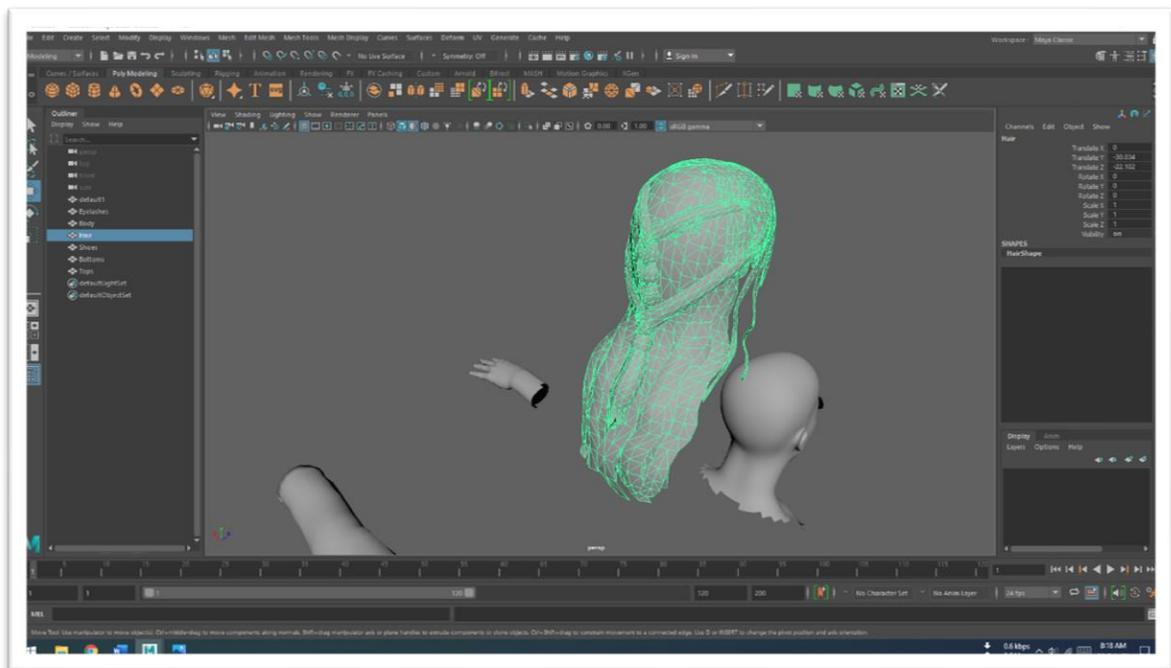


Figure 4.5.4: Hair mesh placement in base mesh

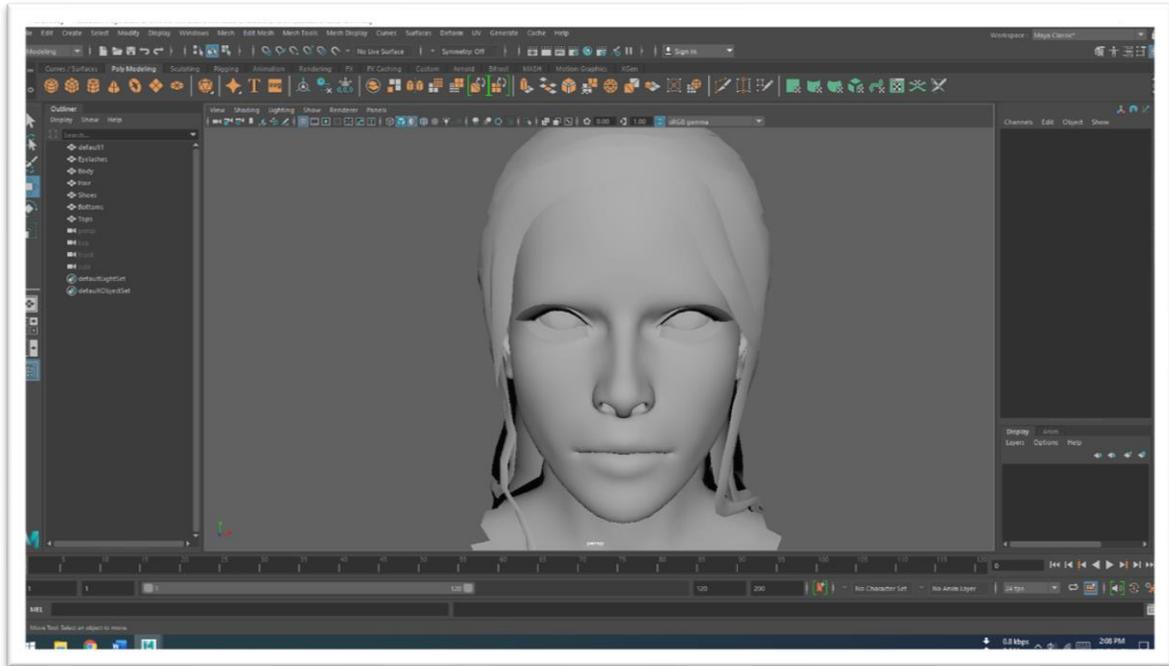


Figure 4.5.5: Female head mesh with hair mesh

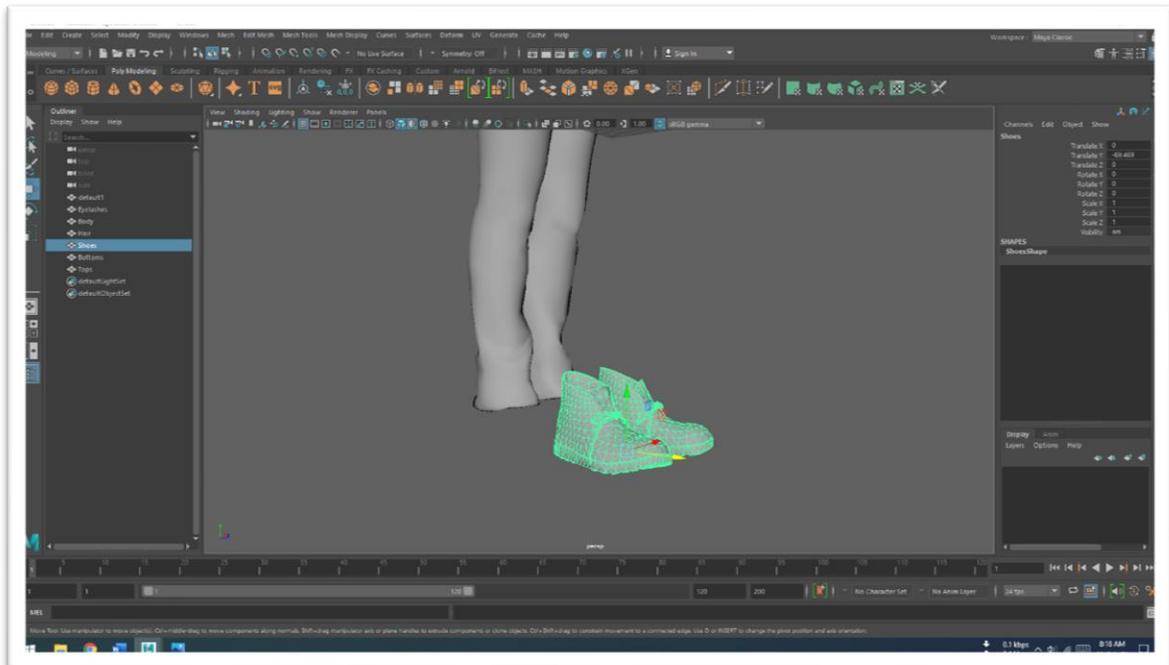


Figure 4.5.6: Optimized lowpoly shoe mesh

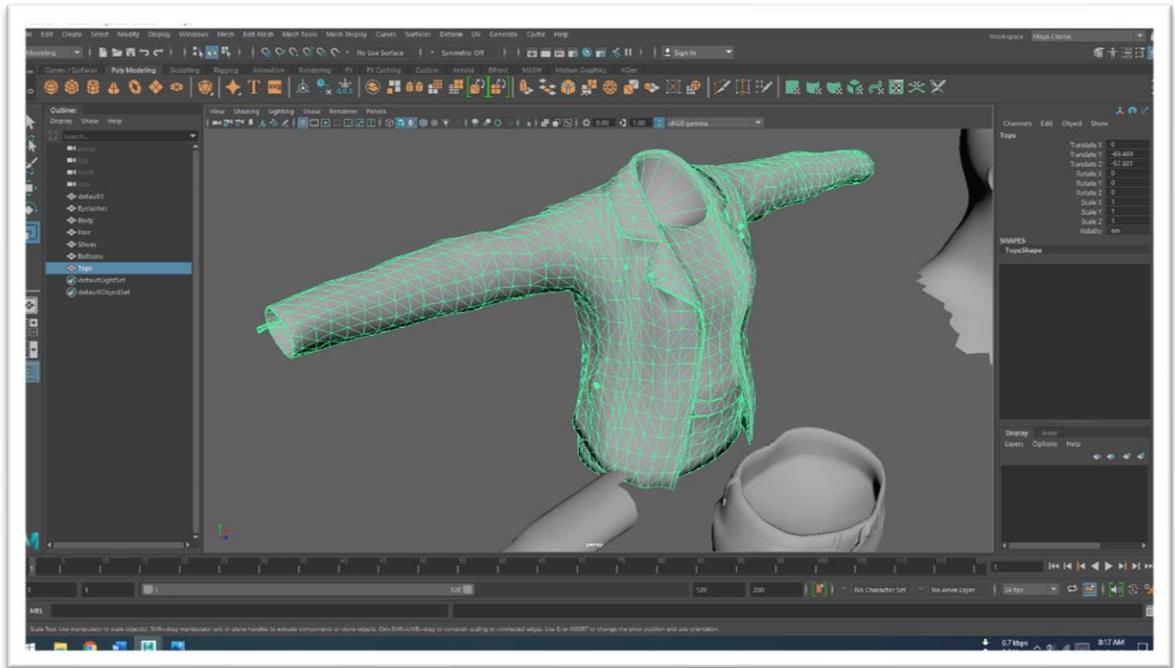


Figure 4.5.7: Optimized low poly coat and t-shirt mesh

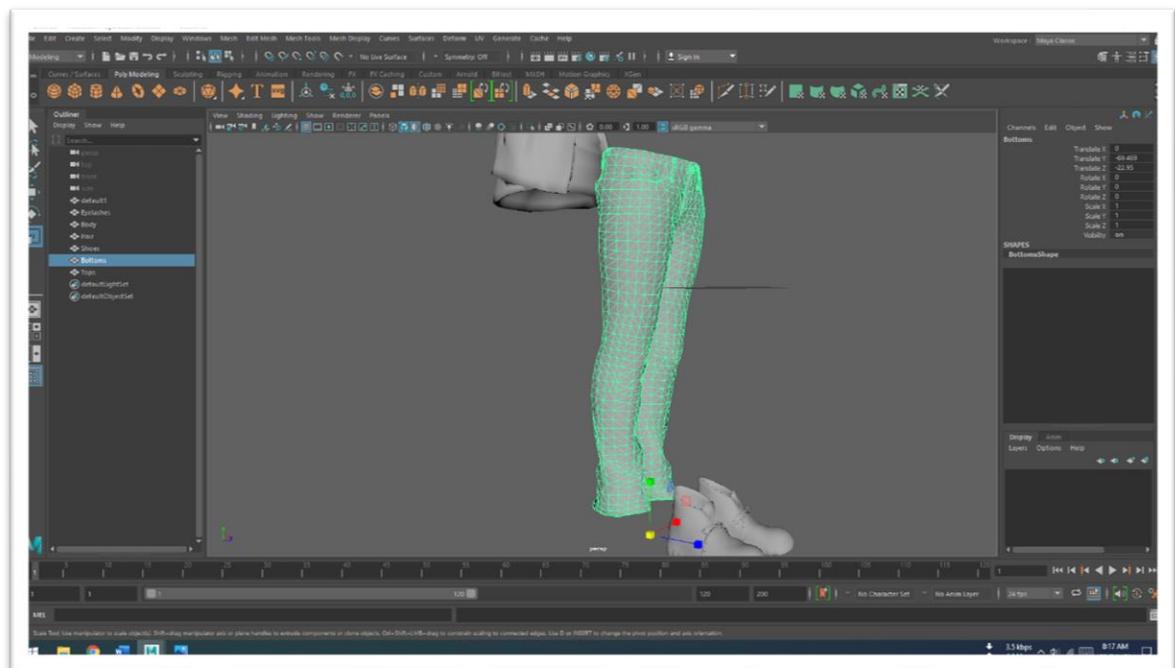


Figure 4.5.8: Optimized lowpoly pant mesh

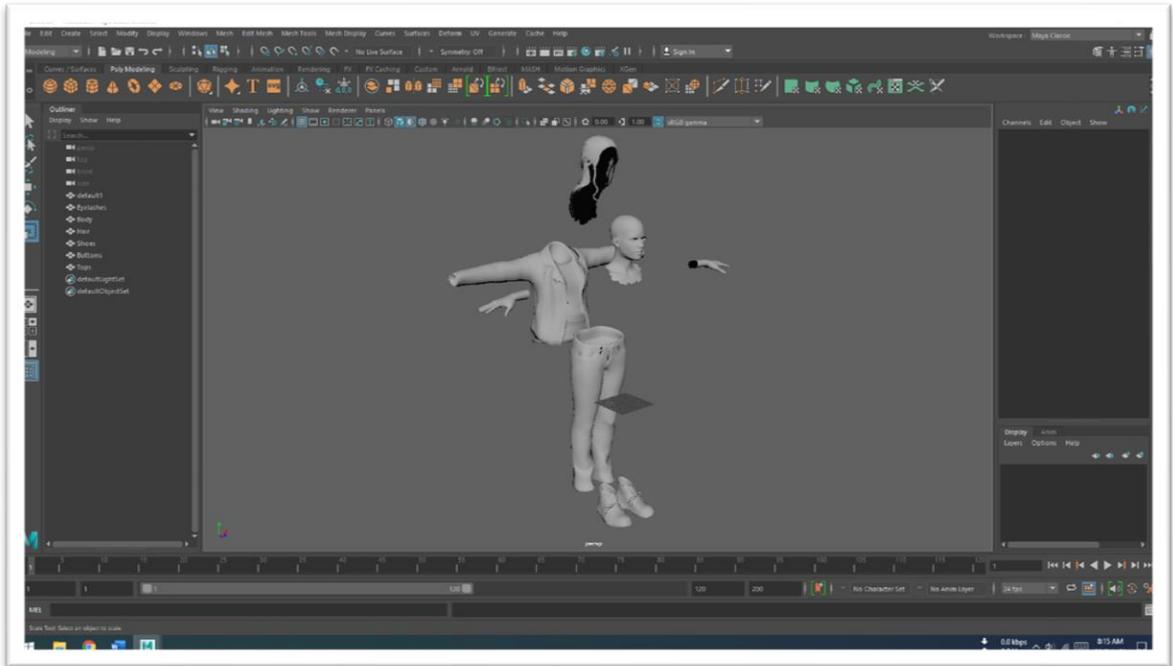


Figure 4.5.9: Compositing different mesh parts

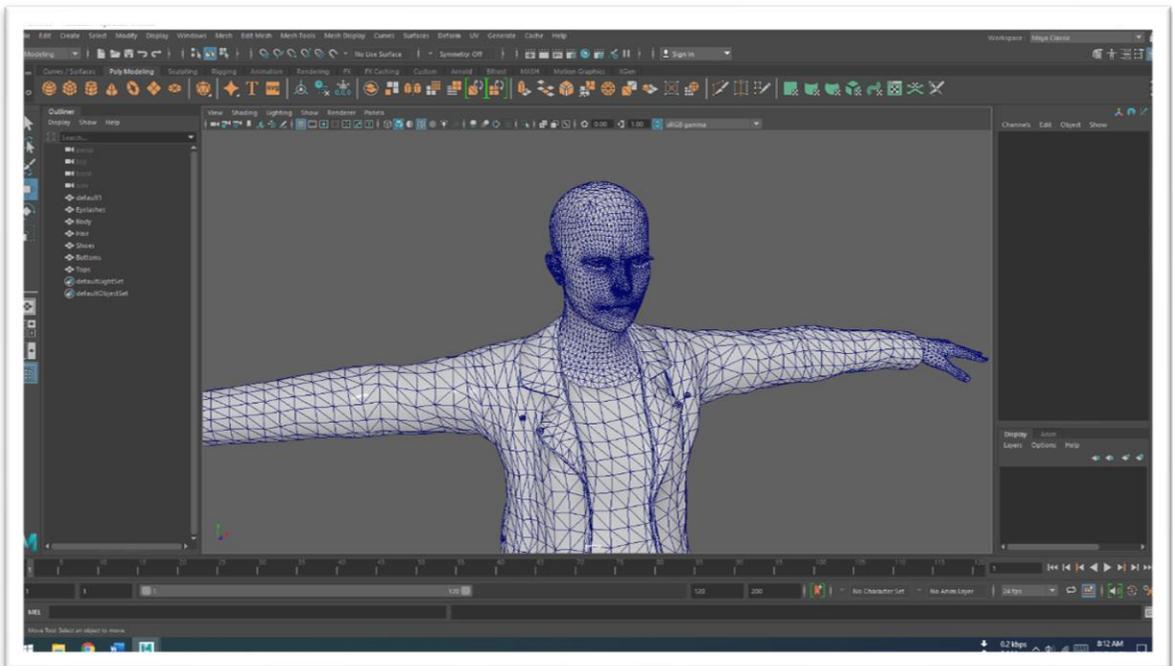


Figure 4.5.10: Composited body mesh without hair

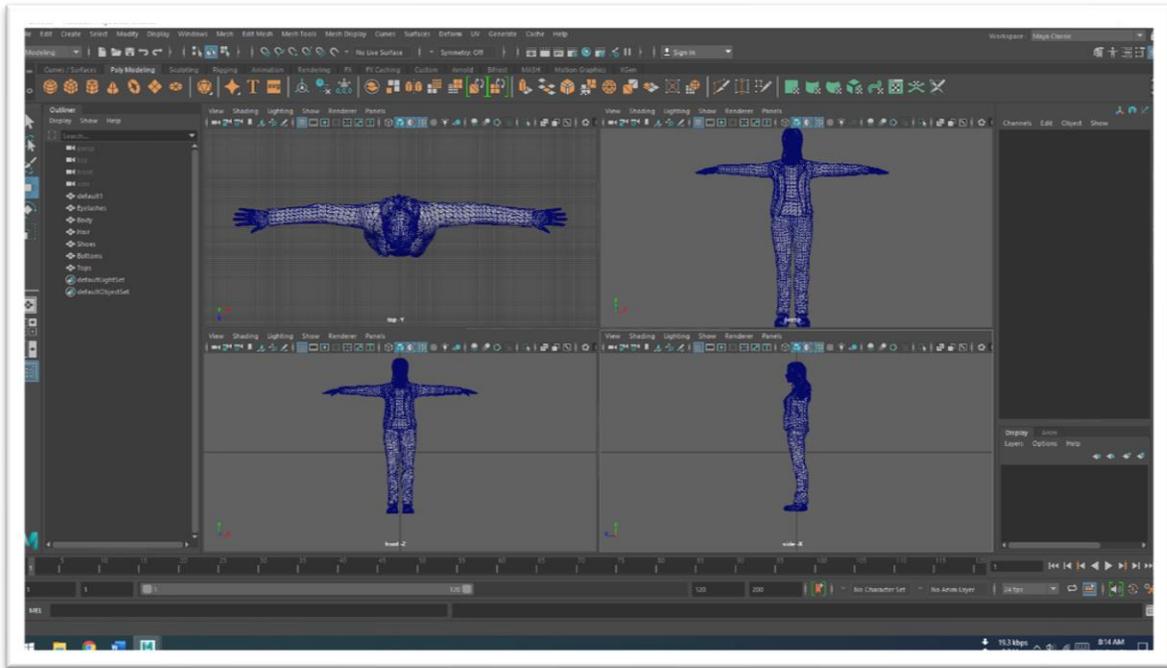


Figure 4.5.11: Composited full body selection with hair

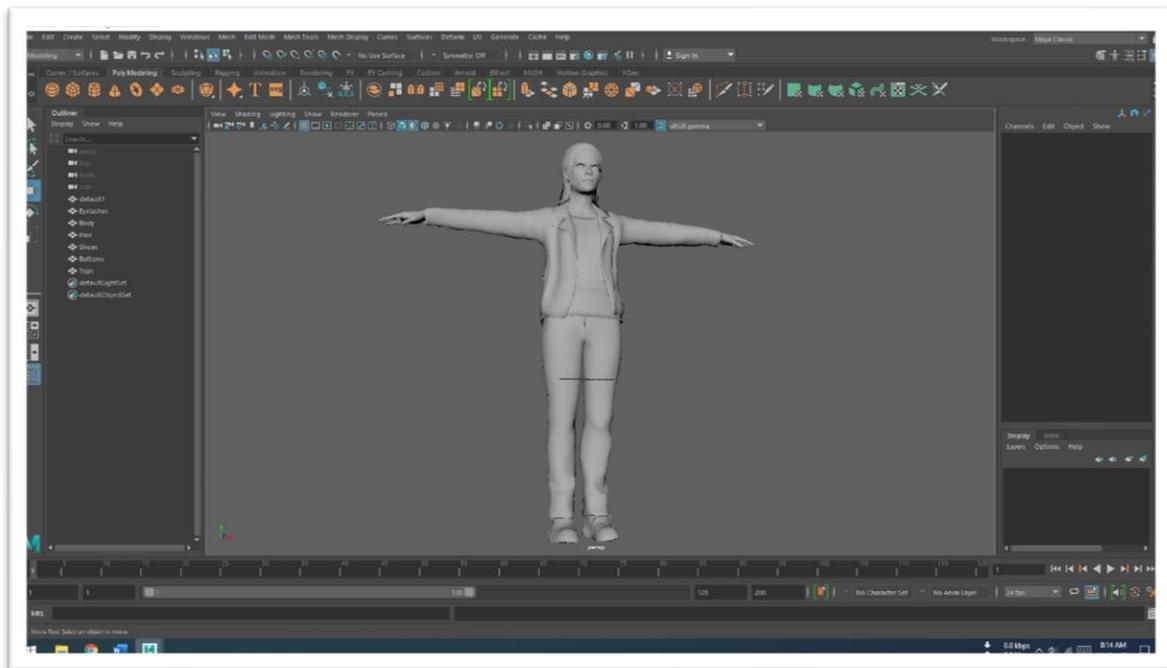


Figure 4.5.12: Composited full body without texture

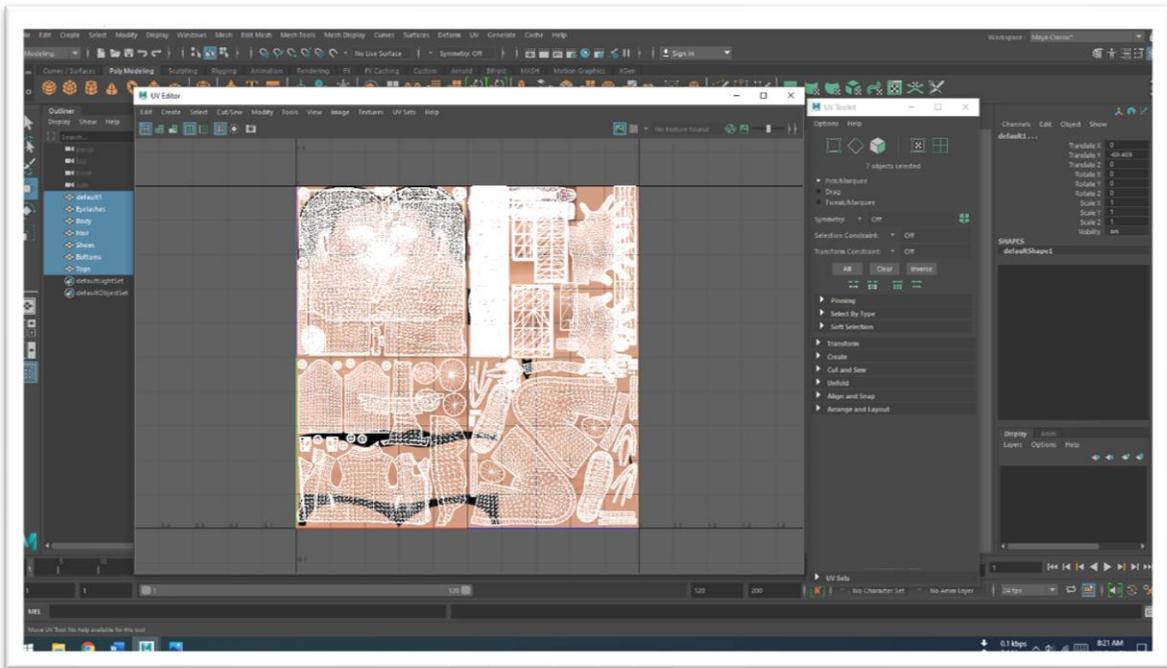


Figure 4.5.13: Body skin UV texture

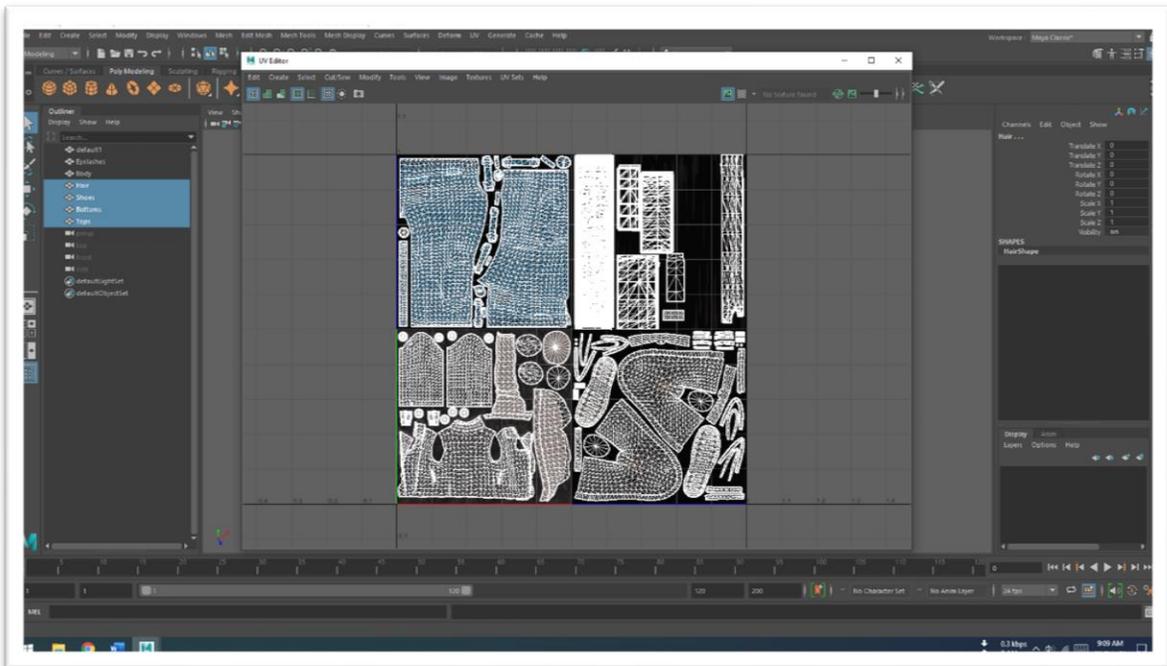


Figure 4.5.14: Dress and props UV texture

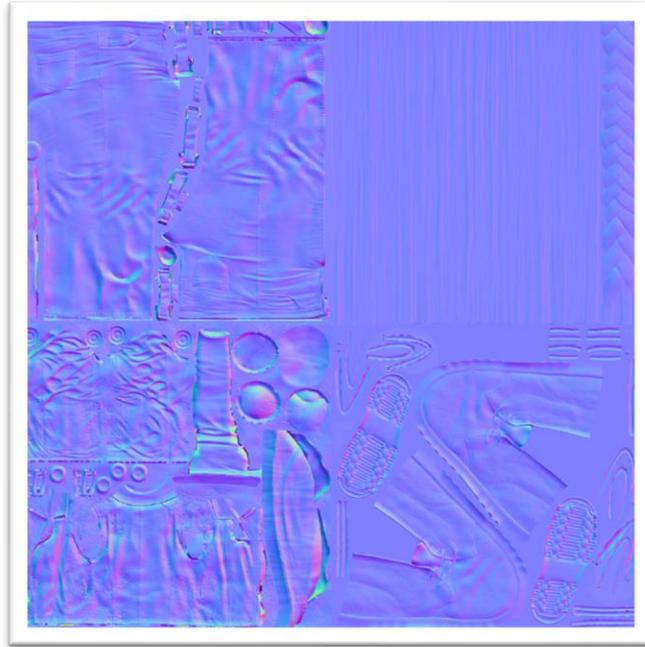


Figure 4.5.15: Dress and props Normal UV map

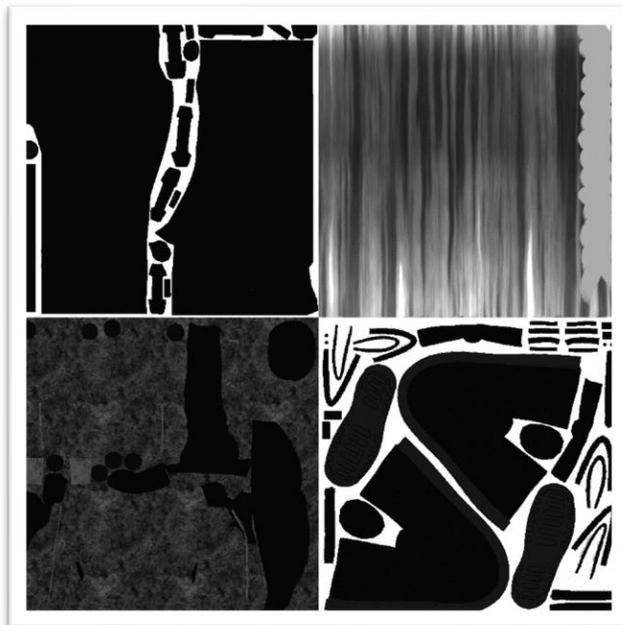


Figure 4.5.16: Dress and props Specular UV map

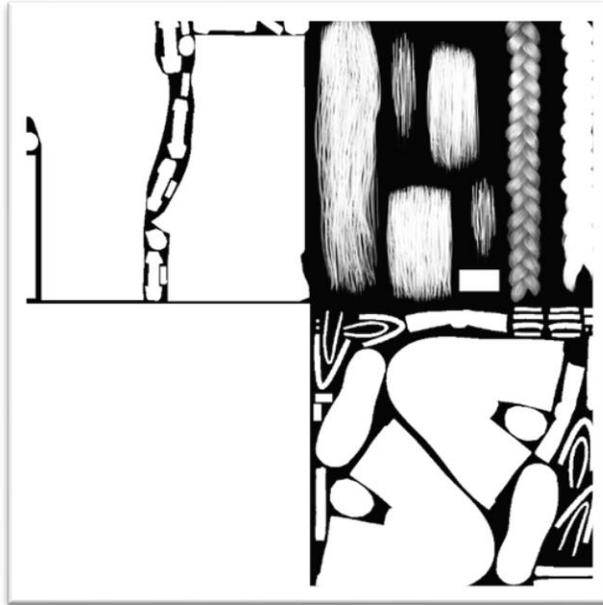


Figure 4.5.17: Dress and props Opacity UV map



Figure 4.5.18: Dress and props Diffuse UV map

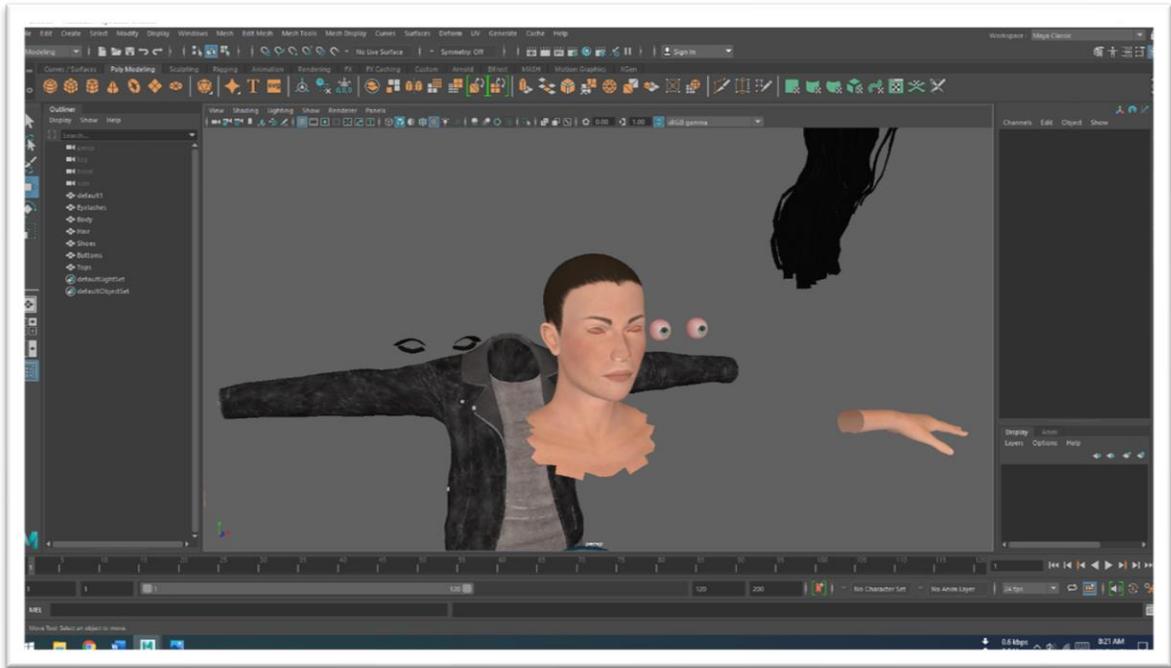


Figure 4.5.19: Individual textured parts

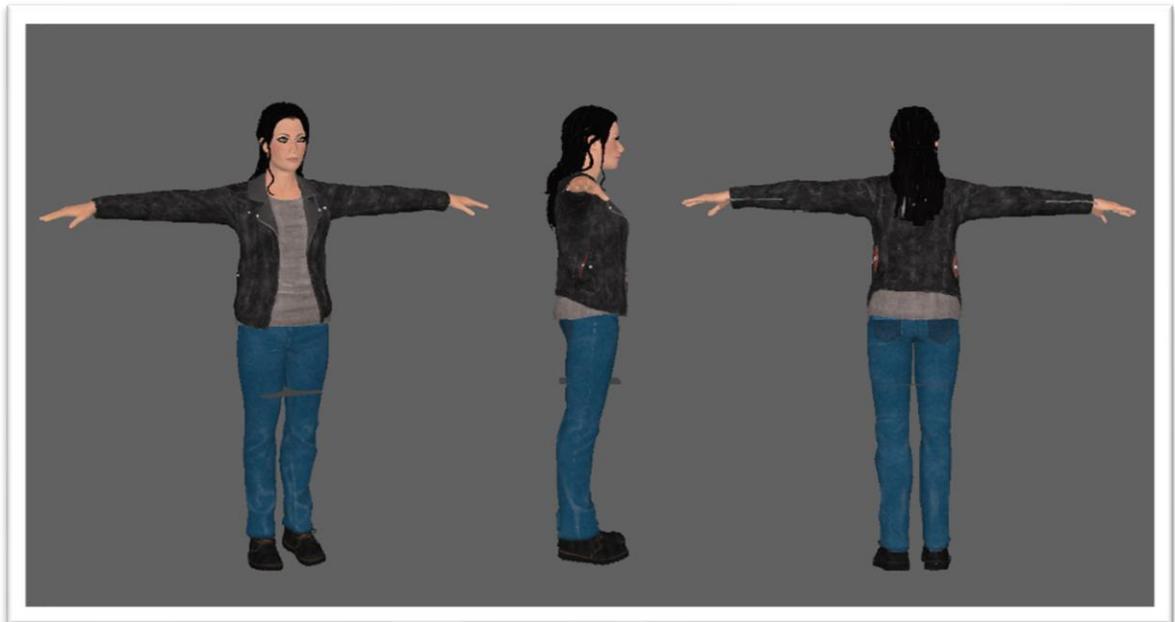


Figure 4.5.20: Full Textured Character Casual Look

4.6 Side Character Development

Supporting characters are people who add dynamics to your story. They work to compliment the main character and often need to add to the overall conflict to the story. A supporting character is not as critical as a main character, but the story should still need to rely on this person in order to be the same.

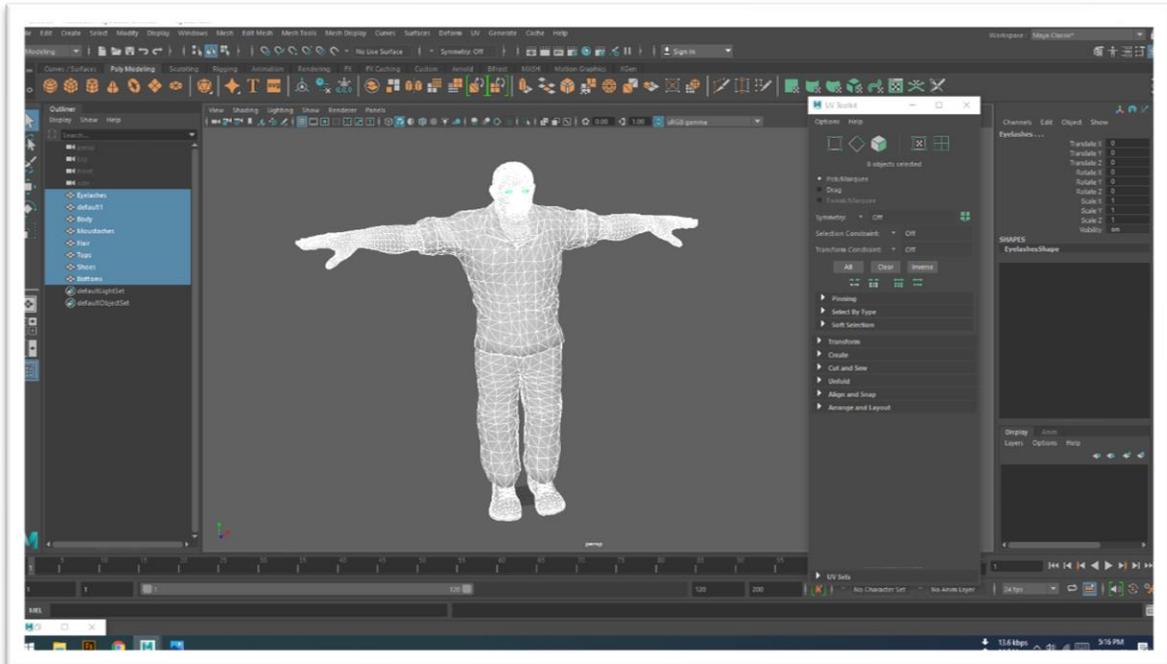


Figure 4.6.1: Chef Army Officer character model

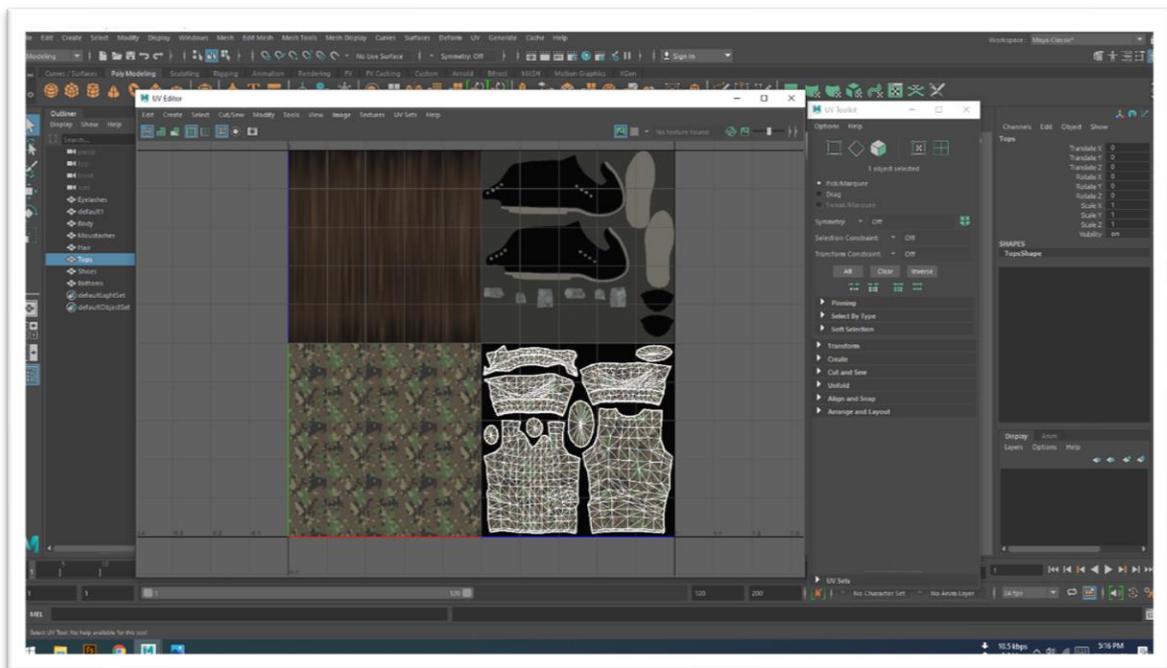


Figure 4.6.2: Chef Army Officer UV map

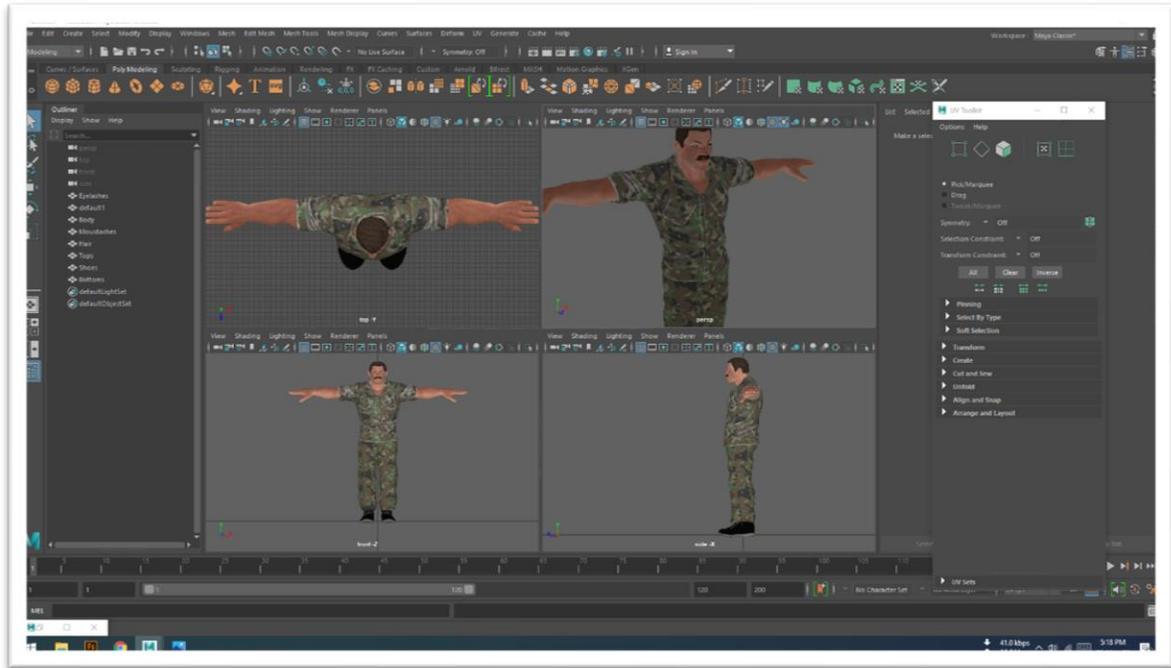


Figure 4.6.3: Chef Army Officer with texture



Figure 4.6.4: General Army Officer with texture

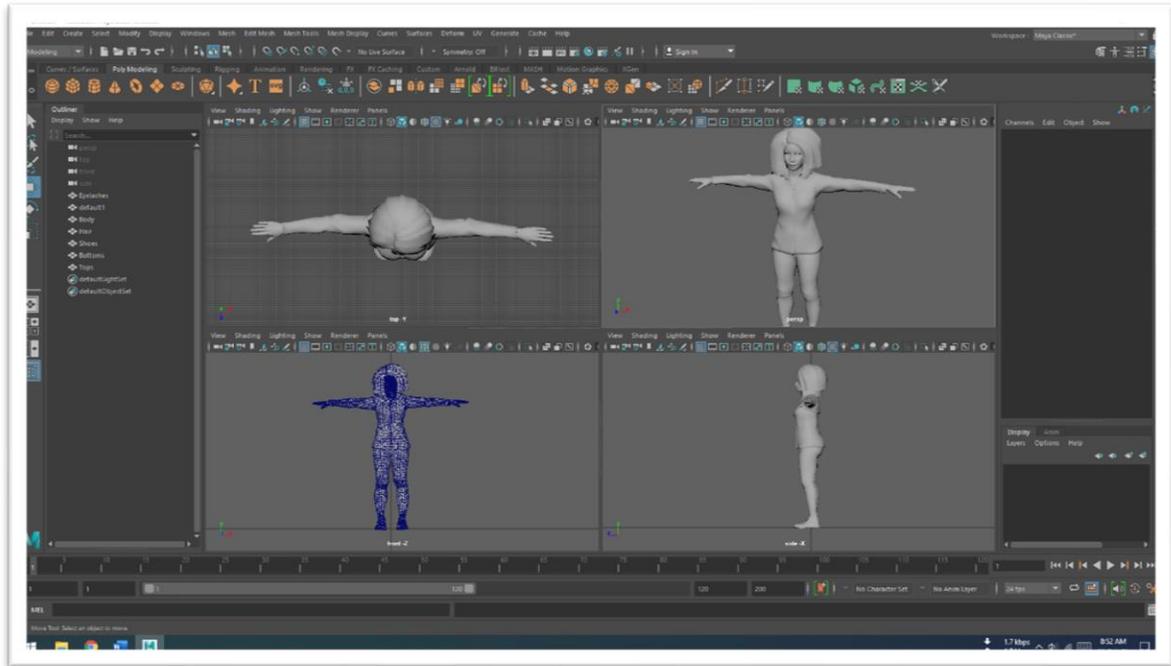


Figure 4.6.5: Victim character development

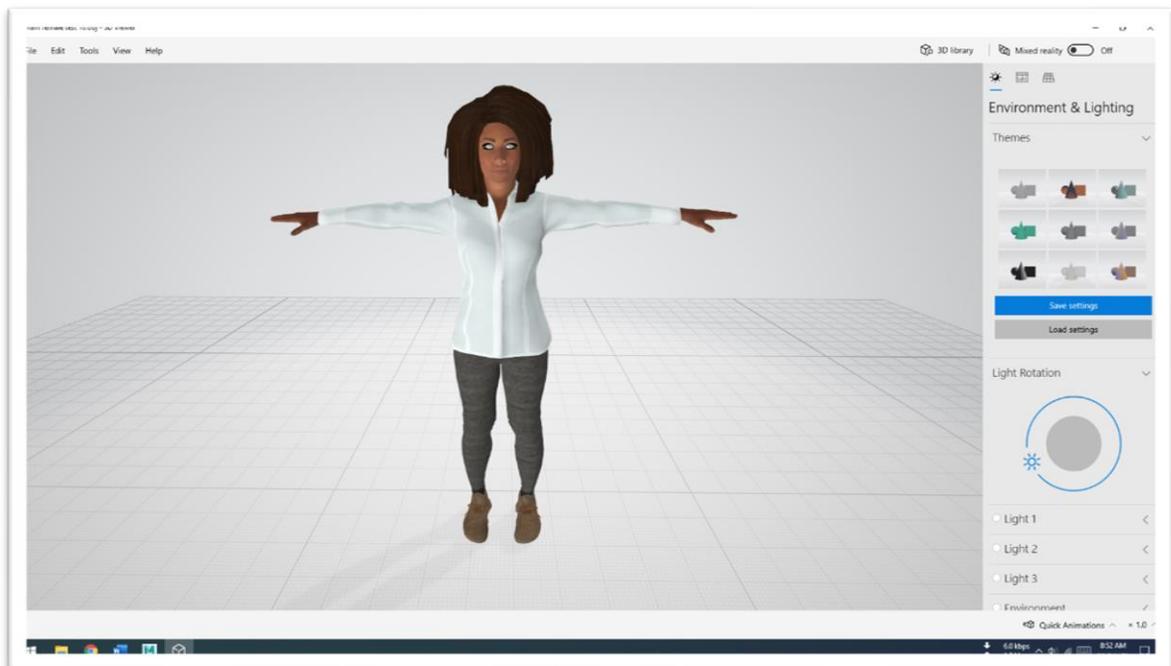


Figure 4.6.6: African Victim character

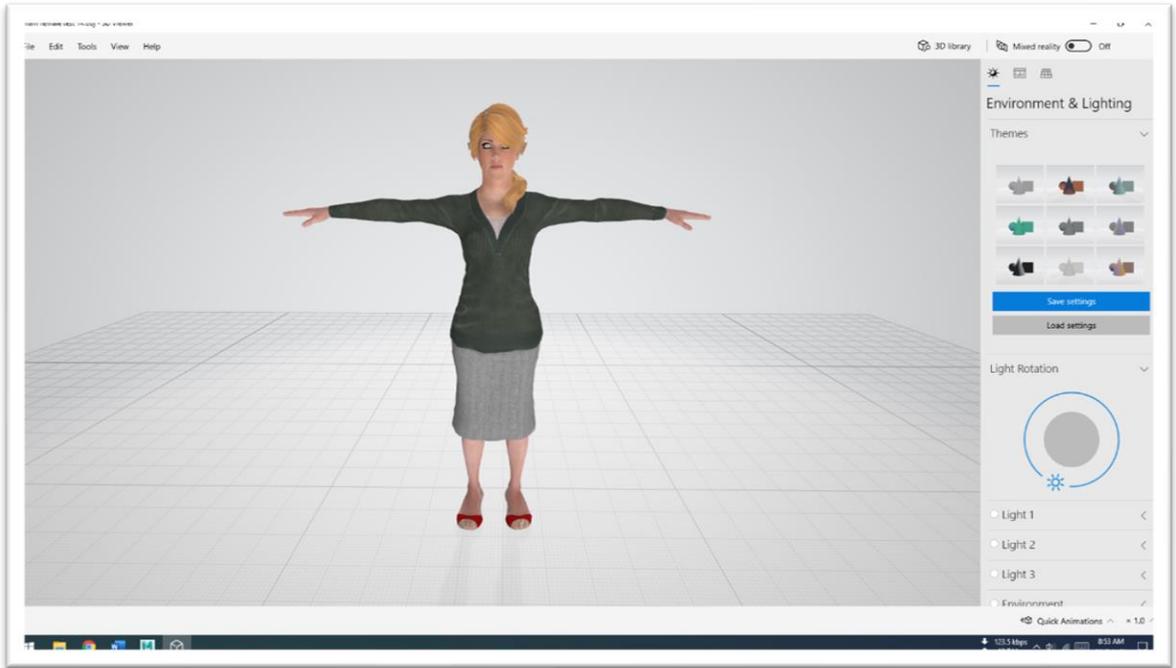


Figure 4.6.7: American Victim character



Figure 4.6.8: French Victim character



Figure 4.6.9: Indian Victim character



Figure 4.6.10: Villain's Assistant



Figure 4.6.11: Villain and his Assistant

For the last moment story modification and short time limit, the Villain character is impetrated from the asset store of Unity game engine. This character is so bold and bossy that it perfectly goes with the story of adventures game MISSION FREEDOM.

4.7 Character Animation

Character animation is a specialized area of the animation process, which involves bringing animated characters to life. Character animators inject life into their characters, providing the appearance of feeling, emotion and personality. Character animation is also differentiated from creature animation, which includes bringing photorealistic humans and animals to life. The activity of character and within gaming industry is rapidly expanding. Game makers use more convoluted characters that make it easier for the player to interact more thoroughly with the gameplay experience.

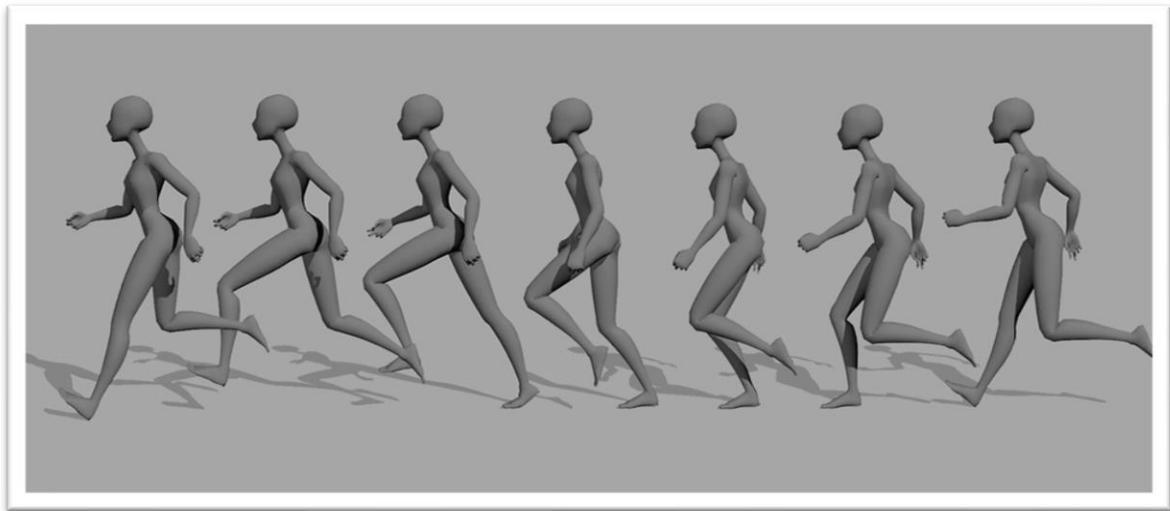


Figure 4.7: Walking character animation frame by frame

In 3D computer games, the T-act is principally utilized like the default present in liveliness programming, which is then controlled to make movements. Animating character for various movement is the final output for this game development project.

4.8 Character Animation in MIXAMO

It is nothing but the sequence of frame after frame which makes a character movement. Adobe Mixamo is very useful solution for various kinds of Character Animation. This web-based software automatically produces keyframe character animation for rigged human character model. Here, I create specific movements for every character.

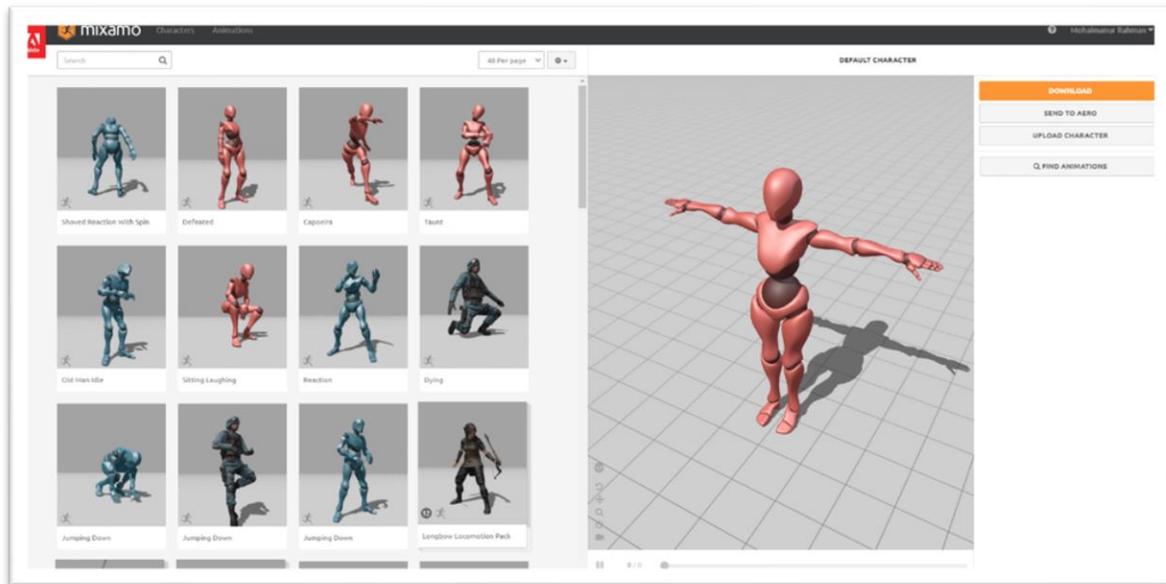


Figure 4.8.1: T-Pose female structure in Mixamo

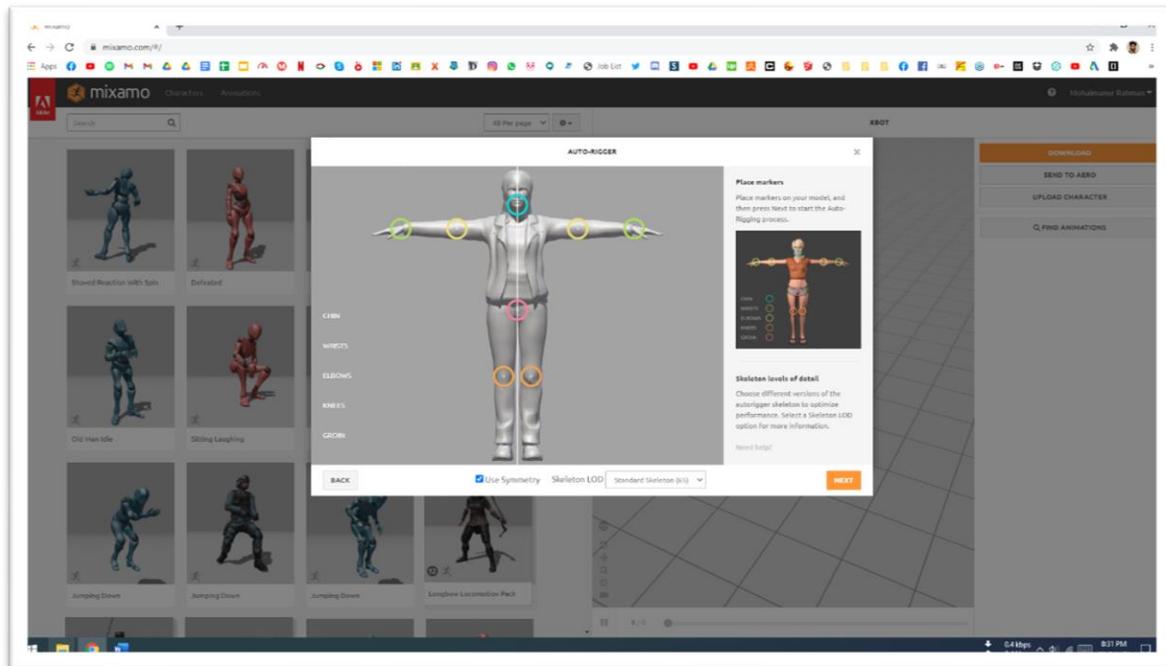


Figure 4.8.2: Setting T-pose rigging point for main character

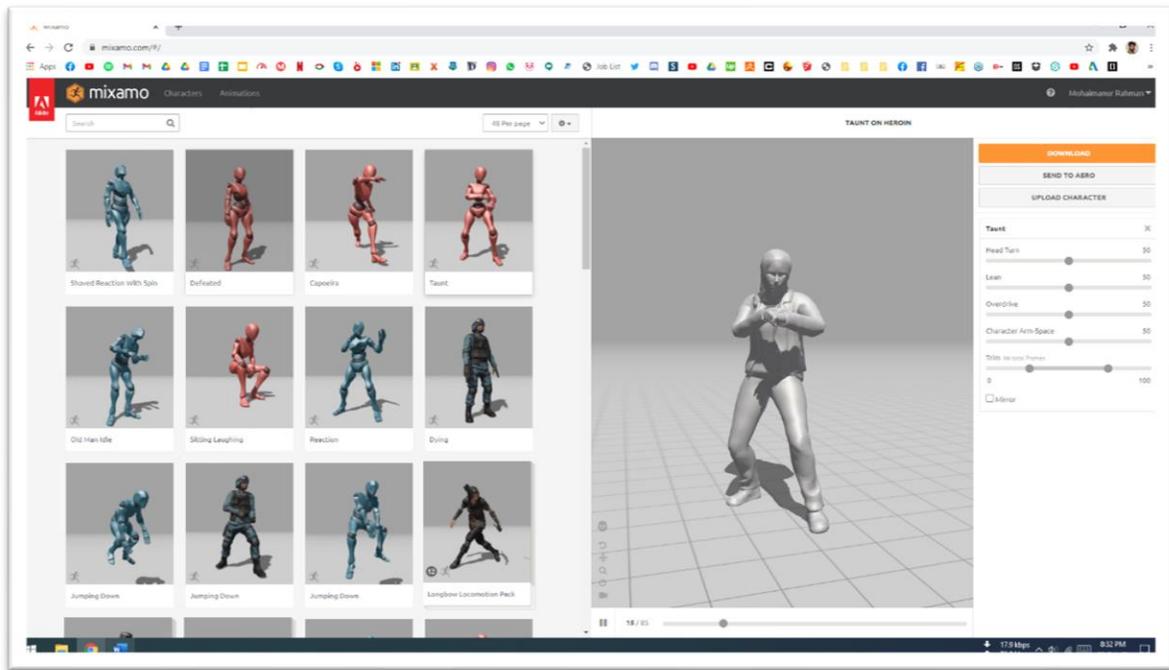


Figure 4.8.3: Action rigged pose of main character

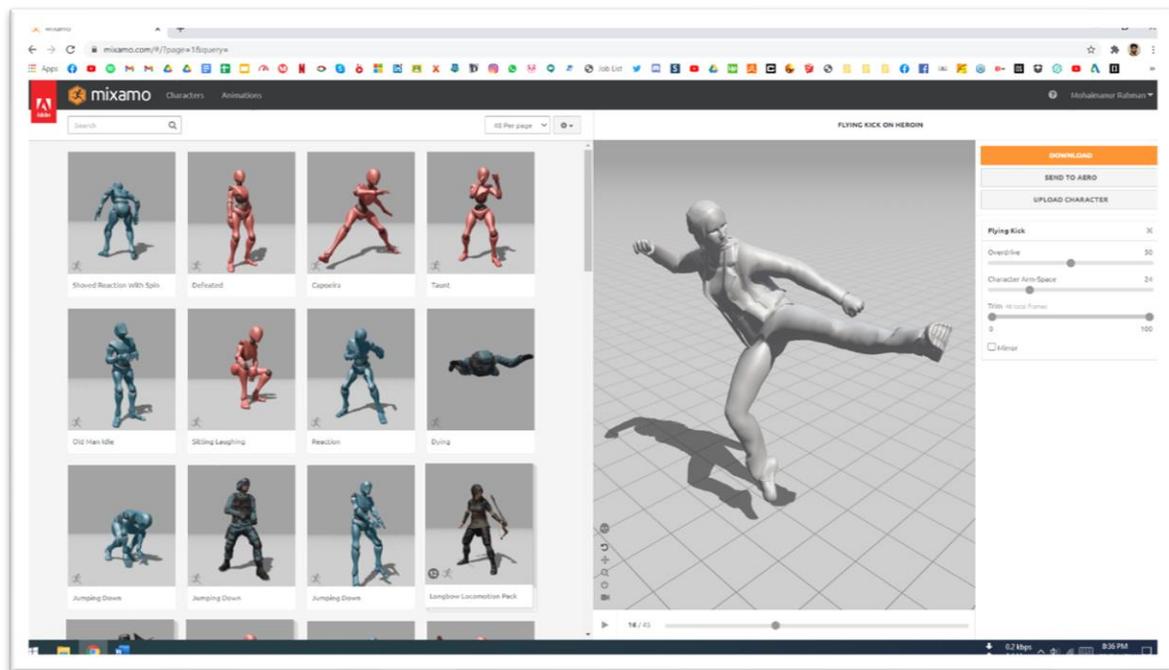


Figure 4.8.4: Fighting rigged pose of main character

4.9 Optimised Environment Design

Game environment design is the practice of applying design and esthetics to the development of a game for entertainment or instructional, exercise or experimental applications. The elements and concepts of game design are gradually being applied to other interactions, in the form of gamification. Often the game developer is also the designer, but other developers do comprehensive product creation to meet an own target audience after licensing the game from the designer.

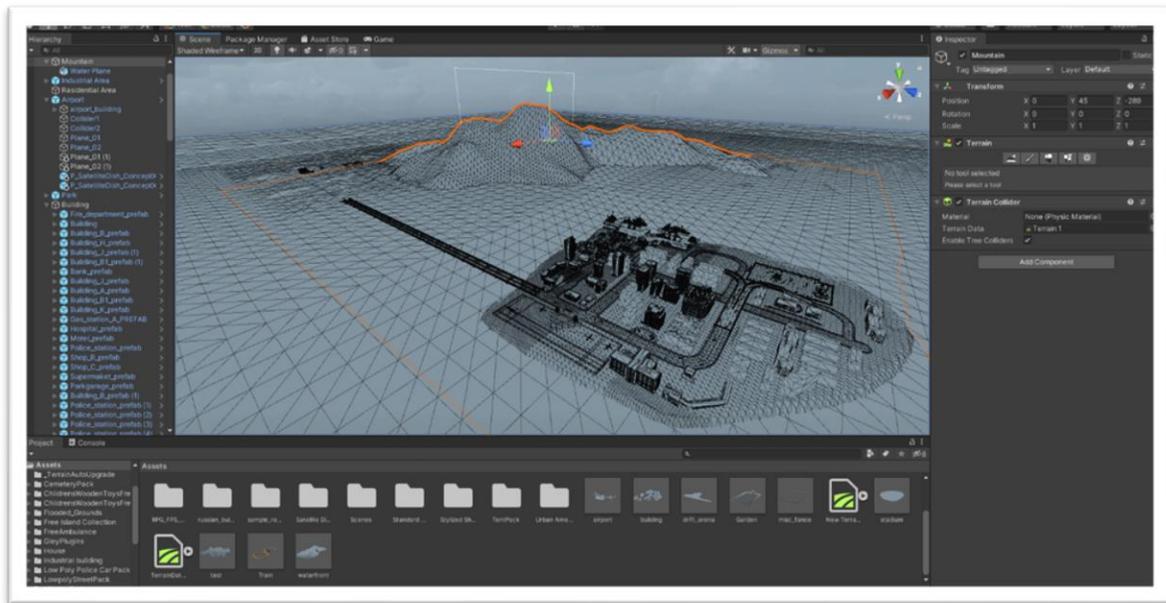


Figure 4.9.1: Optimizing three different terrain into one plane

For bigger games, such as limited-edition card games and most video games, a team is used, and creator and developer roles are normally separated between many individuals. Game prototype is a variant of the game used for testing. Usually, making a prototype is a move from game design to game production and testing. While prototyping in relation to human-computer interaction and interaction design are also researched, the usage of prototyping in game design has remained largely unexplored.

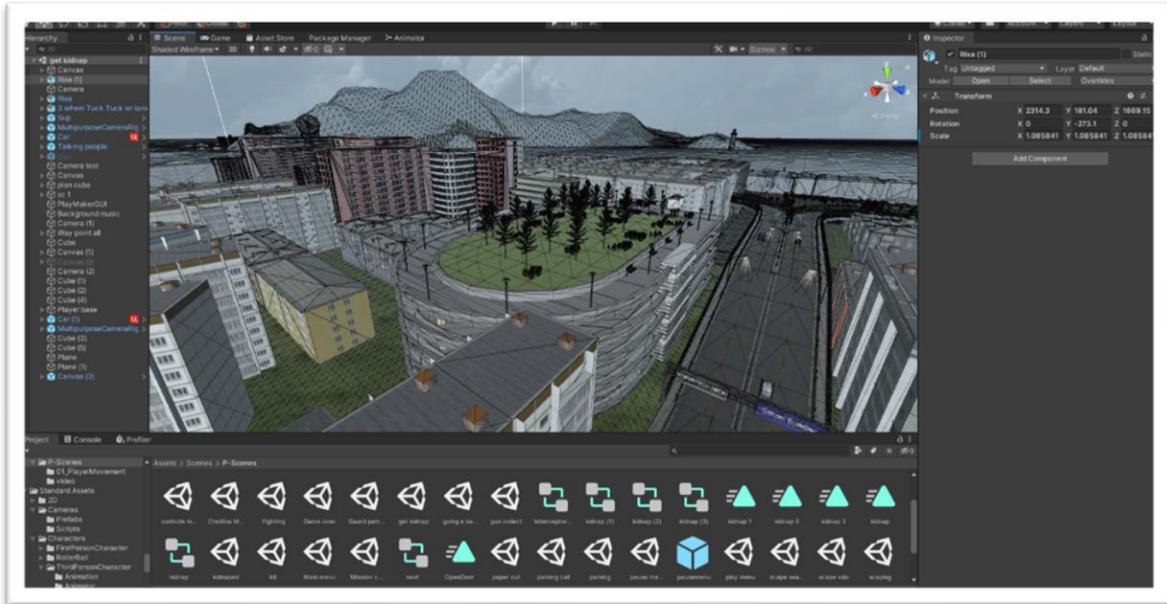


Figure 4.9.2: Optimizing the map connects to the jungle

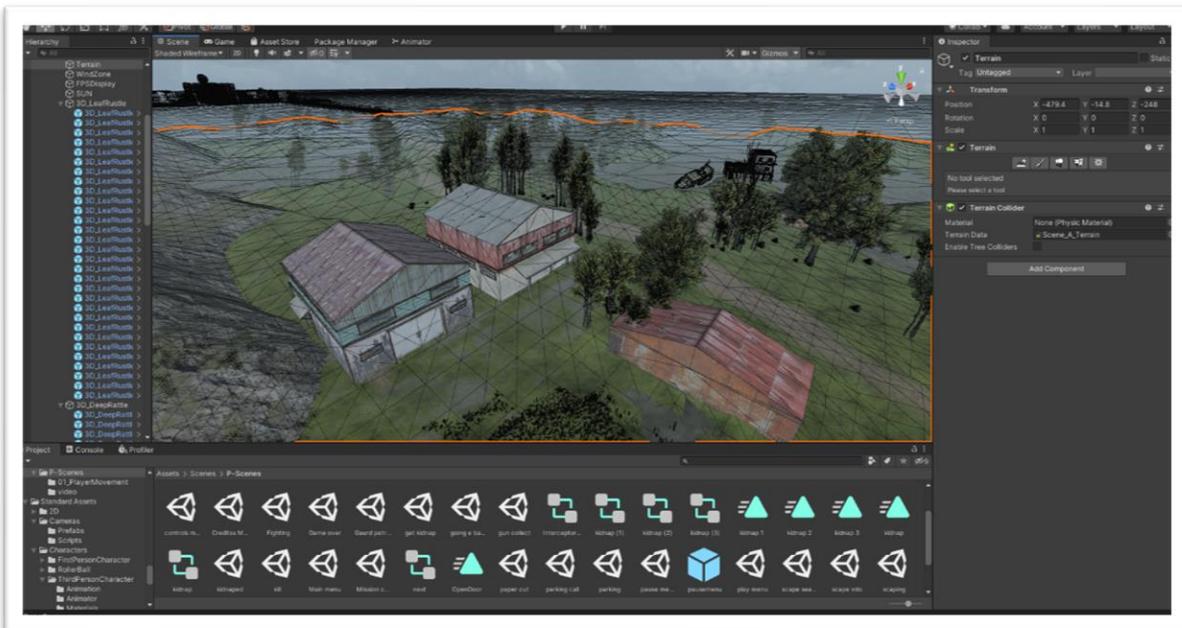


Figure 4.9.3: Optimizing the map connects to the city



Figure 4.9.4: Optimized jungle map with main character

Video Game Optimization defines a method to improve the efficiency of a video game for improved gaming and visual experience. Very few game developers grasp the method of optimizing the whole video game, but understanding the process is remarkably straightforward and accessible to a broader audience. The examples presented in the book can be applicable to a number of game styles, including how to improve machine memory, CPU processing, graphics, and shaders.

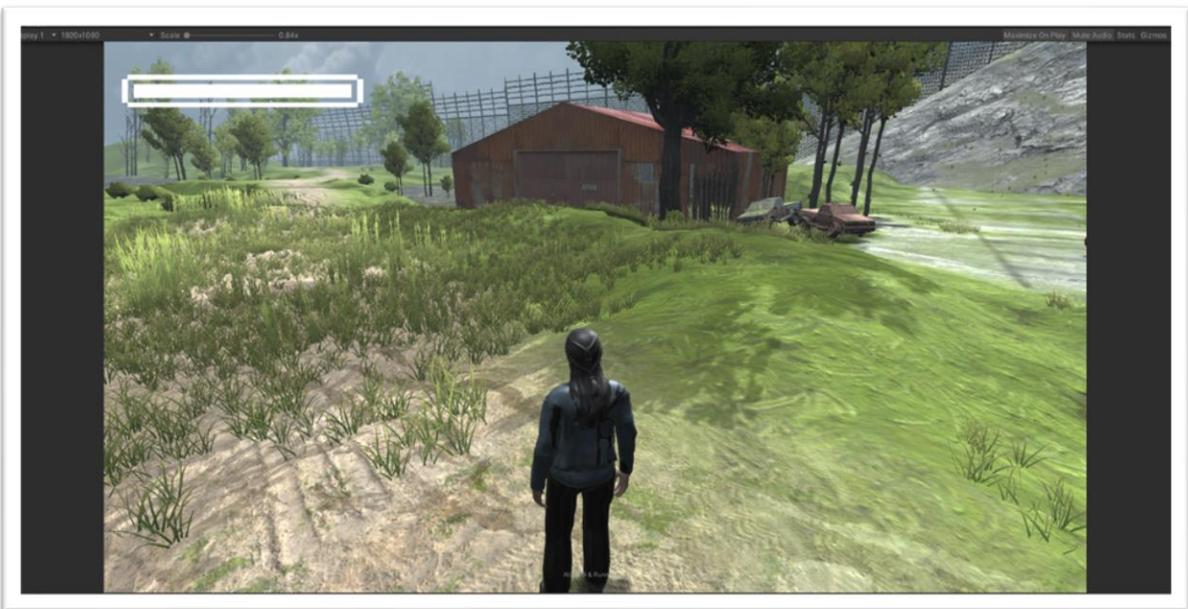


Figure 4.9.5: Optimized jungle map with main character

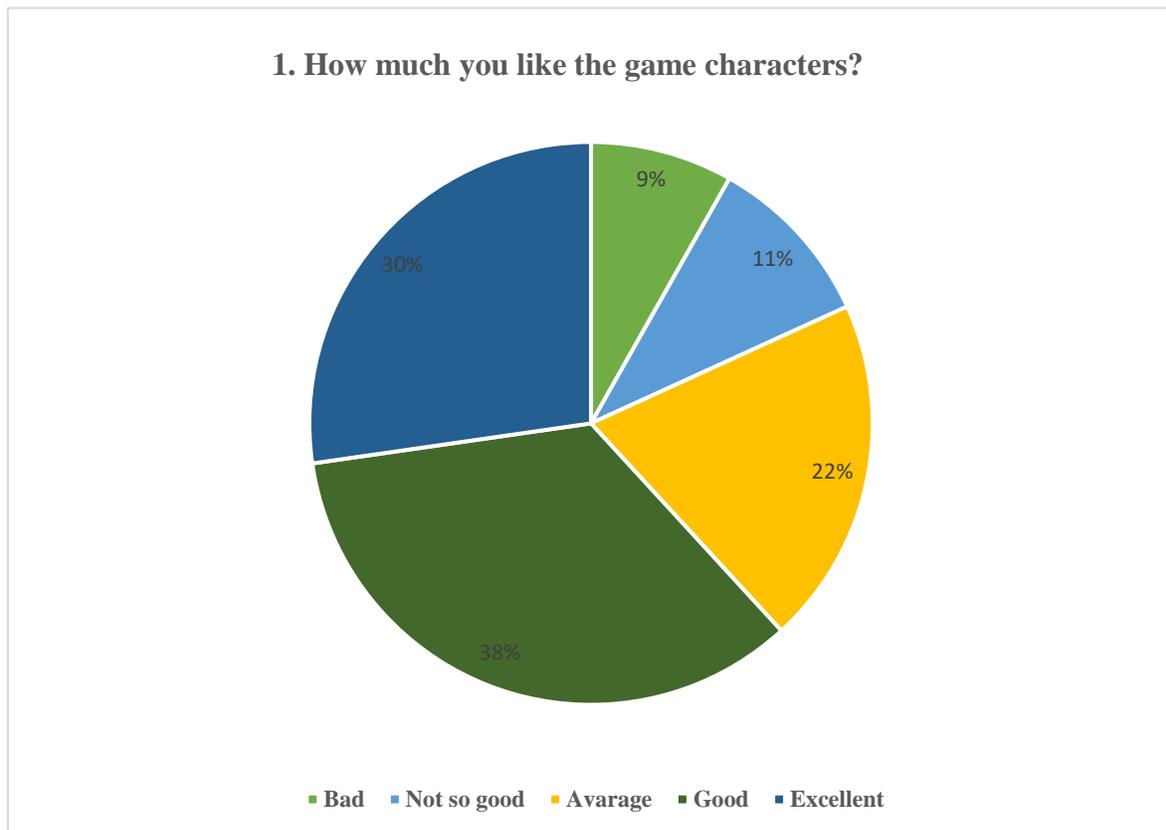
4.10 Software Used In This Project



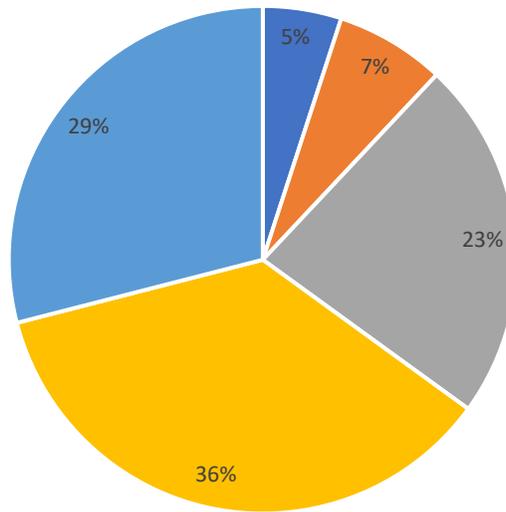
4.11 Servey Report on my work

After facing lots of challenges done the assigned task of character development, character animation and optimised game environment in this game development project. Solving the issues and debug the problems finally able to release my work and did some servey on my work. Overall servey report was satisfying which was done on some friends and gamers.

The purpose of writing a survey report is to study a research topic thoroughly, and to summarize the existing studies in an organized manner. It is an important step in any research project. Determining the objectives, select respondents and creating a data analysis plan is the way to develop the survey. After the distribution and conduct the survey the data should be analysis and finally report the result.

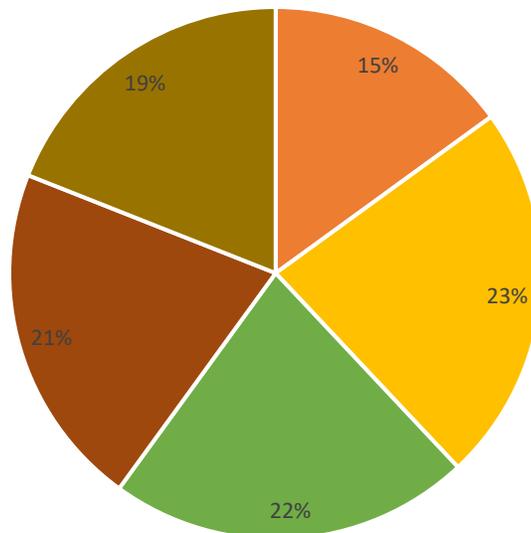


2. Is the character relevant to the game story and environment?



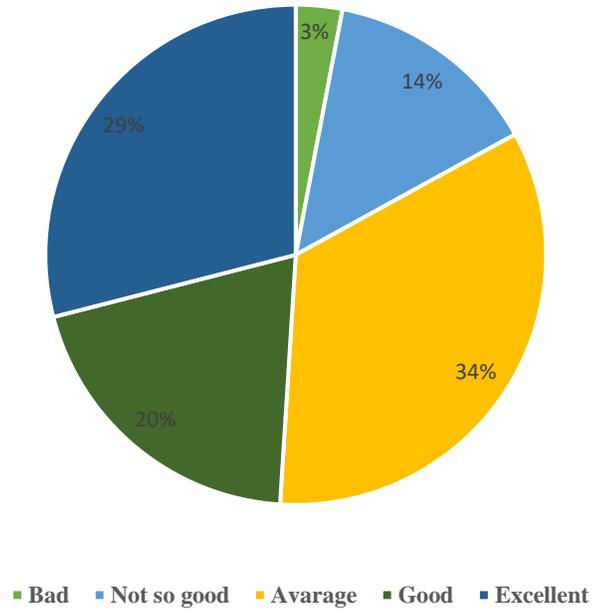
■ Not Relavent ■ Satisfactory ■ Avarage ■ Relavent ■ Outstanding

3. How interactive is the action animation of the character?

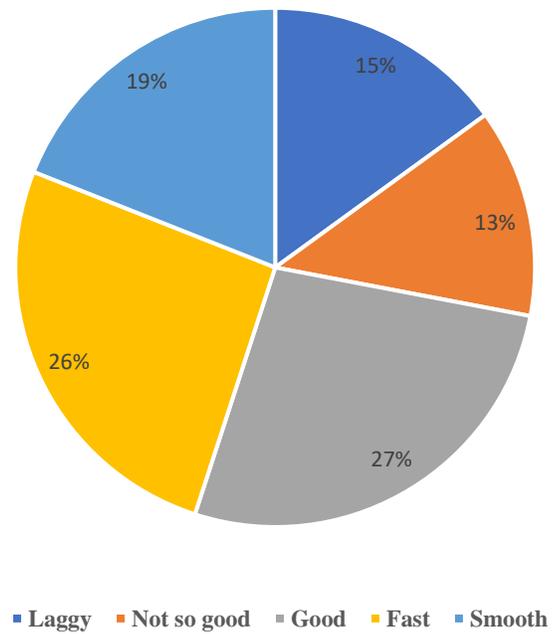


■ Bad ■ Not so good ■ Avarage ■ Good ■ Excellent

4. How are the outfit and props of the characters?



5. How optimized is the game environment and other characters?



CHAPTER 5: FINAL OUTPUT AND DISCUSSION

5.1 Final Gameplay

Gameplay is the basic way that players engage with a game, and in particular with video games. Gameplay is a pattern identified by the rules of the game, the interaction between the player and the game, the difficulties and the overcoming of the plot and the attachment of the player to the game. Media gaming is distinguished from graphics and audio features.

The final output of this game production is a windows computer based executable application file. As my role of character development, character animation and optimized environment design the final gameplay output is presented and served. Here, the story wise step by step gameplay screenshot is given.



Figure 5.1.1: MISSION FREEDOM game start menu



Figure 5.1.2: Story building of the game MISSION FREEDOM

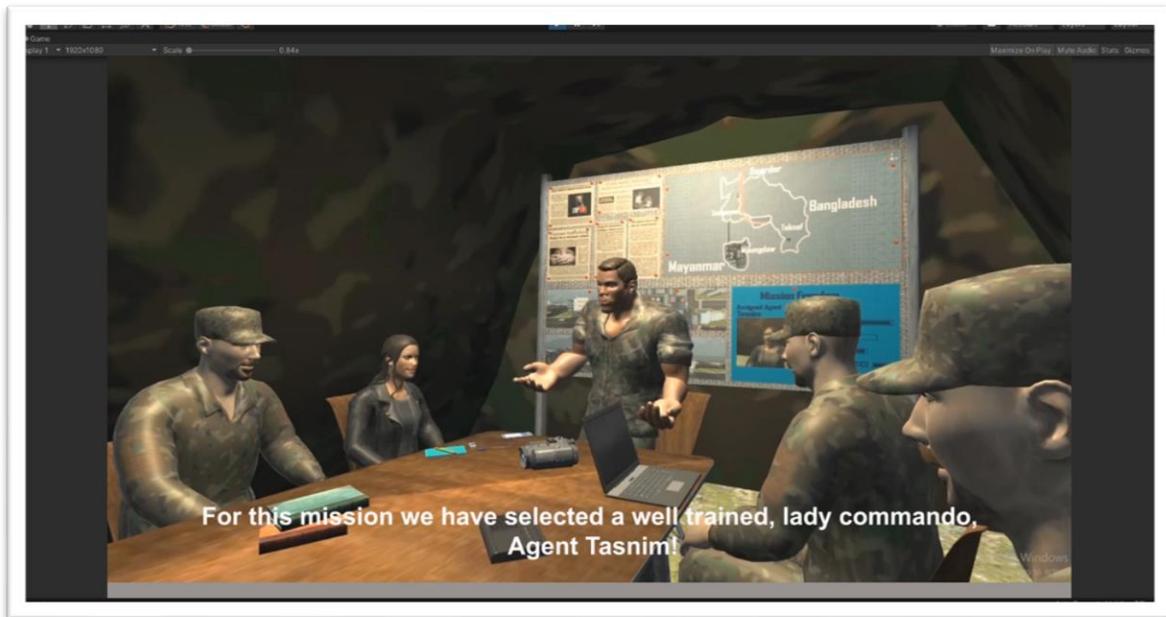


Figure 5.1.3: Army Officer at the meeting for rescue mission



Figure 5.1.4: Agent landed at airport and looking for the clues



Figure 5.1.5: Agent found clues and taking to the privet gunman



Figure 5.1.6: Private gunman taking Agent Tasnim to their safehouse

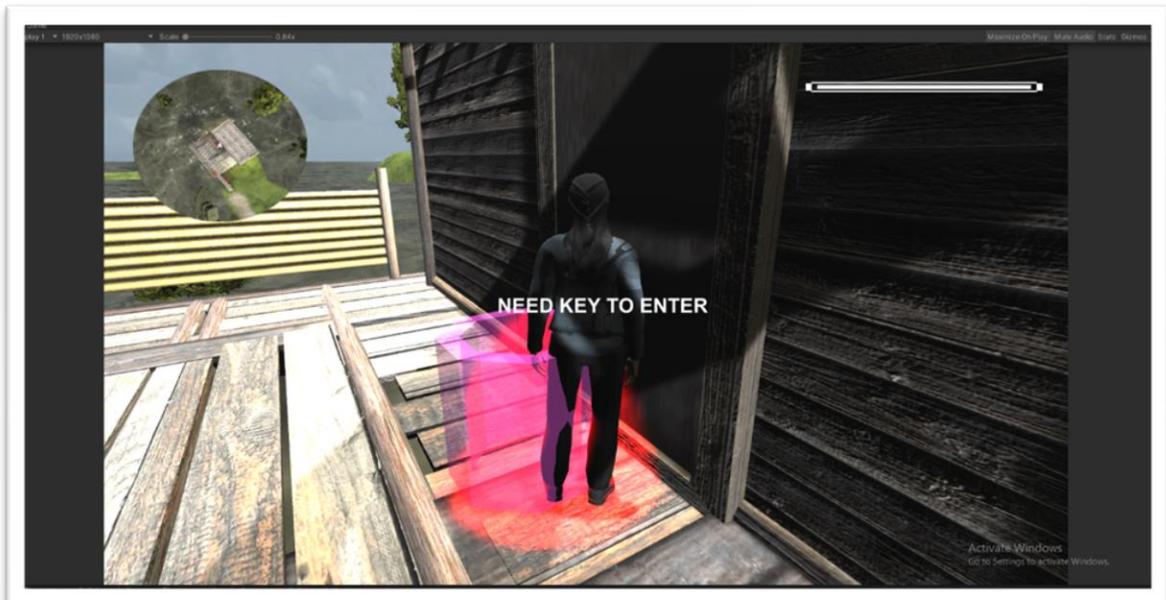


Figure 5.1.7: Agent need to find the key of safe house



Figure 5.1.8: Agent killed the Assistant



Figure 5.1.9: Agent found victims at their safe house

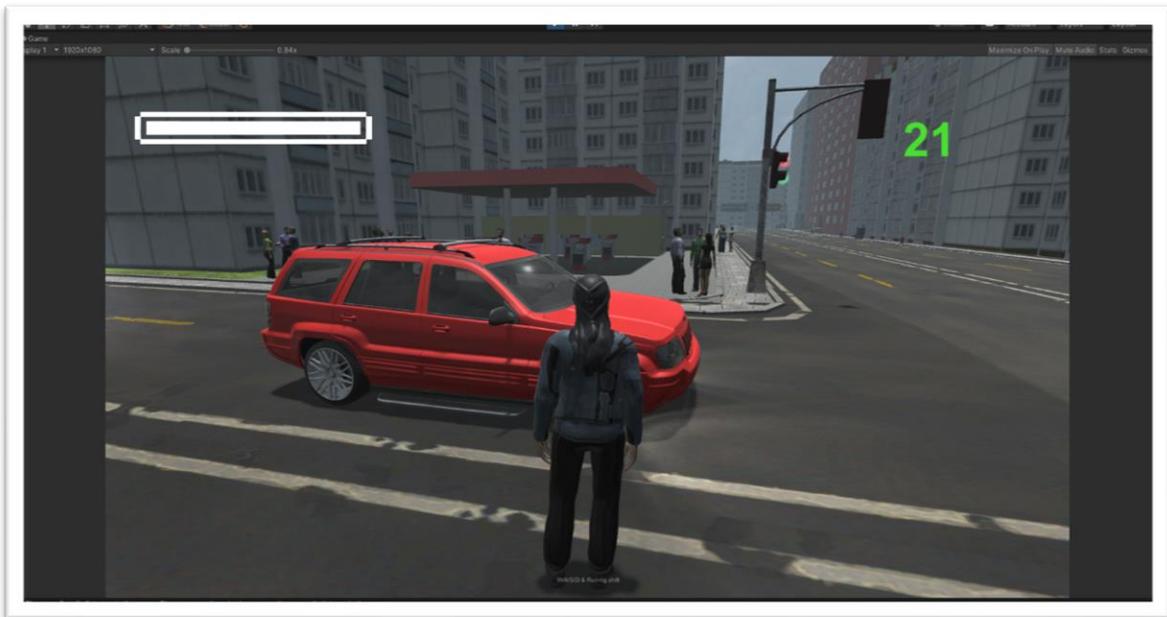


Figure 5.1.10: Agent rescued the victim girls and brings to city

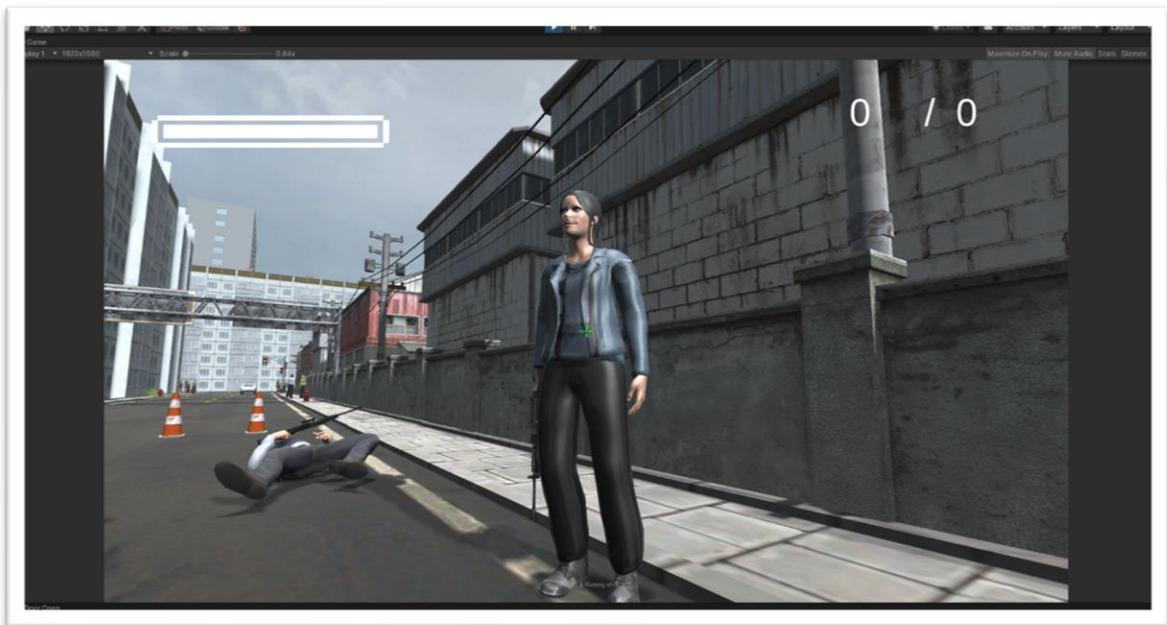


Figure 5.1.11: Agent fights with the private guards

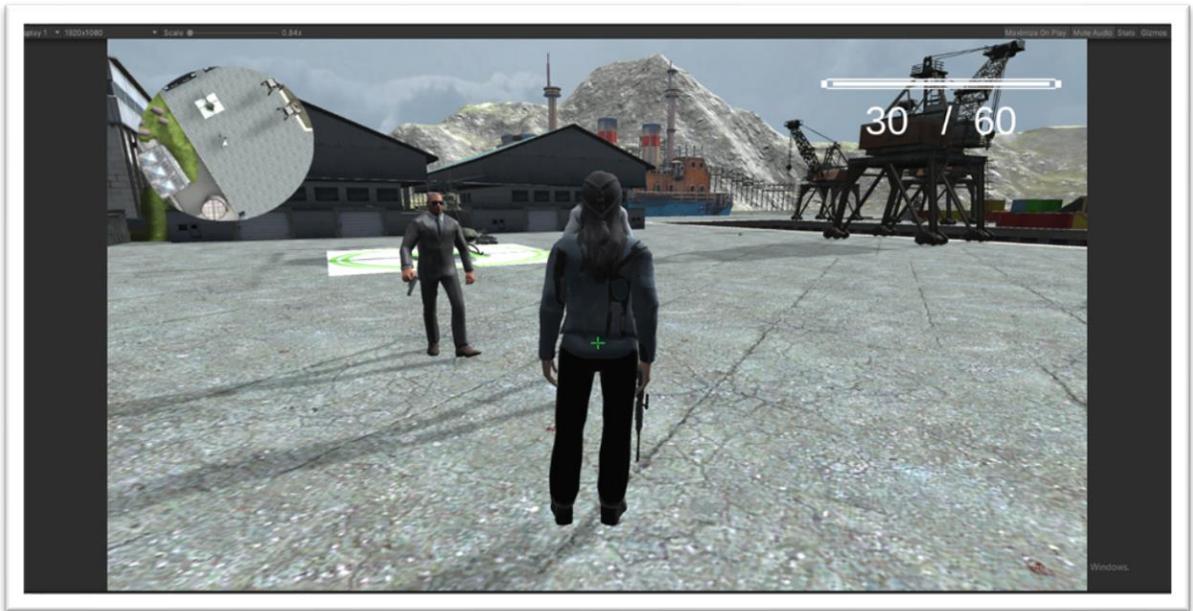


Figure 5.1.12: Agent finally meets the Boss at Shipyard

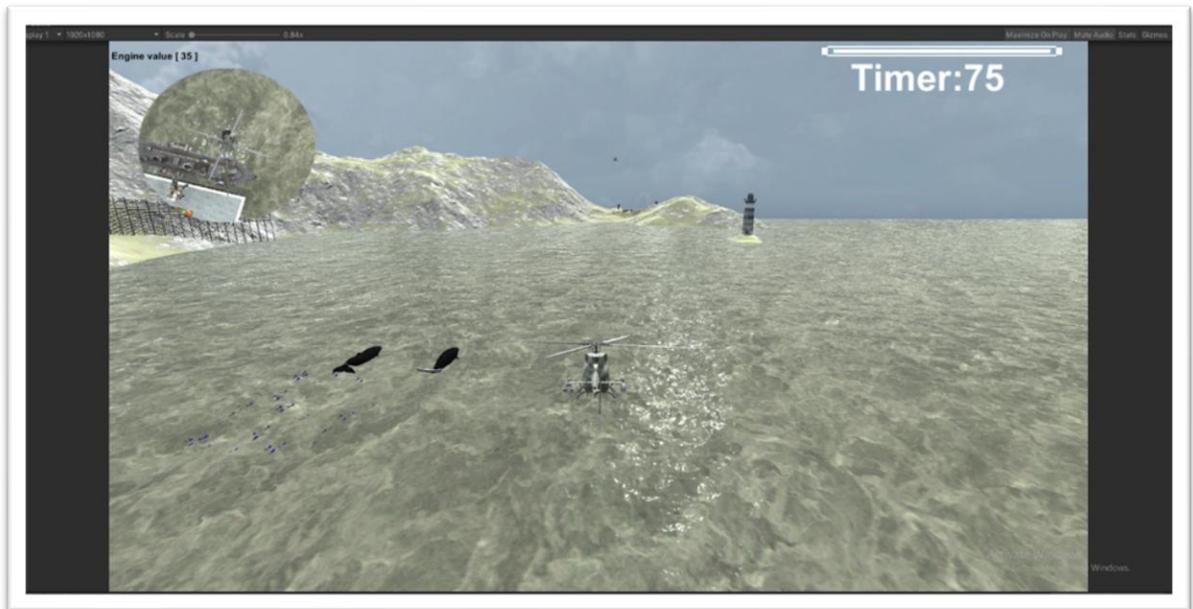


Figure 5.1.13: After fighting everyone returns to army base



Figure 5.1.14: Agent Tasnim awarded best commando

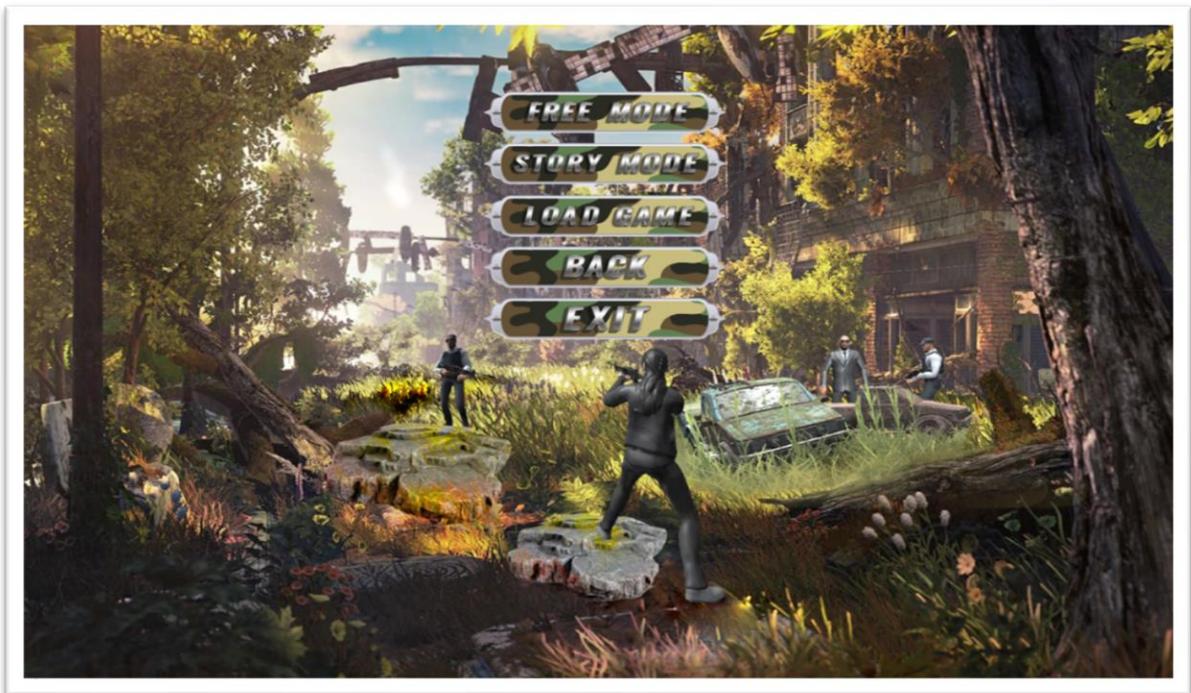


Figure 5.1.15: MISSION FREEDOM game main menu

5.2 Game System Requirements

Both PC programming requires such gear modules or other programming resources to being available on a PC to be utilized capably. These nuts and bolts are known as details for the (PC) framework and are generally utilized when in doubt as opposed to a level out particular. Two courses of action of framework necessities are characterized by most programming: least and suggested. With the increasing interest in higher planning powers and assets in more modern programming versions, over the long term, system needs will typically increase. Industry analysts recommend that this trend has a stronger effect than creative developments in pushing moves up to current PC systems.



MINIMUM SPECIFICATION	RECOMMENDED SPECIFICATION
PROCESSOR Intel Core i5-4690 / AMD FX 4350	PROCESSOR Intel Core i5-7600K / AMD Ryzen 5 1600X
GRAPHICS CARD NVIDIA GeForce GTX 780 / AMD Radeon R9 280X	GRAPHICS CARD NVIDIA GeForce GTX 1660/1060 / AMD Radeon RX 580
RAM 8 GB	RAM 16 GB
OPERATING SYSTEM Windows 7, 64-bit	OPERATING SYSTEM Windows 10, 64-bit
DIRECTX DX11	DIRECTX DX11 / DX12

Figure 5.2: System Requirements for this game

Game manufacturers will periodically sell the consumer a bunch of necessities that are not the same as those needed to run the product. Usually, these necessities are considered the proposed prerequisites. Such prerequisites are most often at an entirely higher degree than the simple necessities, and address the optimal condition where the product is to be run. This is a windows OS-based video game, in future mobile version will be published.

5.3 Game Controls

The game controller is an input mechanism used for computer games or gaming devices to provide input to a video game, usually used to manipulate an entity or character in a game. Game controllers have been developed and modified over the years to be as user-friendly as possible. The mouse and the electronic keyboard are standard input instruments for a personal computer and are currently the main game controllers. In this game we use two input devices: Keyboard for movement, actions and Mouse is used for the Aim, Fire, Instant actions and 360 view of camera movement. Some dedicated keyboard keys for specific actions, game menus and game controls.

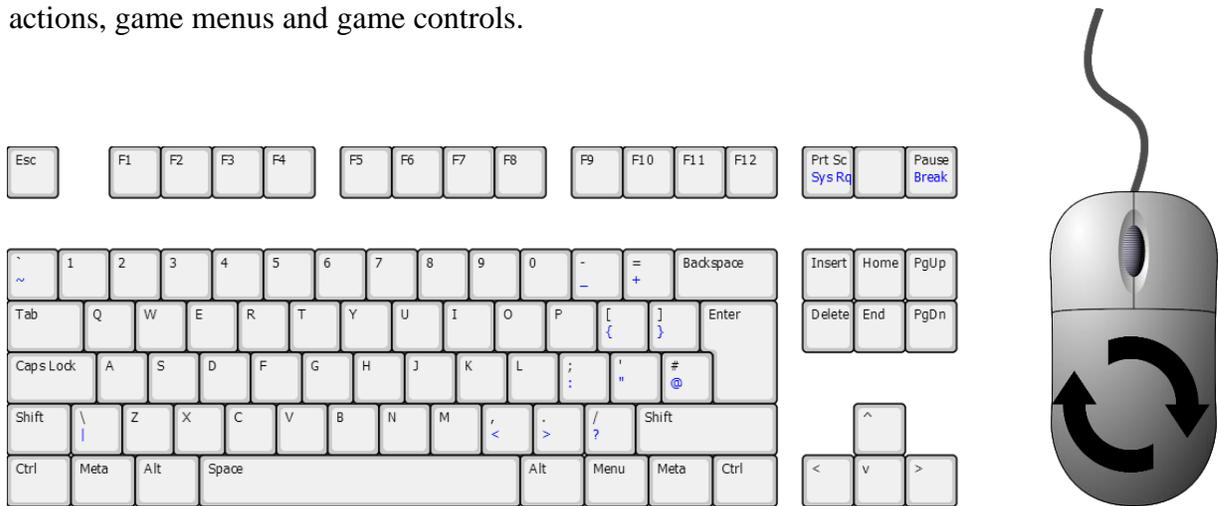
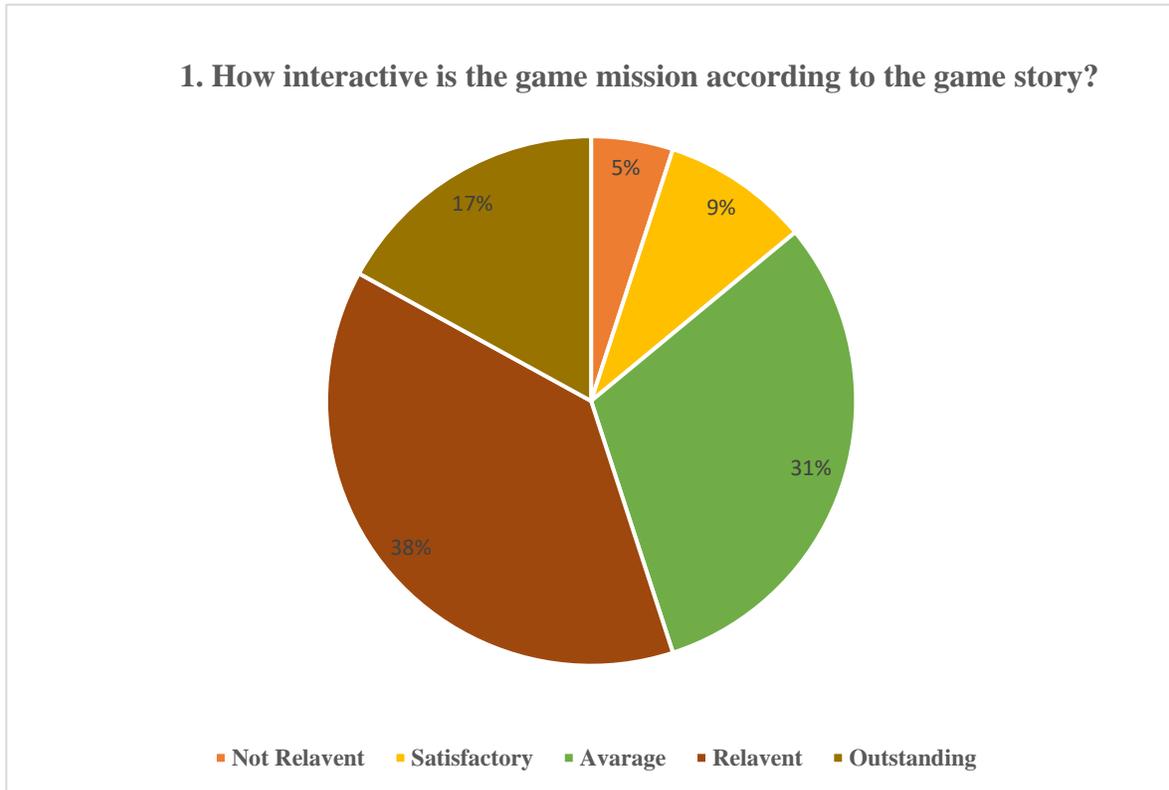


Figure 5.2: Game control commands for this game

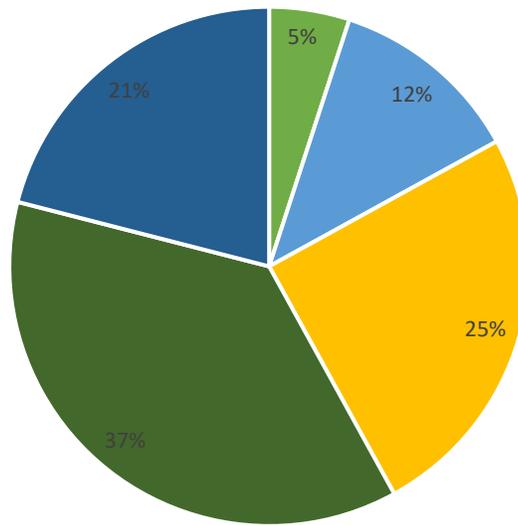
<i>W: Forward</i>	<i>M: Maps</i>
<i>A: Backward</i>	<i>E: Car In/ Car Out</i>
<i>S: Left</i>	<i>ESC: Pause/ Menu</i>
<i>D: Right</i>	<i>Shift: Sprint</i>
<i>K: Kill/ Instant Actions</i>	<i>Space: Jump</i>

5.4 Game Survey

The purpose of writing a survey report is to analyze the research subject in detail and to summarize current studies in an organized way. This is an important phase in any research project. Determining the targets, choosing the respondents and drawing up a data analysis strategy is the way to build the survey. After dissemination and survey, the data should be processed and eventually published

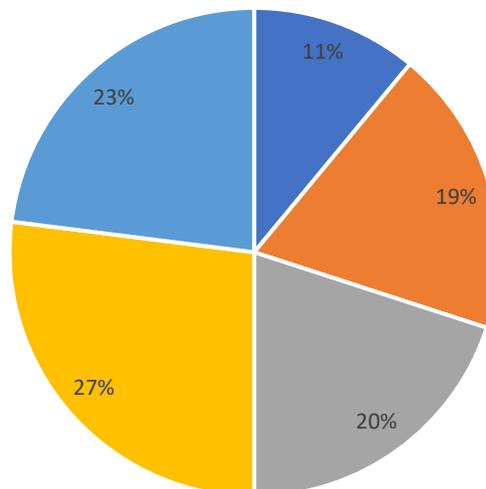


2. How much you like the game level and environment design?



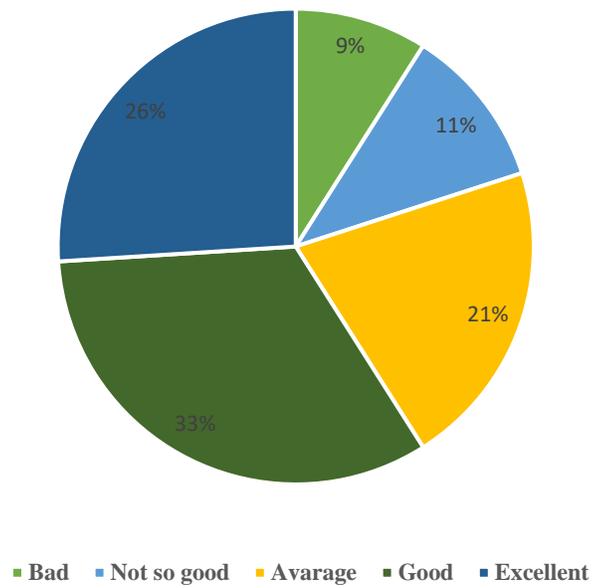
■ Bad ■ Not so good ■ Avarage ■ Good ■ Excellent

3. Is the game controller user friendly enough for playing?

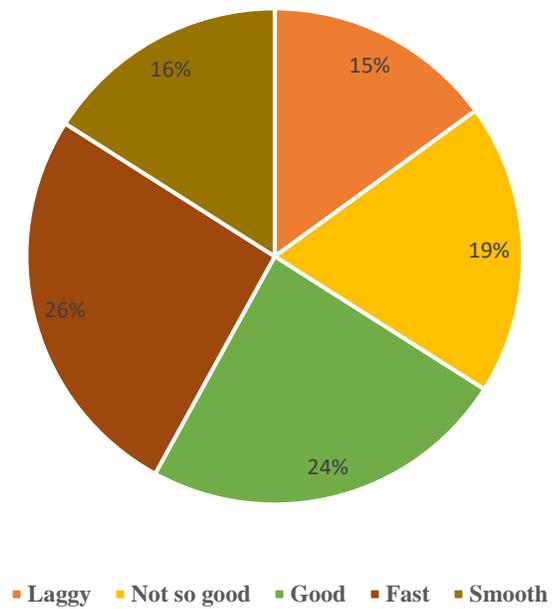


■ Not at all ■ Not so good ■ Avarage ■ Good ■ User friendly

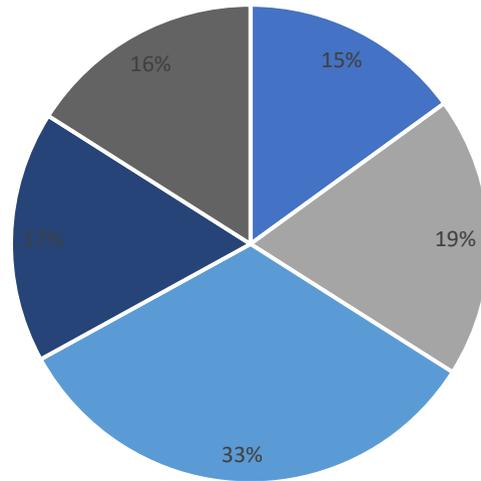
4. How is the overall game graphics optimized with your device?



5. How is the game performance according to the requirement?



6. Which one should be improve from following sections?



■ Characters ■ Graphics ■ UI Design ■ Functionalities ■ Optimization

The objective of writing a survey report is to study the research subject in detail and to summarize current studies in an ordered manner. It's an important phase in any research project. Determining the targets, choosing the respondents and drawing up a data analysis strategy is the way to create a survey. After dissemination and survey, the data should be processed and eventually published.

CHAPTER 6: CONCLUSSION

By the development of games, this industry is also increasing new job opportunities. It is creating hype among the new generations, gamer and game deplorers. With the high global market demand, it also raises possibilities to our game industry. Lots of game has already developed and released in our country and running successfully. It is such an inspiration to develop new games and contribute our game industry through the production of the adventure game 'MISSION FREEDOM'.

Here we try to tell a story about rescuing kidnapped victims and raise awareness against women and children kidnapping and trafficking. By playing this story based adventurous video game anyone can be a hero by the perspective of nation.

Raising awareness for Human rights and reducing kidnapping rate is the major objective of this game. Acording to game story it is mandetory to maintain some basic ang small details. Timeline, Script should lead the story as well as the props and other fucntionalitis of this game. By user servey we found many appritiations and opinioins. In future we will try to develop further and add more features into our game.

REFERENCES

- [1] Petri Lankoski, Staffan Björk, Character-Driven Game Design: Characters, Conflict, and Gameplay, November 2008
- [2] Jeremy Gibson, Introduction to Game Design, Prototyping, and Development, Addison-Wesley, July 2014
- [3] Learn Virtual Character Design for Games and Interactive Media, available at <https://www.researchgate.net/publication/327918742_Virtual_Character_Design_for_Games_and_Interactive_Media>, last accessed on 01-02- 2021 at 12:00am.
- [4] Learn about Game integrated development environment, available at <https://en.wikipedia.org/wiki/Game_integrated_development_environment>, last accessed on 01-02- 2021 at 12:00am.
- [5] Learn about Video game development, available at <https://en.wikipedia.org/wiki/Video_game_development>, last accessed on 01-02- 2021 at 12:00am.
- [6] Learn about Statistics, available at <<https://www.statista.com/statistics/246888/value-of-the-global-video-game-market/>>, last accessed on 01-02- 2021 at 12:00am.
- [7] Learn about Character design a, available at <<https://www.gamedesigning.org/learn/character-design/>>, last accessed on 01-02- 2021 at 12:00am.
- [8] Learn about Game controller, available at <https://en.wikipedia.org/wiki/Game_controller>, last accessed on 01-02- 2021 at 12:00am.
- [9] Learn about Optimization-patterns, available at <<https://gameprogrammingpatterns.com/optimization-patterns.html>>, last accessed on 01-02- 2021 at 12:00am.
- [10] Learn about System requirements, available at <https://en.wikipedia.org/wiki/System_requirements>, last accessed on 01-02- 2021 at 12:00am.