

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS



Final Year Project

Forces Of The Pyramid

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Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Computer Science
in the

Faculty of Computing and Engineering Sciences
Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology University
(SZABIST University) Karachi Campus

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

Declaration of Authorship

We, the undersigned, hereby declare that the project titled "[Forces of the Pyramid]" is our original work and has been completed in accordance with the academic standards of SZABIST University under the supervision of [Waqar Malik].

We confirm that all sources and references used during the research and development of this project have been properly cited and acknowledged. The content of this report is original and has not been copied or plagiarized from any external source.

We further declare that this project has not been previously submitted for the award of any degree, diploma, or other qualification at any other university or institution.

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PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

Project Description

Our project will aim to promote working revolutionary ideas in the gaming industry regarding science fiction and role-play-based progression. Project deals with sophisticated learning system defined as a reinforcement learning technique. The project is totally a reflection of science fiction hence the concepts of physics mainly being shown may not be applicable in real world as our story and lore is completely a work based on fiction and creativity.

Acknowledgement

Working on Forces of the Pyramid – A Journey through Time and Tradition has been a transformative experience for us —Taha Malik and Shoaib Zafar. Our vision is to create a role-playing action-adventure (RPG) game having a science-fiction concept. We initially entitled the project as “Project Force”, but as we have written the entire story and built the game design we renamed it as “Forces of the Pyramid.”

We believe that RPG game design and mechanics deliver a vital and core gaming experience. As developers our aim is to come up with a role-playing game design which would be based on the core of character and player progression, developing skills and taking decisions on the basis of those skills and improving those skills by learning from current and previous scenarios, mimicking the phenomenon of muscle memory of humans.

In the guidance of Sir Waqar Malik we hope to make our project achieve the ambition with which we commenced it.

Plagiarism-Free Certificate

This is to certify that the project titled "[Forces of the Pyramid]" has been successfully completed and submitted by the undersigned students. The project was carried out under the supervision of [Waqar Malik] at SZABIST University

We hereby affirm that the content of this report is entirely original and has not been copied or reproduced from any external source. All references and materials used in the research and development of this project have been properly cited and acknowledged.

This project fully complies with the academic and ethical standards of SZABIST University.

Furthermore, we declare that this work is our own and has not been submitted elsewhere for the award of any degree or qualification.

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Proposal

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

1. Introduction

Our vision is to create a role-playing action-adventure (RPG) game having a science-fiction concept. We initially entitled the project as “Project Force”, but as we have written the entire story and built the game design, we renamed it as “Forces of the Pyramid.”

2. Objective

We believe that RPG game design and mechanics deliver a vital and core gaming experience. As developers our aim is to come up with a role-playing game design which would be based on the core of character and player progression, developing skills and taking decisions on the basis of those skills and improving those skills by learning from current and previous scenarios, mimicking the phenomenon of muscle memory of humans.

3. Problem Description

In most RPG games enemy AI play a vital role in character progression of the player, when it comes to combat system if the player has built its progression to the professional level it becomes very easy to fight and make decisions against the enemy AI. The Algorithm that most enemy AI use is called Behavior Tree or Blend Tree which lets you blend multiple animations on the same time. The problem with that system is that it is unable to learn from the player's input and is unable to make random actions against the player making it easier to defeat. Our idea is to introduce a system for enemy AI that could be able to generate random human-like behaviors which would make it radically difficult for the player to defeat the enemy AI. This will intern increase the idea of player progression in RPG game design.

4. Target-Industry

Gaming industry and software industry looking for reasonable policy-based models for advanced machine learning.

5. Methodology

Our system would utilize a machine-learning algorithm called Q-learning. It is a training technique where it uses environment, states, actions and rewards. The classification of this technique is principal policy and agent policy. Principal policy is described as an environment which contains some data to perform possible actions and we get rewards on every iteration or episodes on the basis of those actions. Agent Policy learns from the Principal Policy and aims to achieve the maximum positive rewards. An agent should avoid negative rewards as much as possible for better accuracy.

6. Project-Scope

Our project will aim to promote working revolutionary ideas in the gaming industry regarding science fiction and role-play-based progression. Project deals with sophisticated learning system defined as a reinforcement learning technique. The project is totally a reflection of science fiction hence the concepts of physics mainly being shown may not be applicable in real world as our story and lore is completely a work based on fiction and creativity.

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7. Feasibility Study

With above defined scope, would you be able to meet your project schedule? Do mention following aspects:

- i. **Risks Involved:** High computing power is required; proper gaming system and appropriate gaming engine will resolve the risk.
- ii. **Resource Requirement:** Nvidia-RTX GPU and AMD-Ryzen 8-core CPU.

8. Solution Application Areas

We believe that idea of a system based on Deep neural networks that generate random human-like behaviors which learns from the previous actions could bring a big change in gaming industry and can provide more challenge and progression to the players. Software industry could also benefit from our policy-based models to solve real world problems.

9. Tools/Technology

Game Engine Unreal Engine 5(UE5)
Animation Cascedeur and blender

10. Expertise of the Team Members

Our team has two members we would distribute work wisely on the basis of capabilities of each member. Shoaib Zafar would be dealing the entire technical part which contains neural networks, shaders, blueprints. Taha Malik would handle unreal engine landmark features like, Nanite, Lumen and Chaos-physics simulation.

11. Milestones

FYP I

Our final year project part 1 will have the core gameplay features like character movement system using motion matching. The combat system and enemy ai which would be using a system called Q-learning some particles effects for powers and sci fiction demonstration.

Major Features

- Third person controller using Motion Matching
- Enemy AI random Behaviors system using Q-learning with plugin called Learning Agent.
- Three playable characters classes with switching system
- Two combat system free flow combat system and hack and slash combat system
- Sound Effects and HUD and GUI
- Health bar system

FYP II

It will take care of entire artistic and visual aspects of our game aiming to deliver photo-realistic graphics and visual effects as best as we can make using unreal engine.

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Major Features

- Concept art and proper level design
- Character sculpting and modeling
- VFX and timeline sequences
- Character Signature move animation
- Niagara particle simulation
- Nanite virtualized layered geometry system

Mention all major tasks/sub-tasks to be accomplished throughout the complete **1-year project**. You would use these milestones while defining the project timeline. Explicitly list the features for both FYP-I and FYP-II as well.

You can include Context Diagram and/or Actor-Goal Matrix (List) to describe your milestones/goals associated with all relevant actors.

12. Project Schedule

FYP I

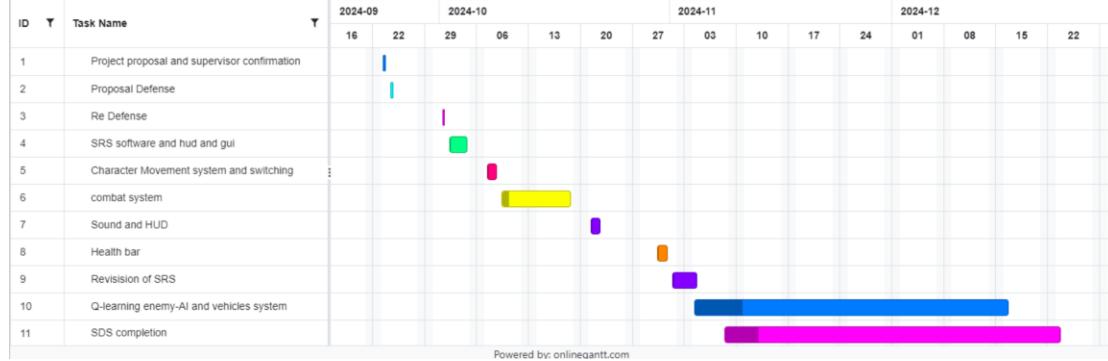


Fig 1.1: FYP I

FYP II



Fig 1.2: FYP II

13. Work Breakdown Structure

FYP I

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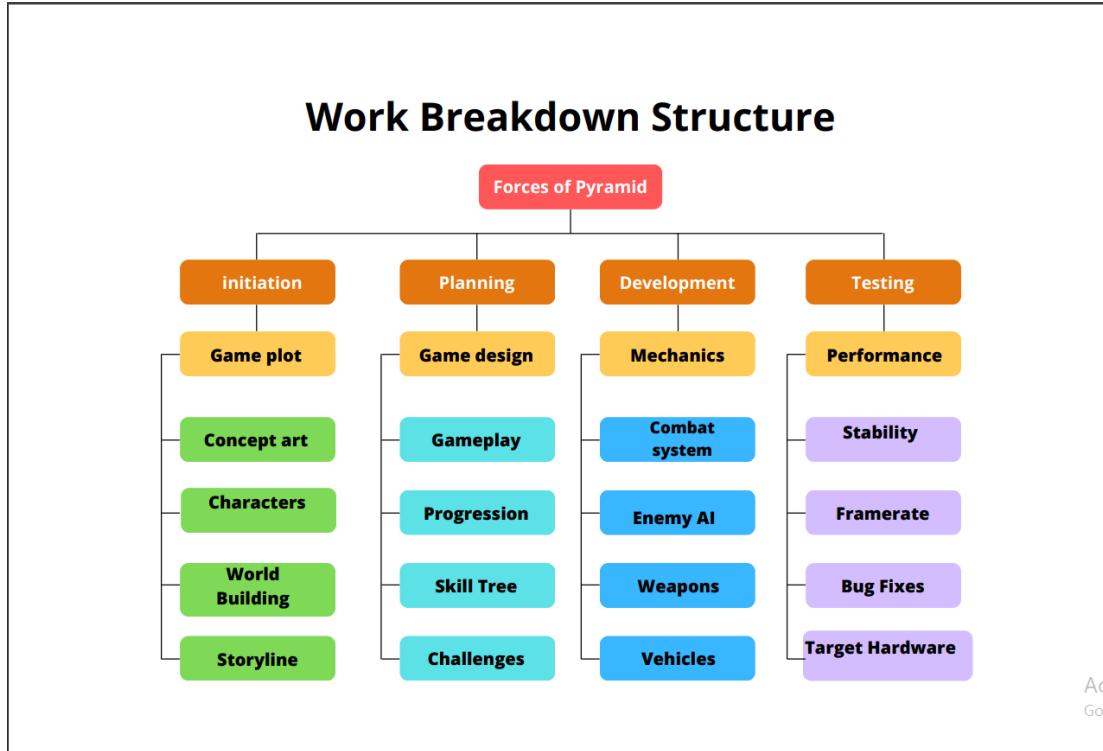


Fig 1.3: WBS

Gantt Chart FYP I



Fig 1.4: FYP I

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Work Break Down Structure (FYP II)

Gantt Chart FYP II

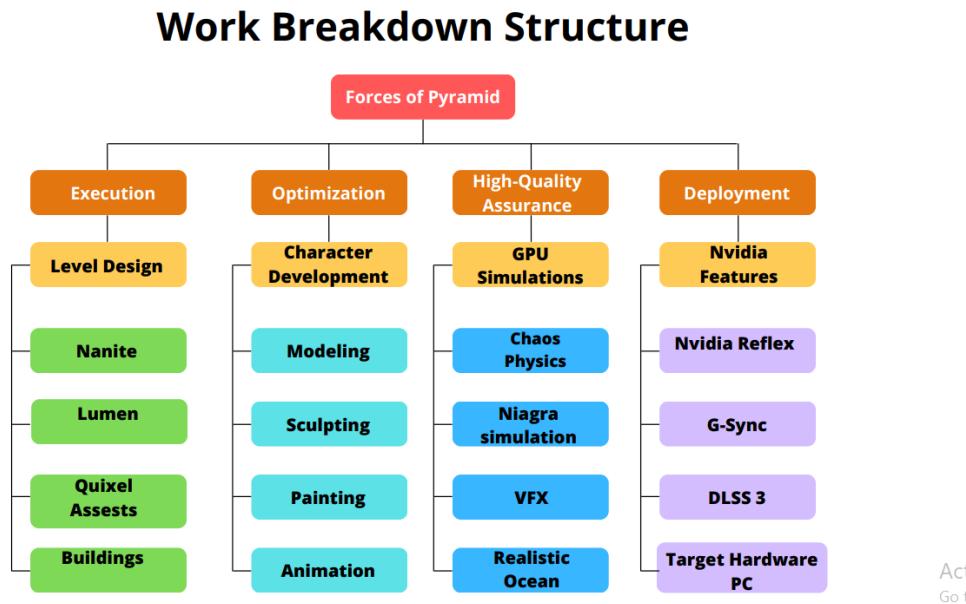


Fig 1.5: WBS FYP-II

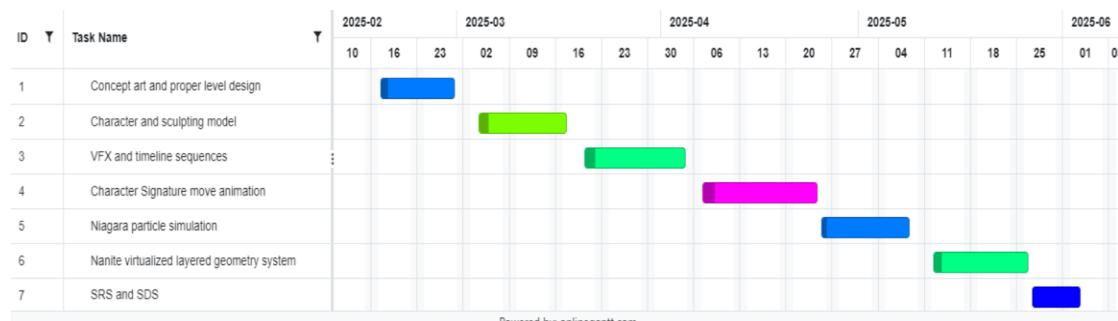


Fig 1.6: GC FYP-II

14. References

Here are some suggested references regarding NVIDIA and Unreal Engine for game development:

- **Book:** Gregory, Jason. *Game Engine Architecture*. Boca Raton: CRC Press, 2022. pp. 289-315.
- **Magazine/Newspaper Article:** Carter, Emily. "NVIDIA's Ray Tracing Revolution in Unreal Engine." *Game Developer Magazine*, March 10, 2023, pp. 42-45.
- **Internet Web page:** NVIDIA. "NVIDIA and Unreal Engine: Elevating Game Development with RTX." 2023. NVIDIA Corporation. Last accessed September 23, 2024. <https://www.nvidia.com/unreal-engine-rtx>.
- **Online Magazine or Newspaper Article:** Wilson, James. "How NVIDIA's DLSS Transforms Unreal Engine 5 Games." *Gamer's Tech Monthly*, May 2, 2023, pp. 18-23. Reproduced in JSTOR. Main City Library, Los Angeles, CA. Accessed September 23, 2024.

These references highlight the intersection of NVIDIA's technology and Unreal Engine for game development projects.

Chapter 1 Software Requirement Specifications

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1 Introduction

1.1 Purpose

We believe that RPG game design and mechanics deliver a vital and core gaming experience. As developers our aim is to come up with a role-playing game design which would be based on the core of character and player progression, developing skills and taking decisions on the basis of those skills and improving those skills by learning from current and previous scenarios, mimicking the phenomenon of muscle memory of humans.

1.2 Document Conventions

In our RPG game design, the combat system experience and Q Learning based enemy system currently holding higher priority in our development.

1.3 Intended Audience and Reading Suggestions

The intended audience of our game are the fans who love sci fi RPGs. The pc gaming audience are our main target while development.

1.4 Product Scope

Our project will aim to promote working revolutionary ideas in the gaming industry regarding science fiction and role-play-based progression. Project deals with sophisticated learning system defined as a reinforcement learning technique. The project is totally a reflection of science fiction hence the concepts of physics mainly being shown may not be applicable in real world as our story and lore is completely a work based on fiction and creativity.

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1.5 References

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2 Internet Web page: NVIDIA. "NVIDIA and Unreal Engine: Elevating Game Development with RTX." 2023. NVIDIA Corporation. Last accessed September 23, 2024. <https://www.nvidia.com/unreal-engine-rtx>.

Online Magazine or Newspaper Article: Wilson, James. "How NVIDIA's DLSS Transforms Unreal Engine 5 Games." *Gamer's Tech Monthly*, May 2, 2023, pp. 18-23. Reproduced in JSTOR. Main City Library, Los Angeles, CA. Accessed September 23, 2024.

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Overall Description

2.1 Product Perspective

We have come across numerous third person combat and shooting games which lack q-learning based enemy AI so we have planned to integrate it in our project making combat easier for the chosen character aiding for it to encounter a more difficult enemy encountered in the previous level.

2.2 PRODUCT FUNCTIONS

1) RPG GAME DESIGN

A roleplaying game design which would be based on action and activities and gaining ability points in a form of rewards. the points that a player would after completing an activity would use on upgrading the entire character class like weapons classes, health powers and utility. The kind of progression that every character would make would be divided into XP, adrenaline and ability points which would be later used on facing the bigger Threat like Boss fights.

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it self into the categories of skill that a player could use and combine some core and PROGRESSION SYSTEM

2) PROGRESSION SYSTEM

The Progression system would work like the points that a player get would after completing an activity would be used on upgrading the entire character class like weapons classes, health powers and utility. The System would deploy itself on every single game level which means on every single enemy interaction the character class would gain XP and ability points which would increase the core constraints of our character like Health, powers, abilities making the character naturally stronger to face new threats on next game level. The abilities that we gain would be based on the difficulty level like we will not gain rewards like Critical Strike or Special Moves on initial levels we need to dedicate ourselves to reach that points and gain ultimate rewards.

3) SKILL TREE

The Skill tree would be based on when and how we would unlock the specific ability on spending how much experience XP and ability points. The Skill tree would complement the entire flow of our game design and direction it would provide a tree of set of skill the we can unlock by spending some ability points. the Skill Tree would distribute special set of skills. The player can create a unique build or moves for encountering bosses or strong enemies.

4) CHARACTER MOVEMENT SYSTEM & SWITCHING SYSTEM

The Character Movement system would utilize a technique called Motion Matching which uses a huge animation Schema and character pose trajectory algorithm to match the desired pose and animation in Realtime where ever the character moves. The Character Switching System would provide a UI to select or switch any character during gameplay.

5) FREE FLOW COMBAT SYSTEM

The Free Flow Combat System would work in a way like the player could jump to enemy and perform hits. The action camera would come closer and slow downtime when the last enemy would be standing, the player would perform a critical strike and build combos on every hit. The system would include features like evade, jump, counter. The system would have special moves which would enable once during encounter when XP and adrenaline would be fully charged

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6) HACK & SLASH COMBAT SYSTEM

The Hack and Slash Combat System would work in a way like a character class would use a weapon slash Attack classification the system would extend two different classification called Procedural Mesh and Mesh slicing. the Procedural Mesh would utilize a procedural instance game object. the Mesh slicing classification would simulate physics and slice everything into pieces. The hack slash combat system would provide range using Euler Transformation where multiple enemies could experience a hit.

3.1

a. User Classes and Characteristics

Our game characters would have three-character classes free range, slash range, Heavy-armor range. The characteristics of our character classes would be gained through our skill tree every character range would utilize a different root of our skill tree. The player could combine set of characteristics and form a unique build with Unique set of skills on current character class. The Characteristics of on every class would be distributed like attack, Heavy attacks, combos, critical strikes and special moves.

b. Operating Environment

High computing power is required, proper gaming system and appropriate gaming engine Unreal Engine 5 will resolve the risk. Nvidia-RTX GPU and AMD-Ryzen 8-core CPU will be required.

c. Design and Implementation Constraints

The Design Constraints are the project would include abstraction by unreal engine for protecting the game code and blueprints. the developers could use plugins to create and solve problems on application layer but they can't change the core rendering logic of unreal engine 5

d. User Documentation

Unreal Engine 5.5 Documentation | Unreal Engine 5.5 Documentation | Epic Developer Community ([epicgames.com](https://www.unrealengine.com))

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3.2 Use Cases

1. Third Person Controller

Use Case Name: Third Person controller
Description: Allows player to control the movements
Actor: player
Goal Characters movement been controlled.
Pre-conditions: Game should be in play ready mode.
Player action (step 1) <ul style="list-style-type: none">• walking• using arrow keys Player action (step 2) <ul style="list-style-type: none">• running• press forward or backward key
Alternative Flow: If the device is not connected so the character will not move. System response: The game will pause
Exception Flow: If the game crashes or closes System Response: Popup window will ask the user to reinstall the game
Post conditions: the game will run like it should

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2. Enemy AI random Behaviors system

Use Case Name: Enemy AI random Behaviors system
Description: Used to identify the enemy on the concept of Q learning
Actor: player
Goal: to identify the enemy in order to approach and attack
Pre-conditions: player should be armed
Player action (step 1) <ul style="list-style-type: none">• Holding the weapon• Grab weapon by default Player action (step 2) <ul style="list-style-type: none">• shooting• press K key Player action (step 3) <ul style="list-style-type: none">• Flipping the sword• press F key
Alternative Flow: If the device is not connected so the character will not move. System response: The game will pause
Exception Flow: If the game crashes or closes System Response: Popup window will ask the user to reinstall the game
Post conditions: the game will run like it should

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3. Character switching system

Use Case Name: Character switching system
Description: enable us to switch the character
Actor: player
Goal: enable user to experience the game with different characters
Pre-conditions: player should have a team of characters
Player action (step 1) <ul style="list-style-type: none">• select the character to be switched• Press P key
Alternative Flow: If the device is not connected so the character will not move. System response: The game will pause
Exception Flow: If the game crashes or closes System Response: Popup window will ask the user to reinstall the game
Post conditions: the game will run like it should

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4. Two combat system

Use Case Name: Two combat system
Description: Hack and slash / free flow, used by the player to attack the enemy.
Actor: player
Goal: To attack and self defence and counter attack
Pre-conditions: Enemy should be identified
Player action (step 1) <ul style="list-style-type: none">• Attack enemy• Press G key Player action (step 2) <ul style="list-style-type: none">• Self defence and counter attack• Automatically controlled by the system
Alternative Flow: If the device is not connected so the character will not move. System response: The game will pause
Exception Flow: If the game crashes or closes System Response: Popup window will ask the user to reinstall the game
Post conditions: The combat will happen like it should.

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5.Character sculpting and modeling

Use Case Name: Character sculpting and modeling

Description: Designing of the character

Actor: player

Goal: the appearance of the character is decided.

Pre-conditions: Character should be present.

Player action (step 1)

- Character design
- Designed before gameplay

Alternative Flow: If the device is not connected so the character will not move.

System response: The game will pause

Exception Flow: If the game crashes or closes

System Response: Popup window will ask the user to reinstall the game

Post conditions: the game will run like it should.

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6.Character Signature move animation

Use Case Name: Character Signature move animation
Description: Character applies its signature moves on the enemy
Actor: player
Goal: to effect the health bar of the enemy
Pre-conditions: Character should be engaged in combat
Player action (step 1) <ul style="list-style-type: none">• Applying signature moves• Press S key
Alternative Flow: If the device is not connected so the character will not move. System response: The game will pause
Exception Flow: If the game crashes or closes System Response: Popup window will ask the user to reinstall the game
Post conditions: the game will run like it should.

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7.Sound Effects and HUD and GUI

Use Case Name: Sound Effects and HUD and GUI
Description: Manages game sound effects and the display of HUD (Heads-Up Display) and GUI (Graphical User Interface) elements for player interaction.
Actor: player
Goal: Sound effects play correctly and HUD/GUI elements update dynamically based on game events.
Pre-conditions: Game is running and audio/video systems are initialized.
Player Action (Step 1): <ul style="list-style-type: none">• Perform an action that triggers a sound effect (e.g., shooting, picking an item).
Player Action (Step 2): <ul style="list-style-type: none">• Interact with HUD elements (e.g., open inventory, check score).
Alternative Flow: If audio device is muted or unavailable, sound effects do not play. System response: The game continues silently; GUI and HUD function normally.
Exception Flow: If HUD or GUI fails to load or display correctly, System Response: Error message appears, and minimal UI is loaded to allow gameplay.
Post conditions: Sound effects and GUI operate smoothly.

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8. Concept Art and Proper Level Design

Use Case Name: Concept Art and Proper Level Design

Description: Ensures the game level design aligns with approved concept art and provides a playable environment.

Actor: Level Designer

Goal: Level layout matches the concept art, maintaining gameplay flow and visual style.

Pre-conditions: Concept art is approved, and the level editor is accessible.

Player Action (Step 1):

- Navigate through the level environment.

Player Action (Step 2):

- Encounter level elements like obstacles, paths, and objects.

Alternative Flow: If level elements do not match concept art or are improperly placed

System response: Designer receives feedback to adjust design.

Exception Flow: If level fails to load properly,

System Response: Game displays error and returns to main menu.

Post conditions: Level is playable and visually consistent with concept art.

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9. Health bar system

Use Case Name: Health bar system
Description: Displays the player's and enemy's remaining health dynamically during gameplay.
Actor: Gameplay Programmer
Goal: Accurately reflect health status in UI based on damage and healing events.
Pre-conditions: Character blueprint and damage system are functioning.
Player Action (Step 1): <ul style="list-style-type: none">• Take damage from an enemy or environmental hazard.
Player Action (Step 2): <ul style="list-style-type: none">• Observe health bar reduce proportionally.
Alternative Flow: If health bar doesn't reflect changes correctly System response: System logs UI-state mismatch and flags for debugging.
Exception Flow: If UI element fails to display at all System Response: Health bar placeholder
Post conditions: Health bar updates in real time and gives accurate feedback to the player.

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10. VFX and Timeline sequences

Use Case Name: VFX and Timeline sequences
Description: Coordinates visual effects with timeline events.
Actor: Cinematic Designer and VFX Artist
Goal: Visual effects are synchronized with scripted timeline actions.
Pre-conditions: Timeline sequence and VFX assets are imported and linked properly.
Player Action (Step 1): <ul style="list-style-type: none">• Trigger a cut scene or scripted event (e.g., boss intro)
Player Action (Step 2): <ul style="list-style-type: none">• Watch synchronized VFX (like light flares, particles, explosions) tied to timeline.
Alternative Flow: If VFX play off-sync or are missing System Response: System alerts with timeline-VFX desync log entry.
Exception Flow: If timeline sequence crashes or does not start System Response: System skips scene or restarts from last checkpoint.
Post conditions: VFX are timed correctly with cinematic/audio/animation elements for immersive experience.

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11. Nanite Virtualized Layered Geometry System

Use Case Name: Nanite Virtualized Layered Geometry System

Description: Uses Nanite to render high-resolution geometry efficiently for optimized performance and detailed visuals.

Actor: Level Designer

Goal: High-detail assets load and render seamlessly without loss in performance.

Pre-conditions: Nanite-compatible assets are imported and Nanite rendering is enabled.

Player Action (Step 1):

- Explore an area with Nanite-rendered structures or terrain.

Player Action (Step 2):

- Zoom in or interact closely with high-detail models.

Alternative Flow: If VFX play off-sync or are missing

System Response: Editor suggests optimization or fallback to standard LODs.

Exception Flow: If Nanite layers are misconfigured or assets are too heavy

System Response: System skips scene or restarts from last checkpoint.

Post conditions: Scene displays highly detailed geometry with efficient resource use and no frame drops.

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12. Niagra particle simulation

Use Case Name: Niagra particle simulation
Description: Integrates and visualizes particle effects like fire, smoke, or magic, enhancing environmental realism and gameplay feedback.
Actor: Technical Artist
Goal: Particle effects behave and appear as designed in real-time during gameplay.
Pre-conditions: Niagara system is integrated and functional within the engine.
Player Action (Step 1): <ul style="list-style-type: none">• Trigger an in-game event that emits particles (e.g., explosion, spell cast).
Player Action (Step 2): <ul style="list-style-type: none">• Observe particle behavior, interaction with the environment, and timing.
Alternative Flow: If particles behave unrealistically or lag during simulation System Response: Logs error or performance warning; notifies artist to optimize effect.
Exception Flow: If Niagra system fails to load System Response: Game disables particle system and continues without it or shows a placeholder.
Post conditions: Particles are visually and physically aligned with gameplay events and scene logic.

e. Assumptions and Dependencies

Our operating environment unreal engine 5 would provide features like Nanite, Lumen and Chaos Physics and particle simulations that very heavy on memory and GPU. We would perform some optimization to achieve all these features like advance graphics physics and AI in Real-time. The Dependencies like a user must have an 3rd gen NVidia RTX GPUs for proper features like DLSS and Frame generation and Retracing. We would fix problems like memory and renderer parallelization for better performance and Frame rates.

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7) External Interface Requirements

a. User Interfaces

The user interfaces of our game would include a main menu to start the game. the player menu , progression and skills menu would work under the main menu for better UI interface management.

The progression and skills interfaces would involve a tree-based system that would work with the player menu in Real-time. Hud heads up display system would use during combat to indicate the incoming attacks with proper logos and indication.

b. Hardware Interfaces

The Core of our game design would heavily utilize Parallel and distributed Computing philosophy. The distributed compute on our gameplay would work in way like our Q-learning based enemy system would utilize GPU compute grid and would create blocks within that grid. Every single block on that grid would compute the current state and action of an agent then it offload workload across multiple cores forming grids and blocks and train agents with various states and actions in Real-time. We will use linear interpolation for slicing meshes in hack and slash combat. We would optimize the game rendering process which utilizes double buffered queue architecture for rendering.

c. Software Interfaces

Our game design would utilize features like Nanite virtualized Geometry System, Niagara particle system and Chaos physics simulations. We will utilize Machine learning Library called Learning Agents which uses reinforcement learning for creating ML agents' enemies that faster and smarter with human.ous enemy techniques.

d. Communications Interfaces

Our game design will have some life like NPCS non playable characters that we can talk to them by selecting dialogue boxes.

System Features

The following combat system, progression and skill tree are our current system features.

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

e. System Feature 1

Free flow combat system, hack and slash combat system, progression system and skill tree. Q learning based enemy system which generates human like performance.

i. Description and Priority

In our RPG game design the combat system experience and Q Learning based enemy system currently holding higher priority in our development. UI interfaces Hud heads up display and health bar system is holding low priority.

ii. Stimulus/Response Sequences

Our game design would utilize system called Q learning based enemy ai system that generates human like actions. It's a reinforcement learning that uses the concept of principal and agent policy . the Agent learns its actions from the principal policy would create an environment for actions and on every single actions we will get rewards which defines the average factor on agent all this gets computed in a equation called Bellman equation.

Functional Requirements

It's a reinforcement learning that uses the concept of principal and agent policy. the Agent learns its actions from the principal policy would create an environment for actions and on every single action we will get rewards which defines the average factor on agent all this gets computed in a system called Bellman equation. An Agent should avoid negative rewards for better accuracy. This technique forms a q table which stores the values of states and actions and by connecting average of these two factors two every consecutive neuron it forms a DQN (Deep Q Neural Network) and generates human like actions.

All this would require a GPUs with dedicated machine learning cores and CUDA GPU Acceleration for training ML agents models.

REQ-1:

The system would require a lot of animation data for combat and training

REQ-2:

The system would a powerful GPU for simulations and Graphics

8) Other Nonfunctional Requirements

- Performance requirement
- Safety requirements
- Security requirements
- Software quality attributes
- Business rules
- Other requirements

All the nonfunctional requirements are mentioned above

a. Performance Requirements

The developers and testers must have a Nvidia Powered system with GPUs to properly test the features like DLSS and Frame Generation.

b. Safety Requirements

Our game will have loud gun play and heavy combat so the age rating would be requested for those that were under age should avoid to play our game without parental guidance.

c. Security Requirements

Our game after the final build compilation would require an anti-piracy measure to encounter piracy of our game. We will have policy for externals through we could take legal actions against them

d. Software Quality Attributes

The quality of our game design would be experience based gameplay with story storytelling with solid graphics and simulations. The performance of our game would be best on PC

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

powered with Nvidia GPUs. We would try to optimize our game to run on the bestselling GPUs according to the steam and Epic games hardware survey.

e. Business Rules

Our Business Rules would be B2C (Business-to-Consumer) we could release our game as a company and people would just buy and play as a product they completely own.

9) Other Requirements

The Xbox game controller or gaming mouse keyboard and accessories are required for proper gaming experience. A 144 Hz gaming monitor with NVidia G-sync is required for High Frame Rates.

Appendix A: Glossary

DLSS Deep Learning Super Sampling

CUDA Compute Unified Device Architecture

UE5 Unreal Engine 5

[Q*] Q-reinforcement learning

Appendix B: Analysis Models

GAME DESIGN USE CASES

10)

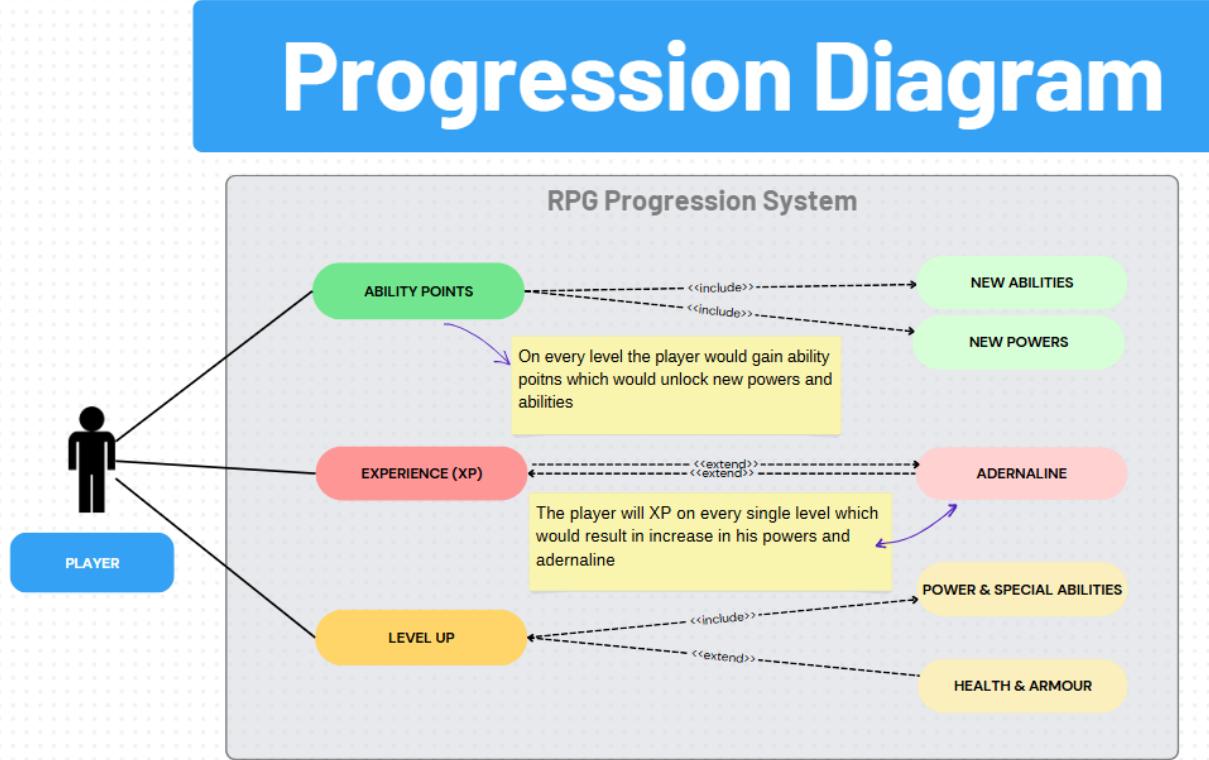


Fig 1.1: RPG Progression System

11) FREE FLOW USE CASE

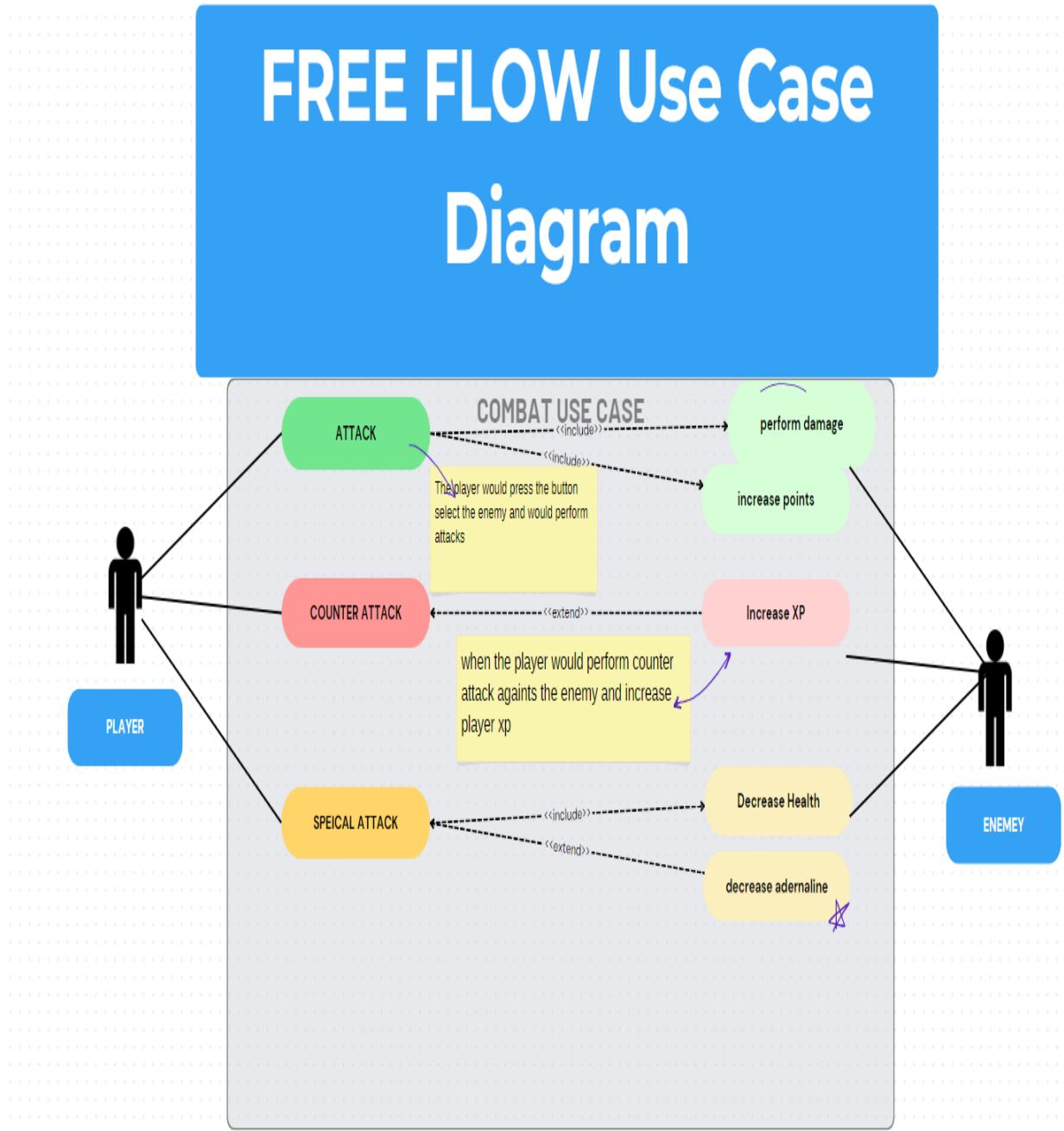


Fig 1.2: Free Flow

12) HACK & SLASH USE CASE

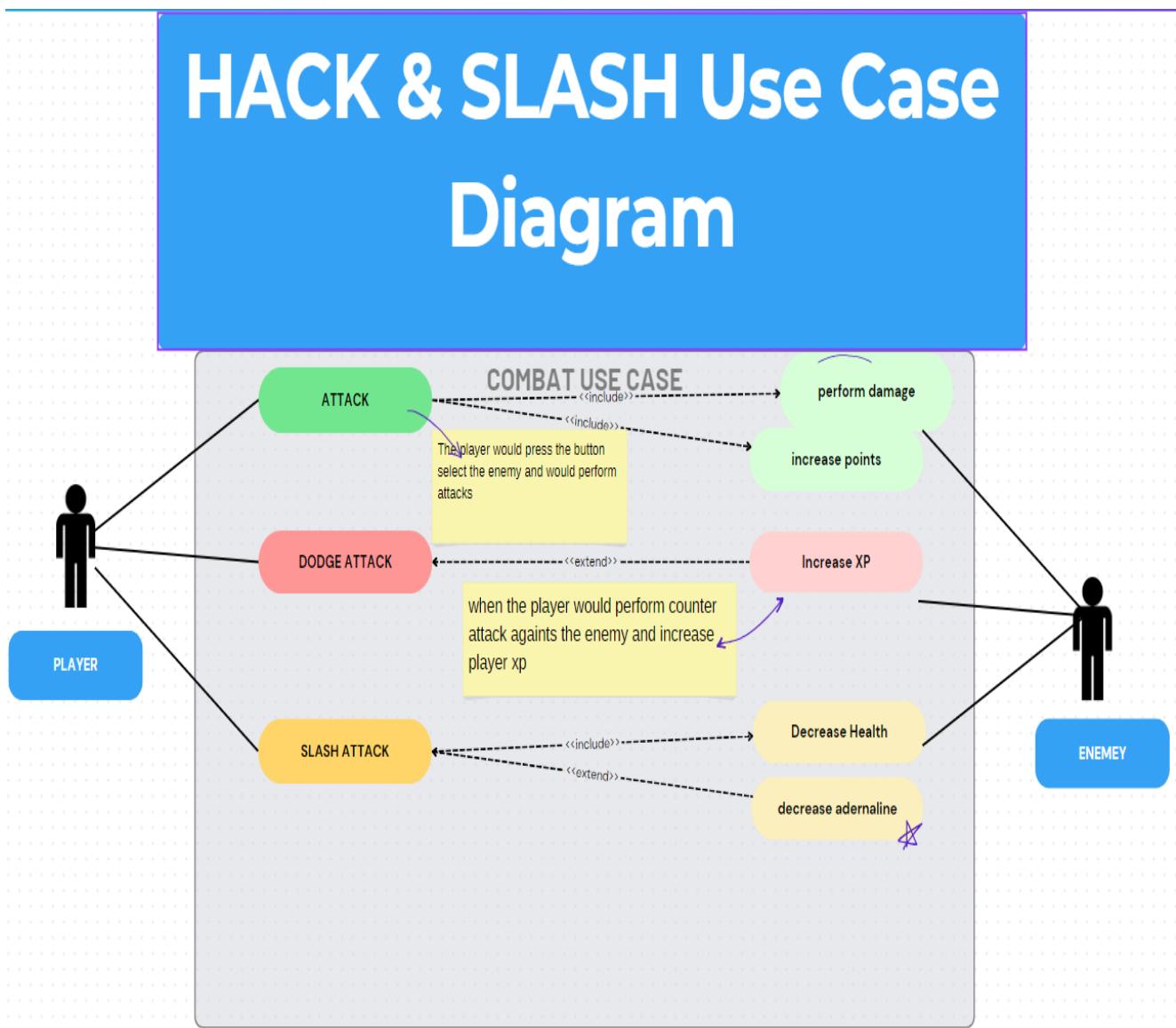


Fig 1.3: Hack & Slash

13) SKILL TREE USE CASE

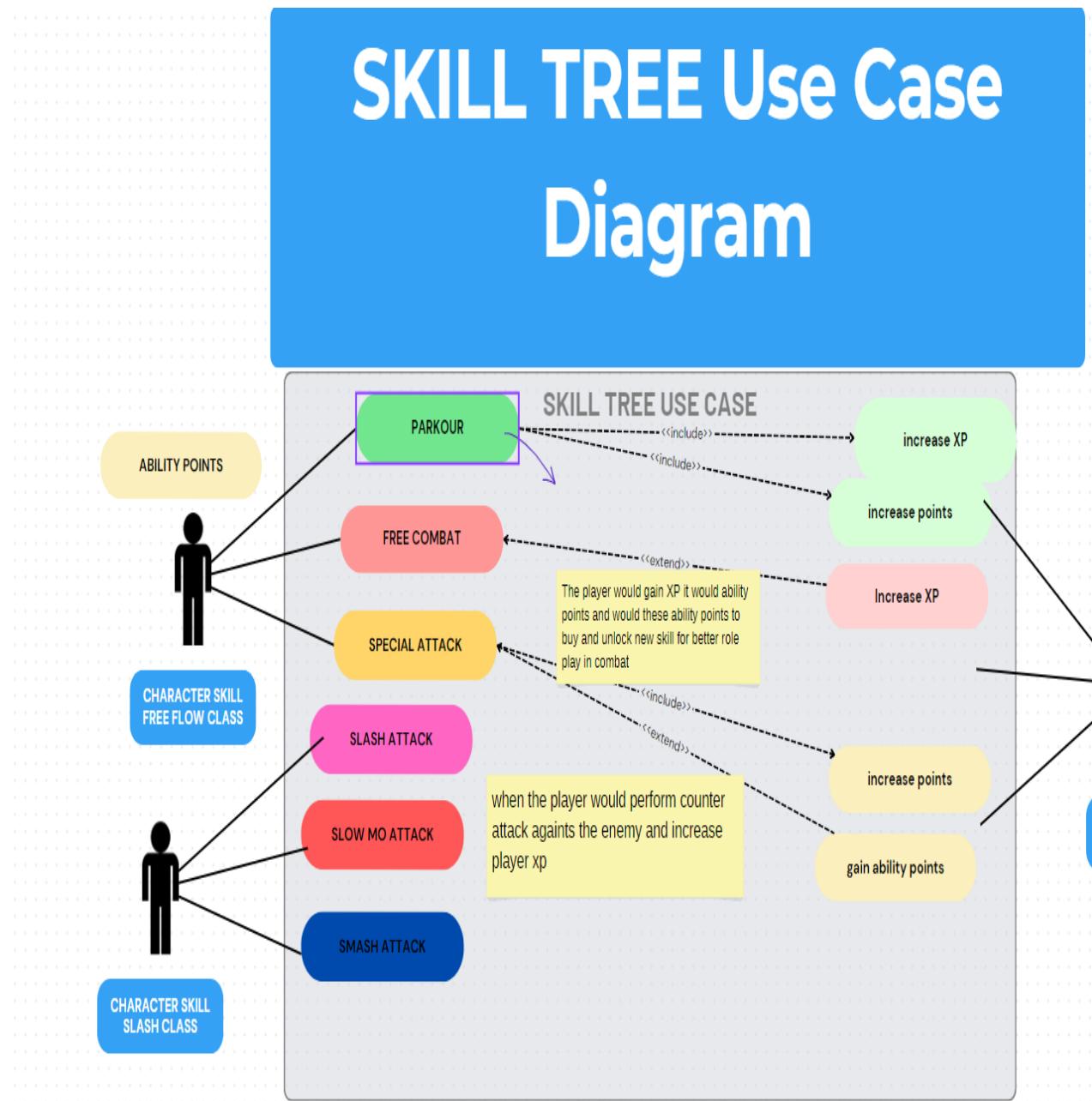


Fig 1.4: Skill Tree

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

14) ENEMY AI

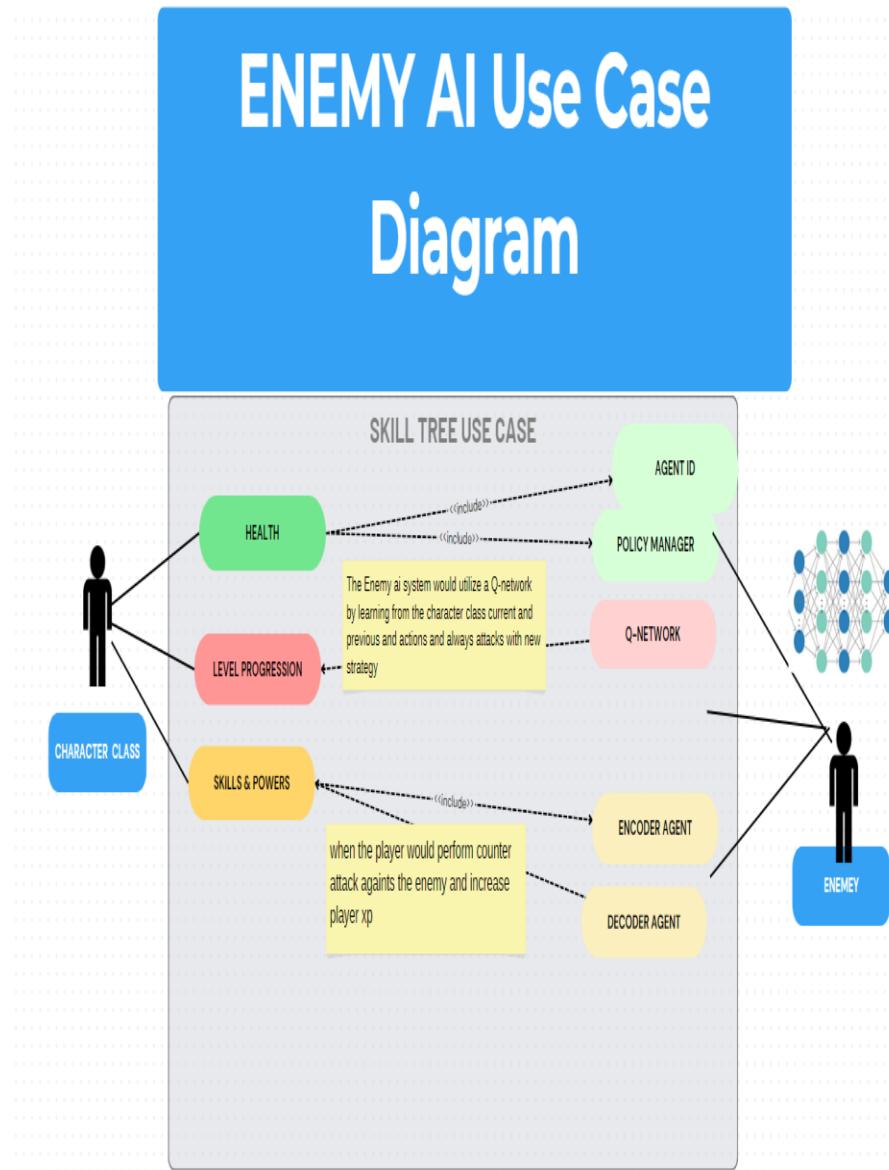


Fig 1.5: Enemy AI

15) MOTION USE CASE

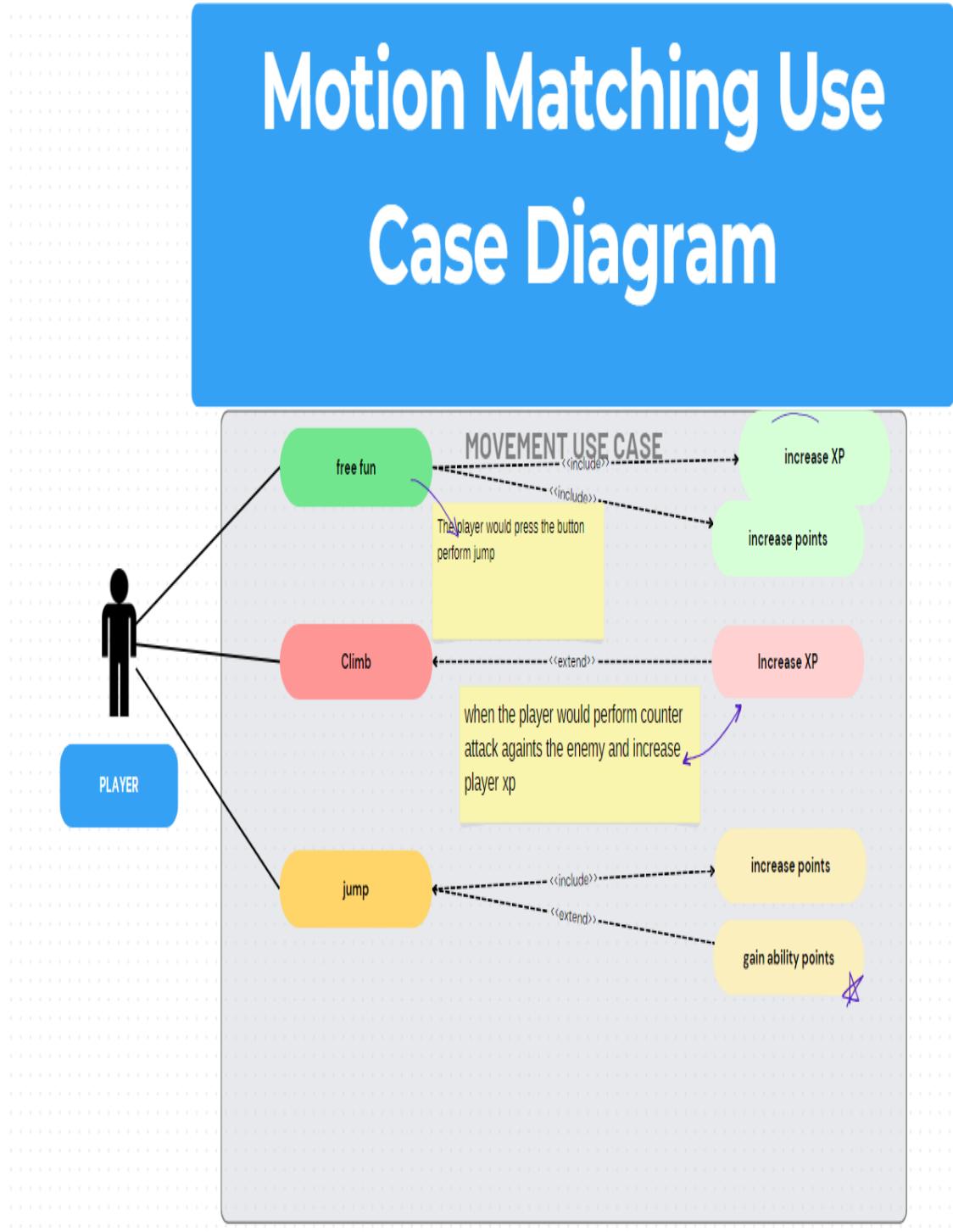


Fig 1.6: Motion Matching

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

16) SKILL TREE

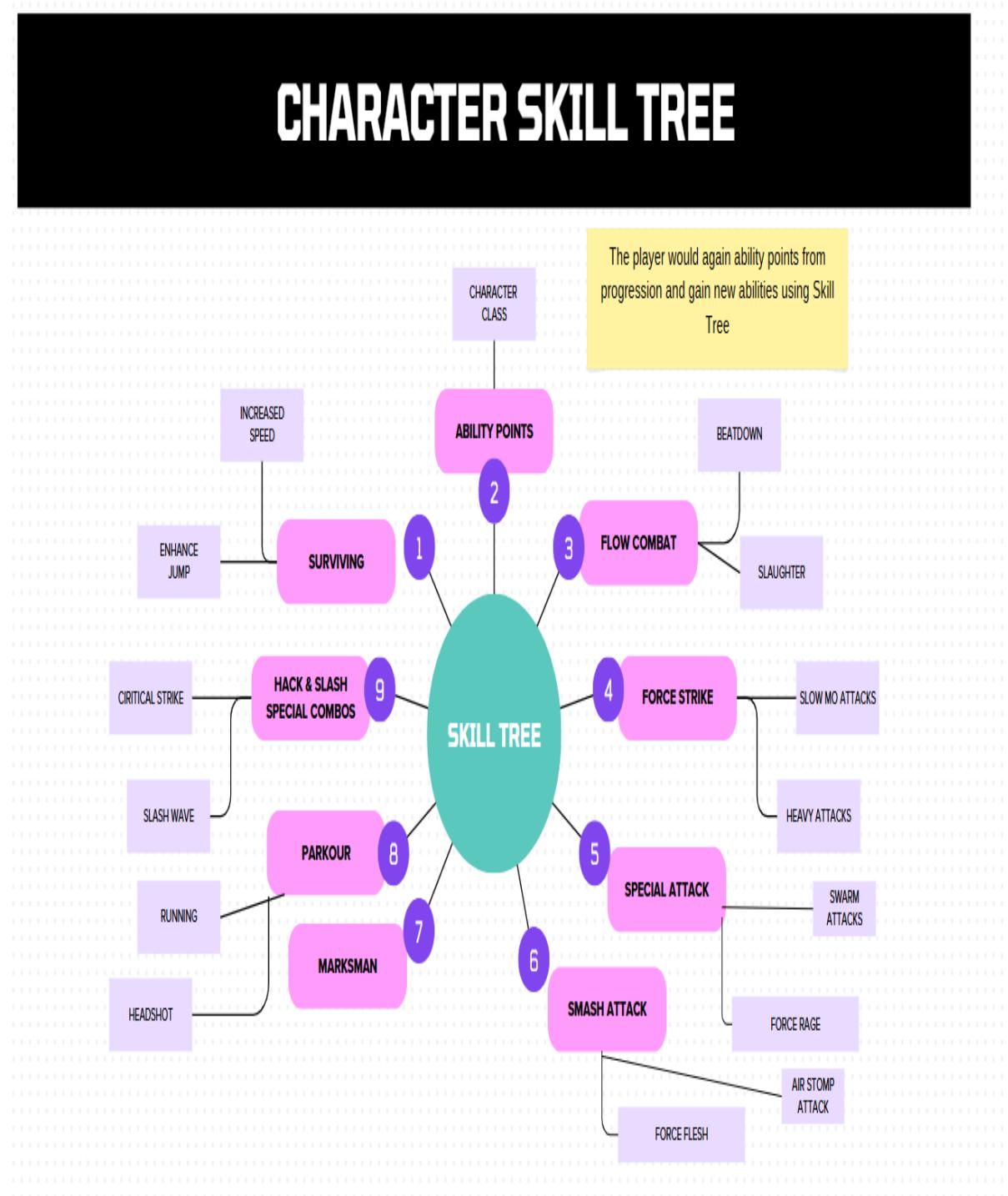


Fig 1.7: Character

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

17) CHARACTER MOVEMENT

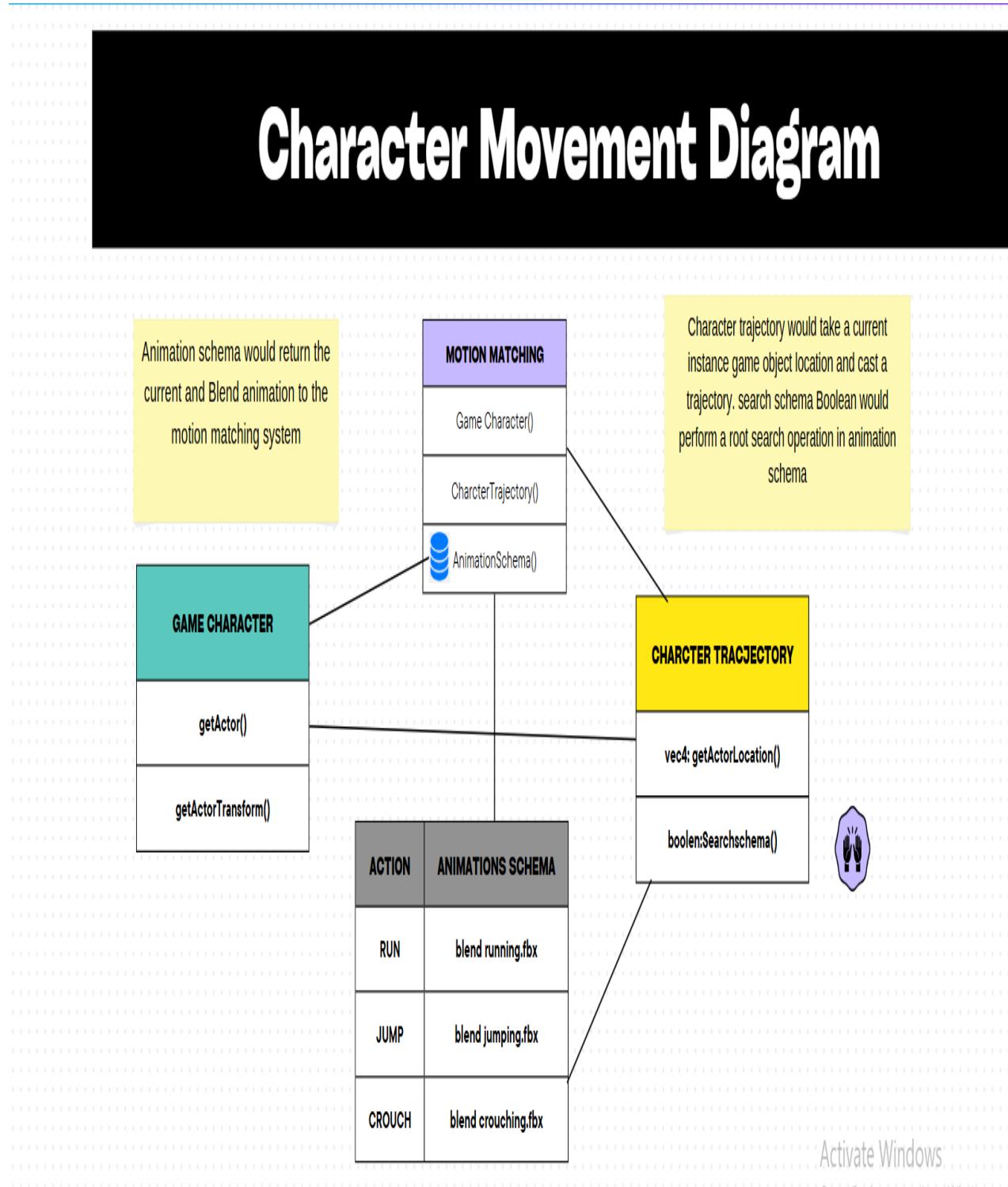


Fig 1.8: Character Movement

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

18) FREE FLOW COMBAT SYSTEM

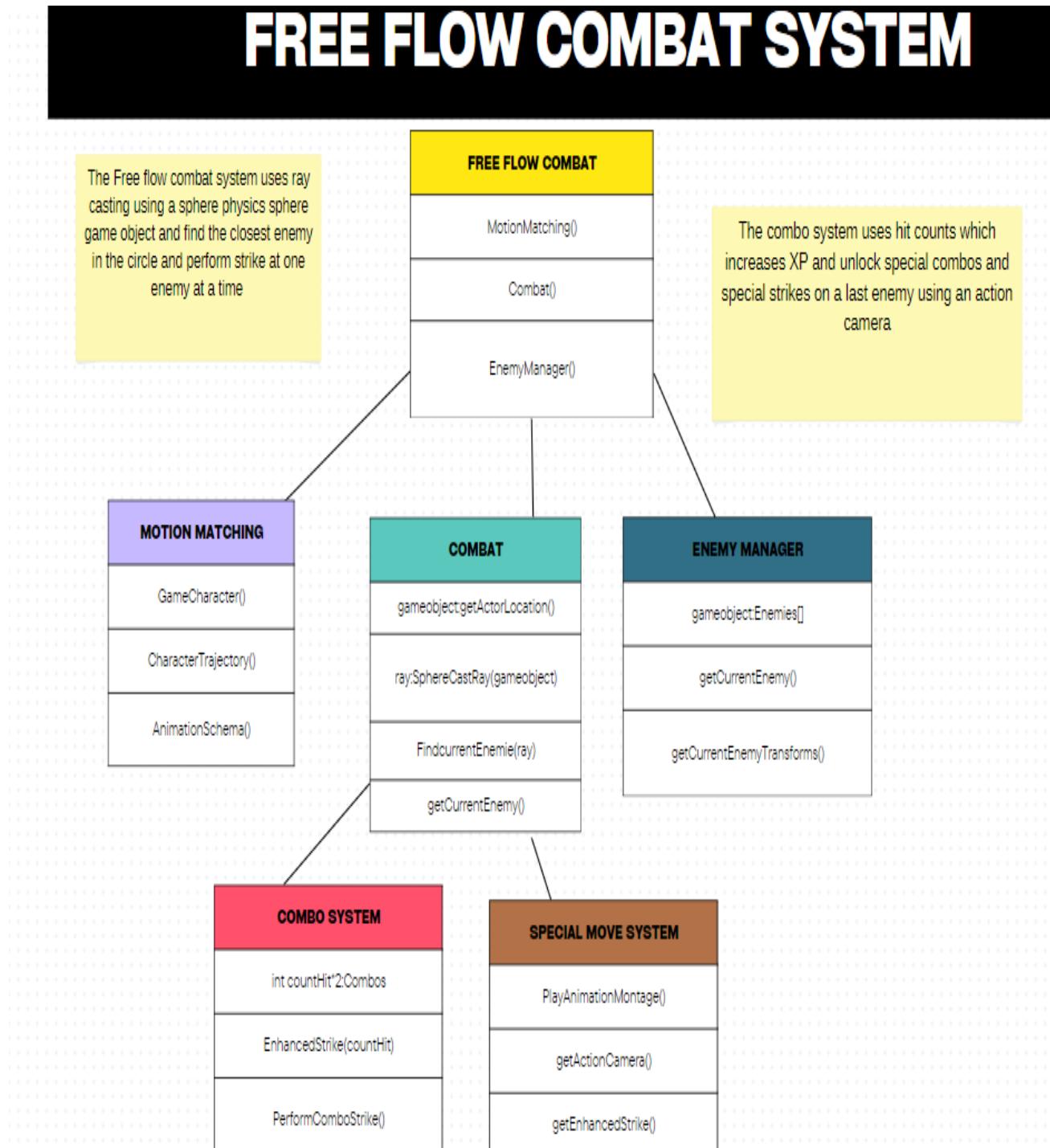


Fig 1.9: Free Flow

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

19) HACK & SLASH COMBAT SYSTEM

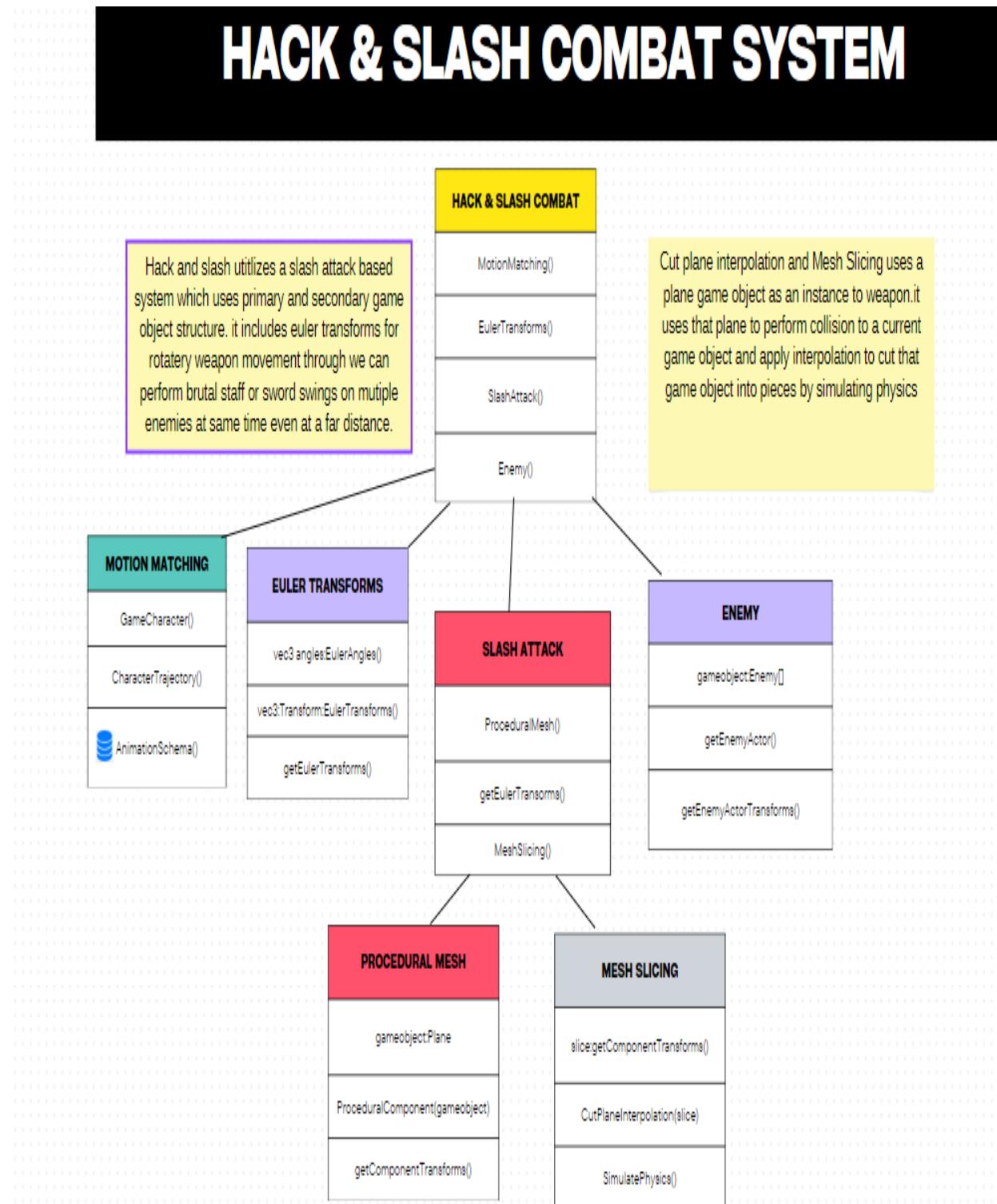


Fig 2.0: Hack & Slash

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

20) ENEMY AI SYSTEM

Q-LEARNING BASED ENEMY AI

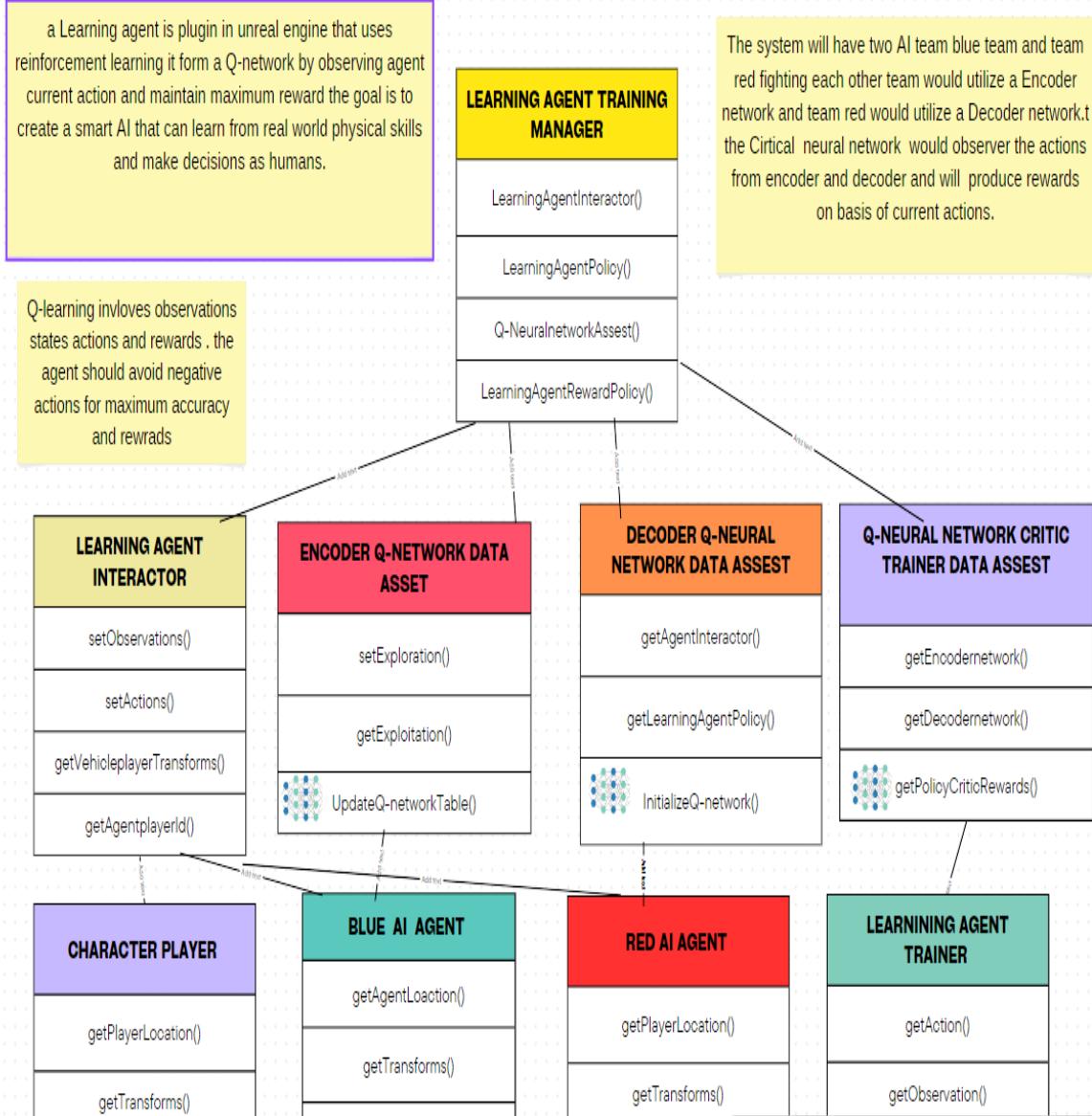


Fig 2.1: Enemy AI

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

21) ENTITY RELATIONSHIPS

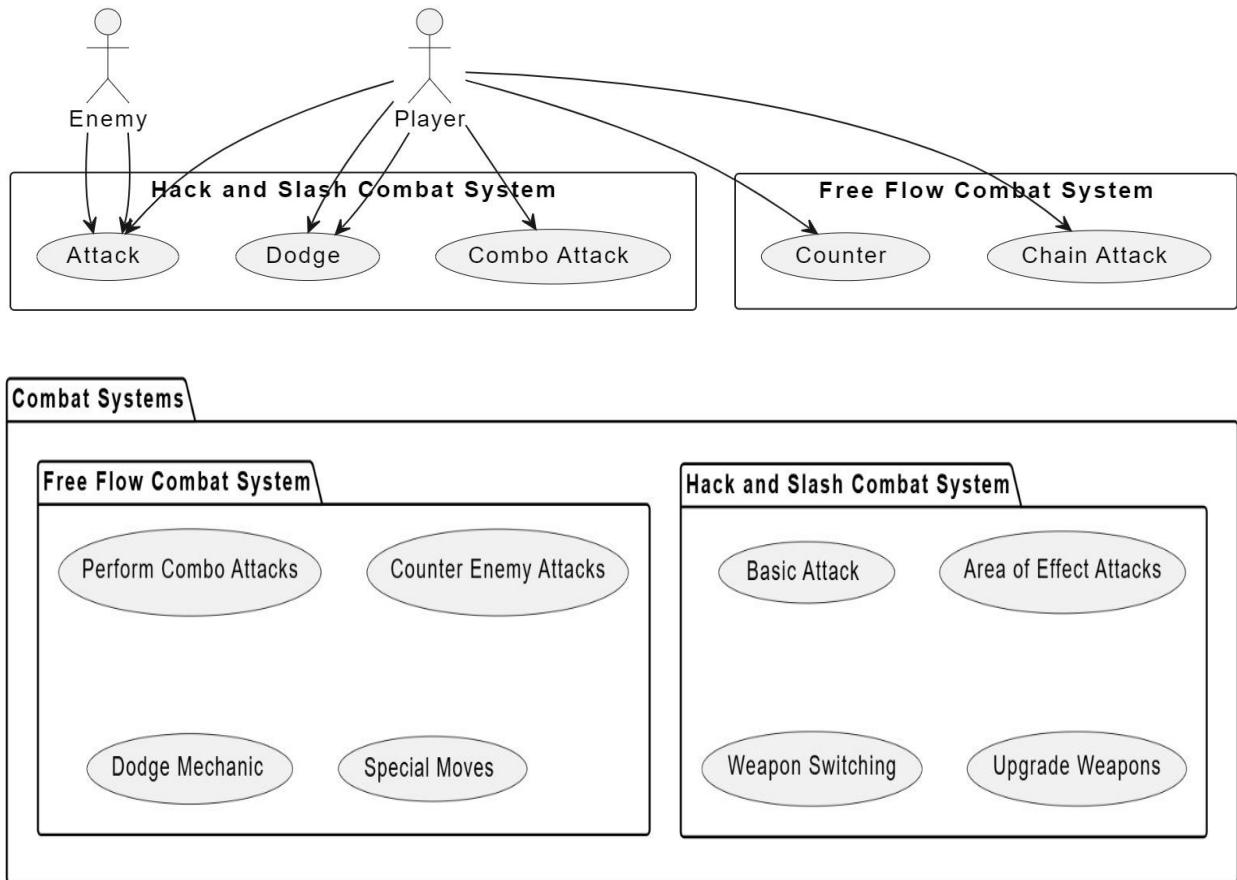


Fig 2.2: ERD

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

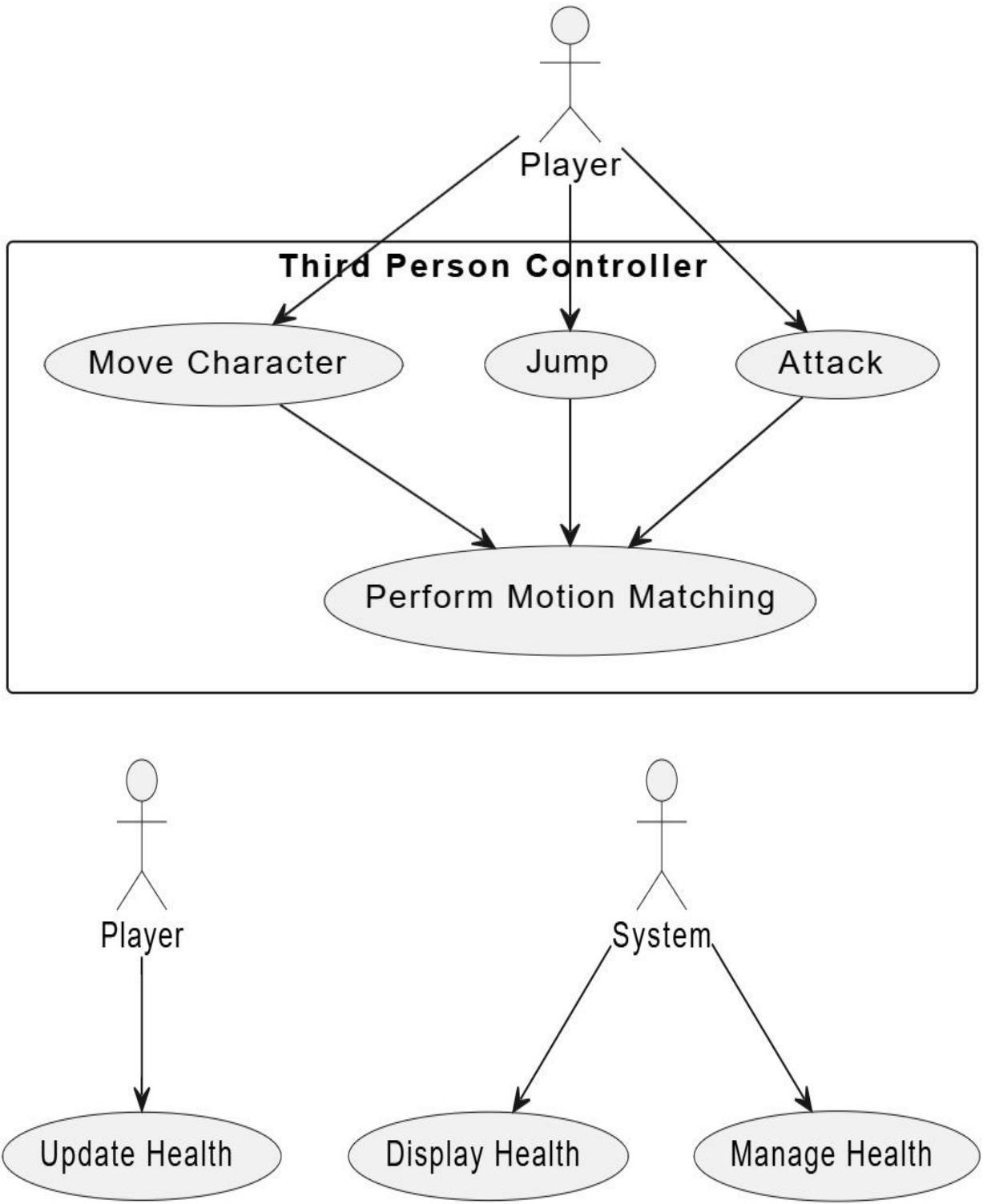


Fig 2.3: ERD

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

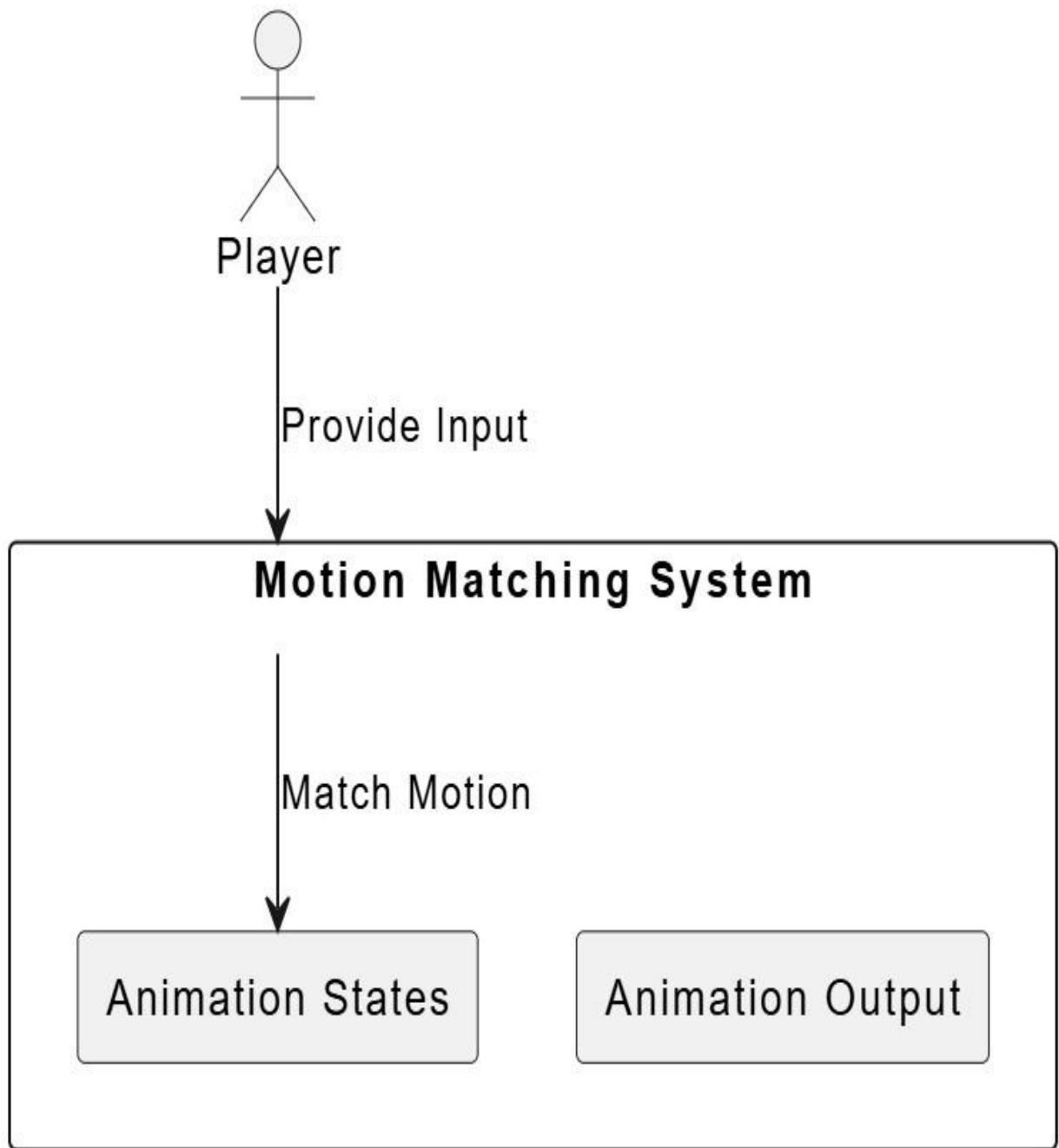


Fig 2.4: ERD

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

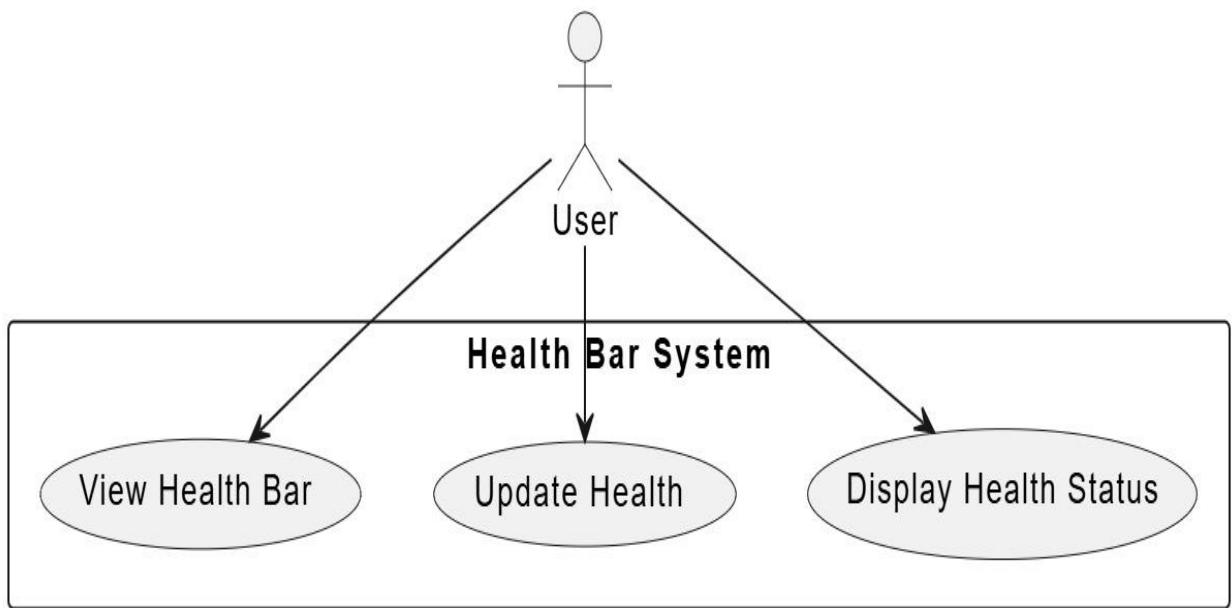


Fig 2.5: ERD

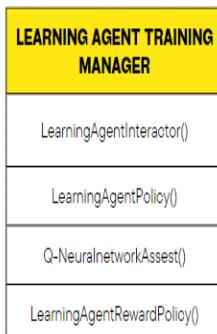
PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

22. Q-learning

Q-LEARNING BASED ENEMY AI

a Learning agent is plugin in unreal engine that uses reinforcement learning it form a Q-network by observing agent current action and maintain maximum reward the goal is to create a smart AI that can learn from real world physical skills and make decisions as humans.

Q-learning involves observations states actions and rewards . the agent should avoid negative actions for maximum accuracy and rewards



The system will have two AI team blue team and team red fighting each other team would utilize a Encoder network and team red would utilize a Decoder network.t he Critical neural network would observer the actions from encoder and decoder and will produce rewards on basis of current actions.

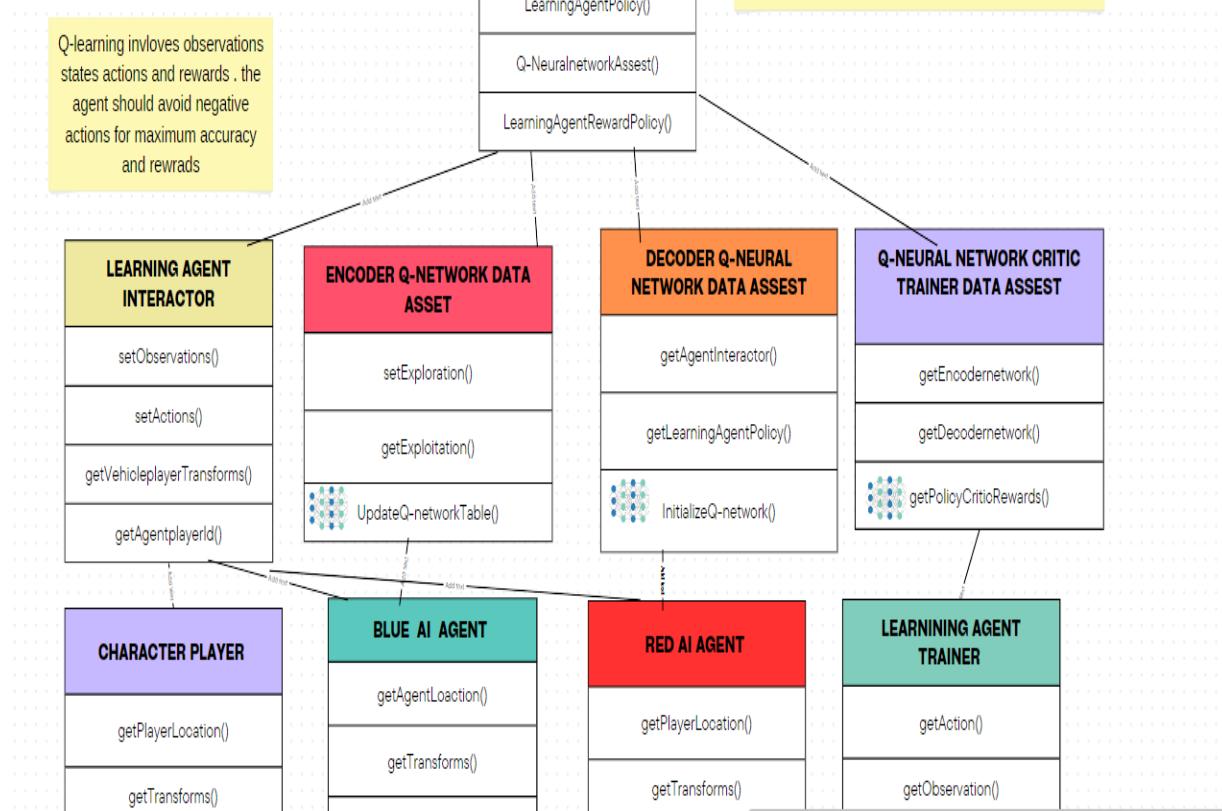


Fig 2.6: Q-Learning Based Enemy AI

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS



Fig 2.7: UI/UX

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS



Fig 2.8: UI/UX

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

23 UI/UX DOCUMENT



Fig 2.9: UI/UX

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

24 DARK FORCE UI



Fig 3.0: UI/UX

PROJECT PROPOSAL FOR FORCES OF PYRAMIDS

25 CHARACTER UI



Fig 3.1: UI/UX

26 Appendix C: To Be Determined List

Learning based enemy system and simulated vehicle traffic system is in planning and development. We would showcase the class diagrams in second draft

Software Design Specifications

1.1 Overview of document

- Section 2:
Introduction to the document and project.
- Section 3:
Overview of system architecture.
- Section 3:
Detailed description of system components.
- Section 4:
User Interface Design.
- Section 5:
Reusability of components and code.
- Section 6:
Design Decisions and tradeoffs.
- Section 7:
Pseudo Code.
- Section 8:
Appendix

2. Introduction

2.1 Purpose of this document

The purpose of this document is to ensure that the final outputted software product meets the requirements of the end customer and outline the design specifications of the software

2.2 Scope of the development project

Our project will aim to promote working revolutionary ideas in the gaming industry regarding science fiction and role-play based progression. Project deals with sophisticated learning system defined as a reinforcement learning technique. The project is totally a reflection of science fiction hence the concepts of physics mainly being shown may not be applicable in real world as our story and lore is completely a work based on fiction and creativity

2.3 Definitions, acronyms, and abbreviations

Terms	Description
SDS	Software Design Specification
SRS	Software Requirement Specification
UI	User Interface

2.4 References

Here are some suggested references regarding NVIDIA and Unreal Engine for game development:

- **Book:** Gregory, Jason. *Game Engine Architecture*. Boca Raton: CRC Press, 2022. pp. 289-315.
- **Magazine/Newspaper Article:** Carter, Emily. "NVIDIA's Ray Tracing Revolution in Unreal Engine." *Game Developer Magazine*, March 10, 2023, pp. 42-45.
- **Internet Web page:** NVIDIA. "NVIDIA and Unreal Engine: Elevating Game Development with RTX."
- 2023. NVIDIA Corporation. Last accessed September 23, 2024. <https://www.nvidia.com/unreal-engine-rtx>.
- **Online Magazine or Newspaper Article:** Wilson, James. "How NVIDIA's DLSS Transforms Unreal Engine 5 Games."
- "Gamer's Tech Monthly," May 2, 2023, pp. 18-23. Reproduced in JSTOR. Main City Library, Los Angeles, CA. Accessed September 23, 2024.
These references highlight the intersection of NVIDIA's technology and Unreal Engine for game development projects.

2.5 General Constraints

This game is designed to be run on a PC installed on an operating system. It is also necessary to have a working internet connection.

2.6 Program Structure

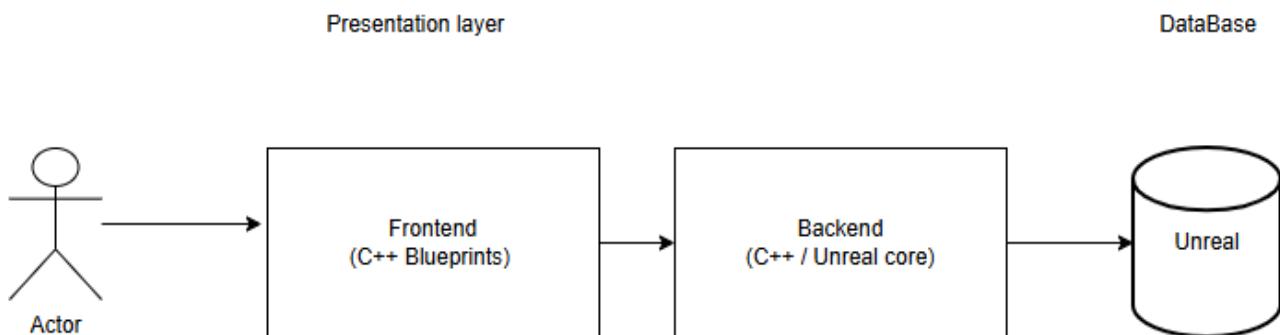


Fig 1.0: Program Structure

3 Detailed description of components

3.1 Home

Description: It is a very first page of the game where user will access Game categories.

Data Members:

- **Include Type:** Views for User
- **Visibility:** Game categories.

Methods: sending and receiving data from blueprints

Identification	Located at the very first page of the game
Type	Play
Purpose	To give user multiple type of gameplay categories
Function	User will be able to sign into the mobile application after entering their credentials and Pressing login.
Dependencies	User Account must already be created.
Data	Check database for credentials.

3.2. Play

Description: If User access this so user can play a new game or resume the previous game

Data Members: Type: Views for user to play a new game or resume.

- **Visibility:** Users/Game players.

Methods: Send request for data entry to the back end.

Identification	Located at very right to the home button at the top of the first page of the game.
Type	Access/Play
Purpose	Allow user to play a new game or resume the previous one.
Function	Users will be able to start a new game with the selected category.
Dependencies	If user wants to play new game so make sure game should not be running in the background.
Data	Store information in the database.

3.3. Example

Description: User can access different type of gameplay categories demo videos how to play the game.

Data Members: **Include Type:** Views for user to watch a demo videos related to how to play a game.
 • **Visibility:** users/game players.

Methods: Getting data from database.

Identification	Located at the right hand of play button, at the top of the first page of the game
Type	View
Purpose	Allow user to watch demo videos related to the game that shows how to play the game.
Function	Users will be able to watch the videos to know how to play the game with complete instructions.
Dependencies	User must be logged in.
Data	Demo videos Data already stored in the database.

3.4. Settings

Description: User can alter the game resolutions and sound types as well as language selection.

Data Members: **Type:** Views for users to select language type and set the resolutions of the game according to them.
 • **Visibility:** users/game players.

Methods: Send request for data change to the back end.

Identification	Located at the top of very first page right to the example button.
Type	View/edit
Purpose	Allow users to change the graphics/resolutions of the game as well to select the language.
Function	Users will be able to change the resolution and language setting.
Dependencies	User must have an account of the game.
Data	-

3.5. Inventory

Description: User can access this feature to change the character setting, character inventory and user can also buy anything for character from the given feature of shop in the inventory.

- **Data Members:** views for pet owners/doctors for data entry.
- **Visibility:** pet owners and doctors

Identification	Located on the top of second page.
Type	View
Purpose	Allow users to edit the character setting and other setting.
Function	Users will be able to access and change the settings according to them.
Dependencies	User must have game account.
Data	-

3.6. Map

Description: Allow users to access the map locations of the gameplay.

- Data Members:** Type: views for users to see the maps and game map locations
- **Visibility:** Users/ game players.

Identification	Located right to the inventory button
Type	View
Purpose	Allow users to see the game maps and locations in the maps.
Function	Users will be able to see the different maps and locations of the game maps.
Dependencies	User must have a game account logged in.
Data	-

3.7. Skills

Description: Allow users to see the skills, agility, speed of the character.

Data Members: Type: Views for users to see the skills.

- **Visibility:** users/game players.

Identification	Located at the 2 nd page of the game at top right to the map button.
Type	View
Purpose	Allow users to access and see the agility, speed of the character.
Function	Users will be able to see the skills, agility and speed of the game character.
Dependencies	User must be logged in to the game account.
Data	-

3.8. Missions

Description: User can access the tasks and missions of the gameplay.

Data Members: Type: Views for user to access the tasks and missions of the game.

- **Visibility:** Users/game players

Identification	Located on the 2 nd page of the game at top right to the skills button.
Type	View
Purpose	Allow users to access and see the missions of the games and tasks of the games.
Function	Users will be able to access the missions and tasks of the game.
Dependencies	User must be logged in to the game account.
Data	-

3.9. Progress

Description: User can review the progress of the game play of itself

Data Members: Type: Views for game progress.

- **Visibility:** users/players.

Identification	Located on 2nd page right to the missions button.
Type	View
Purpose	The overall progress percentage of the game.
Function	In this the overall progress percentage of the game will be displayed of the user wrt levels.
Dependencies	Player must be signed in.
Data	-

3.10. Bios

Description: Allow users to access image scanning feature.

Data Members: Type: Views for pet owners/doctors for data entry.

- **Visibility:** pet owners and doctors.

Identification	Located on the home page on the top right corner in Drawer
Type	View
Purpose	Allow users to access image scanning feature to scan their pet's wounds and get information about that wound.
Function	User will be able to access this image scanning feature to get information about their pet's wounds.
Dependencies	User must be logged in, must be a pet owner or a Doctor
Data	Store information in the database.

3.11. Online

Description: User can access this feature to play game online with friends.

- **Inclusion Members:** for users to play online.
- **Visibility:** users/game players.

Identification	Located at right of the Bios button.
Type	View
Purpose	Allow user to play game online.
Function	User will be able to play this game online with friends.
Dependencies	User must be logged in.
Data	-

4. User Interface Design.

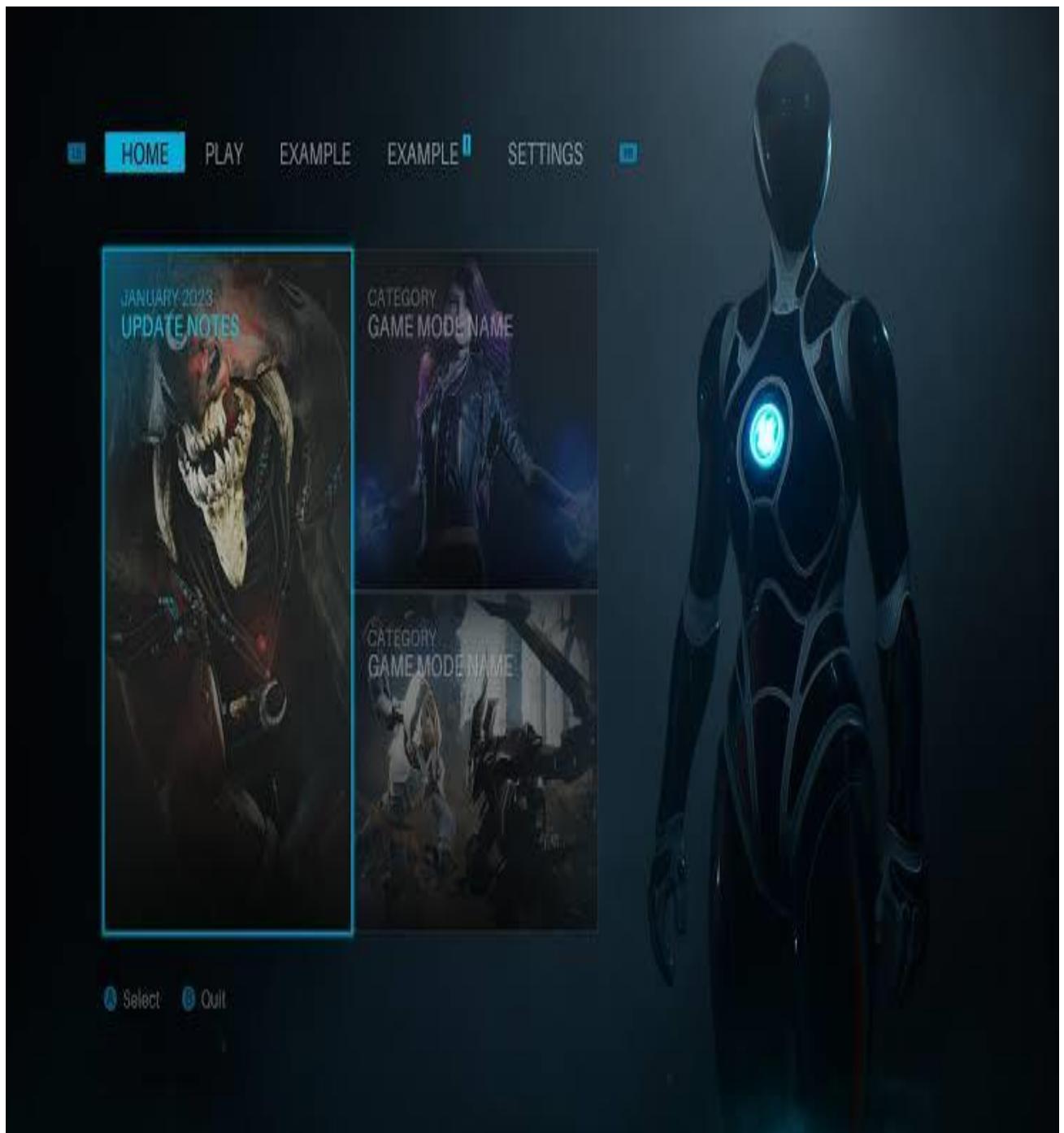


Fig 1.1: UI/UX

SDS FOR FORCES OF PYRAMIDS

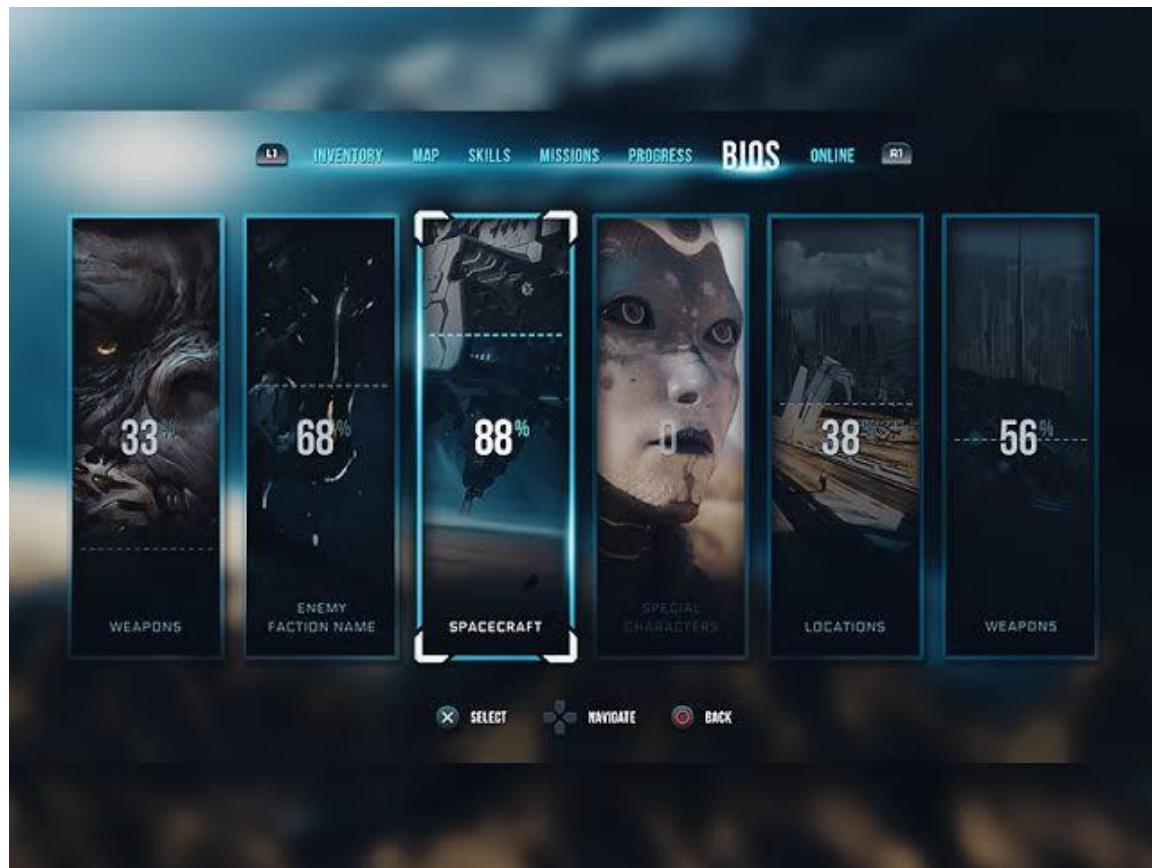


Fig 1.2: UI/UX

- **Reuse and relationships to other products**

Reusability allows the developers to be more efficient because the same code can be developed once and used in many different applications. Secondly, Reliability can be improved by reusing those components that have already been through the rigorous testing procedure. Developing new code requires additional time and money for testing and validation. Much of these can be avoided by reusing already created components.

- **Design decisions and tradeoffs**

N/A

- **Pseudocode for components**

SDS FOR FORCES OF PYRAMIDS

N/A

- Appendices:
N/A

5. ACTIVITY DIAGRAMS:

Home:

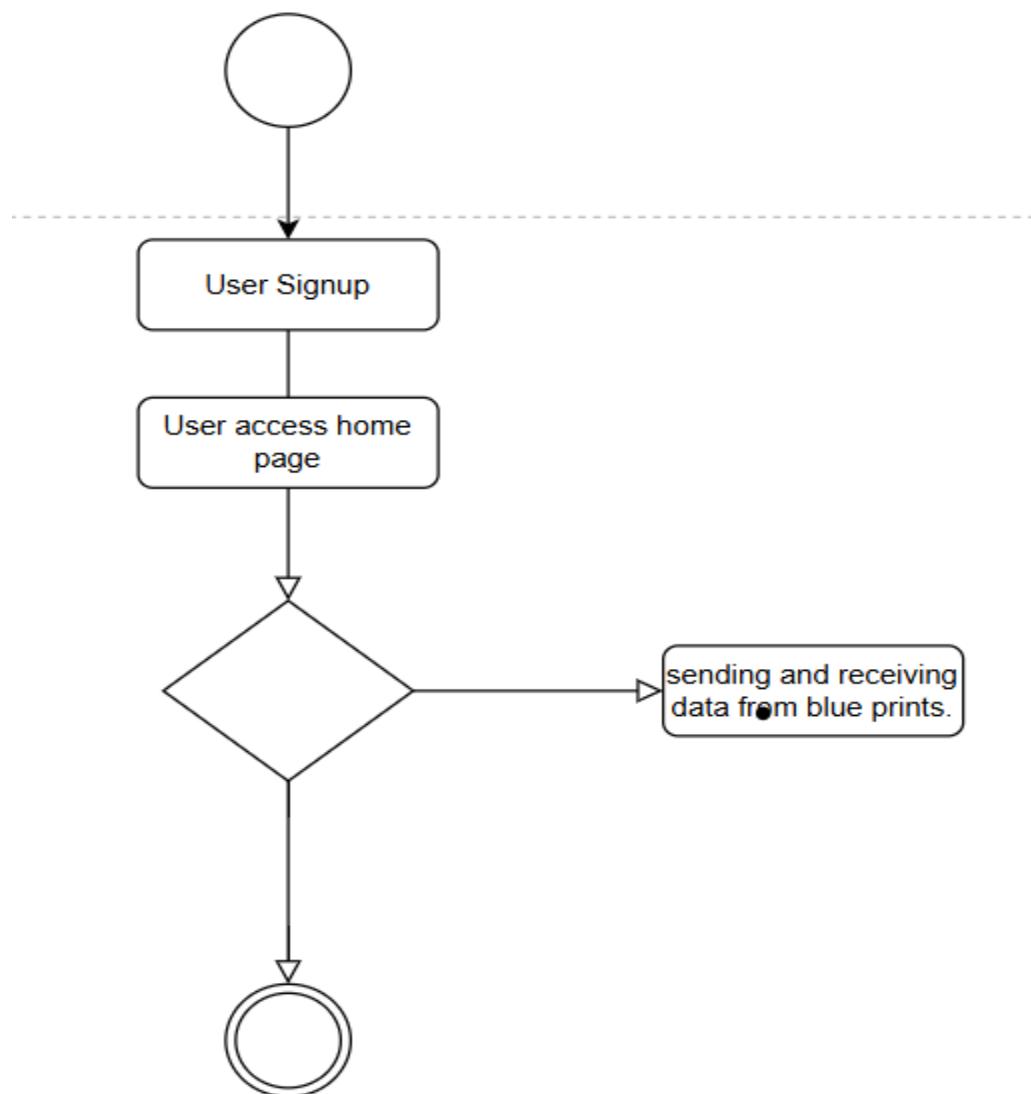


Fig 1.3: Home

Play:

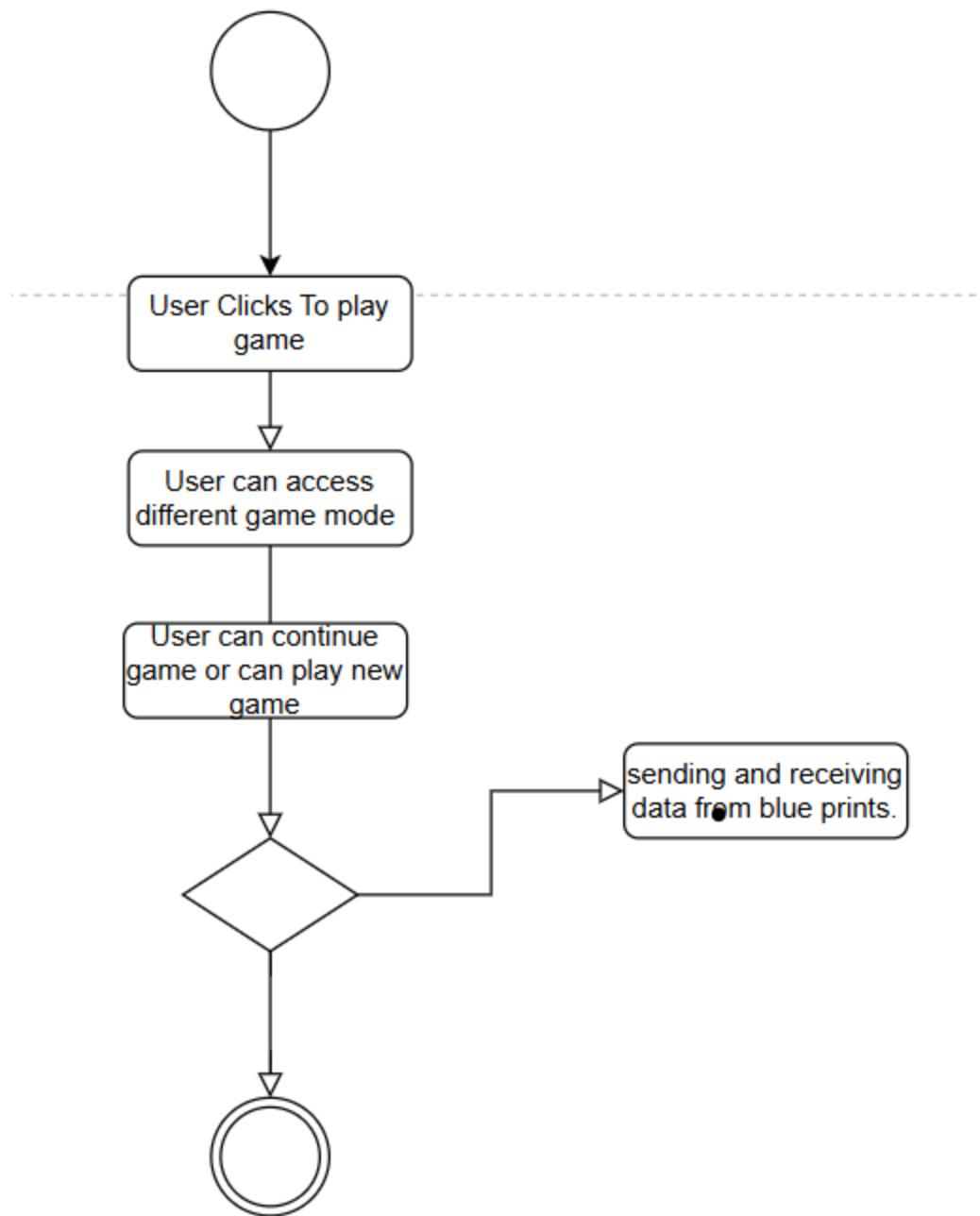


Fig 1.4: Play

Setting:

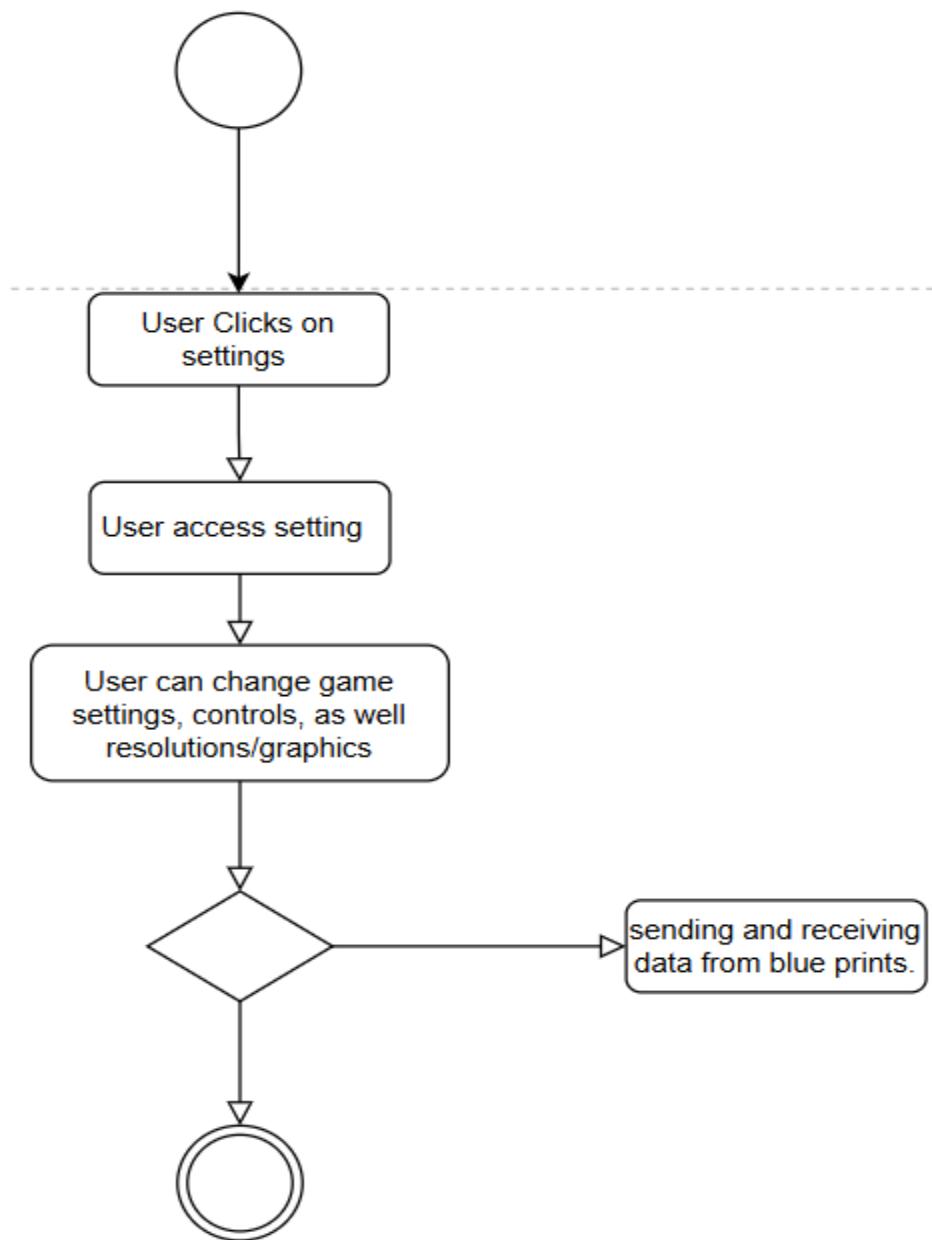


Fig 1.5: Settings

SDS FOR FORCES OF PYRAMIDS

Map:

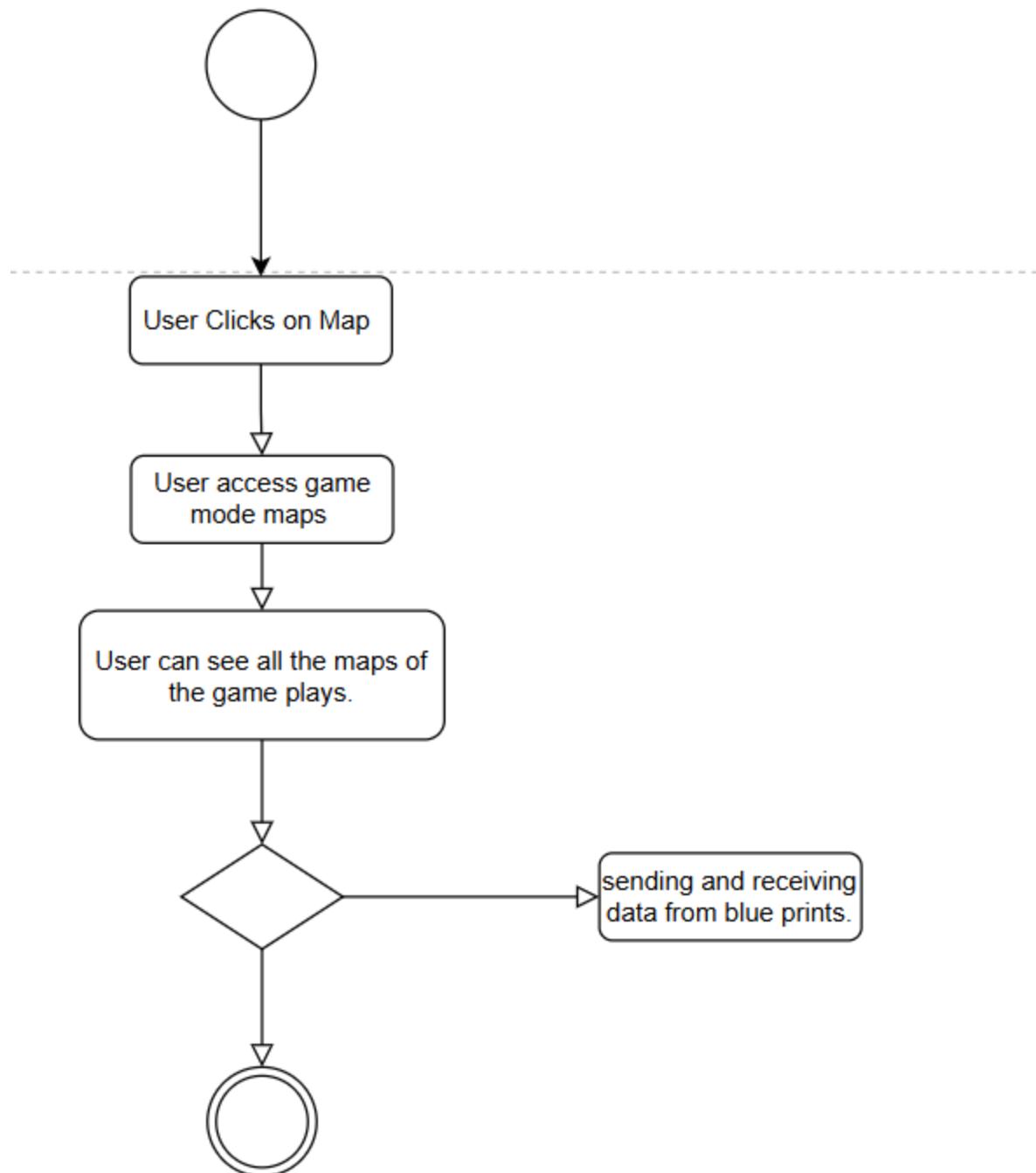


Fig 1.6: Map

SDS FOR FORCES OF PYRAMIDS

Online:

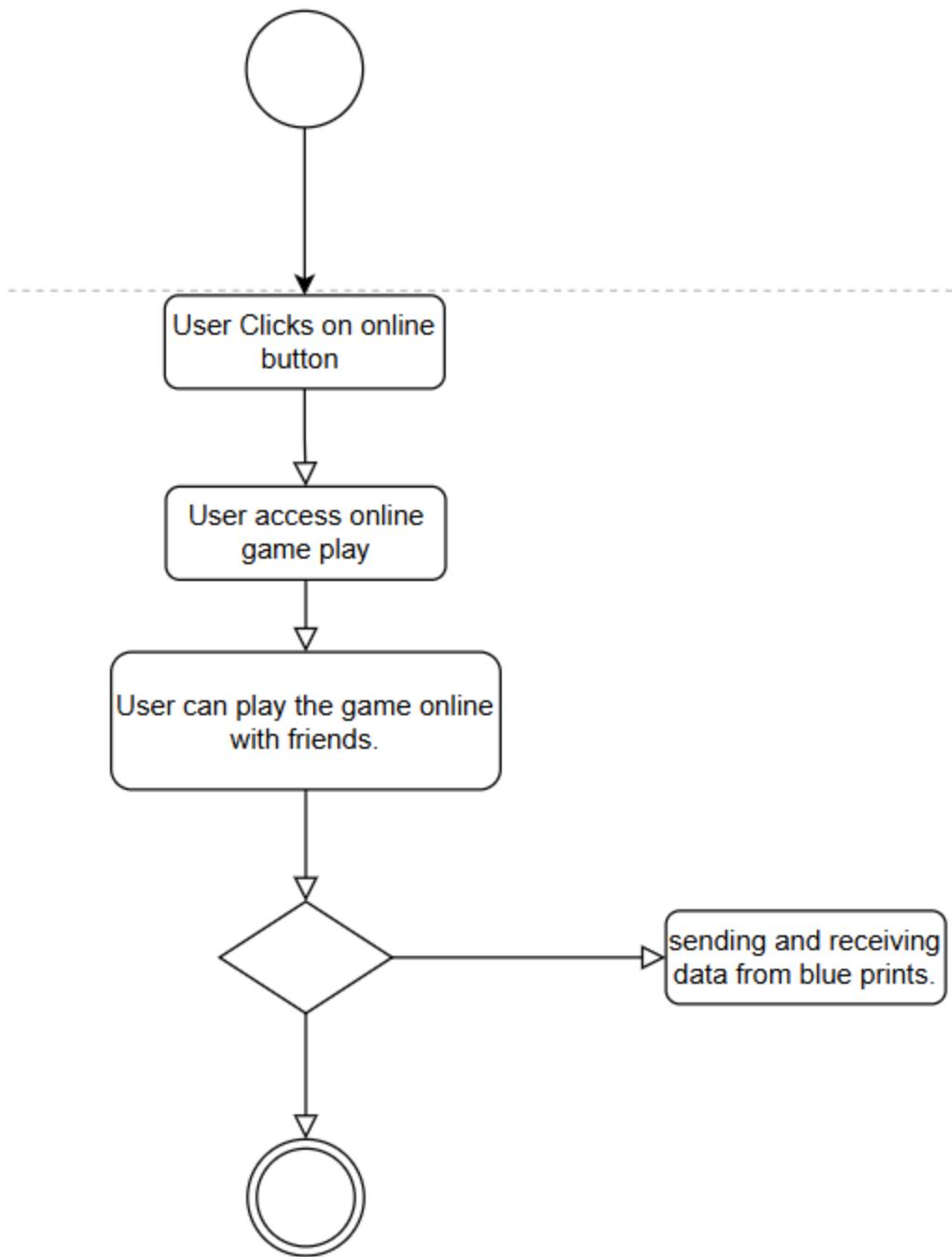
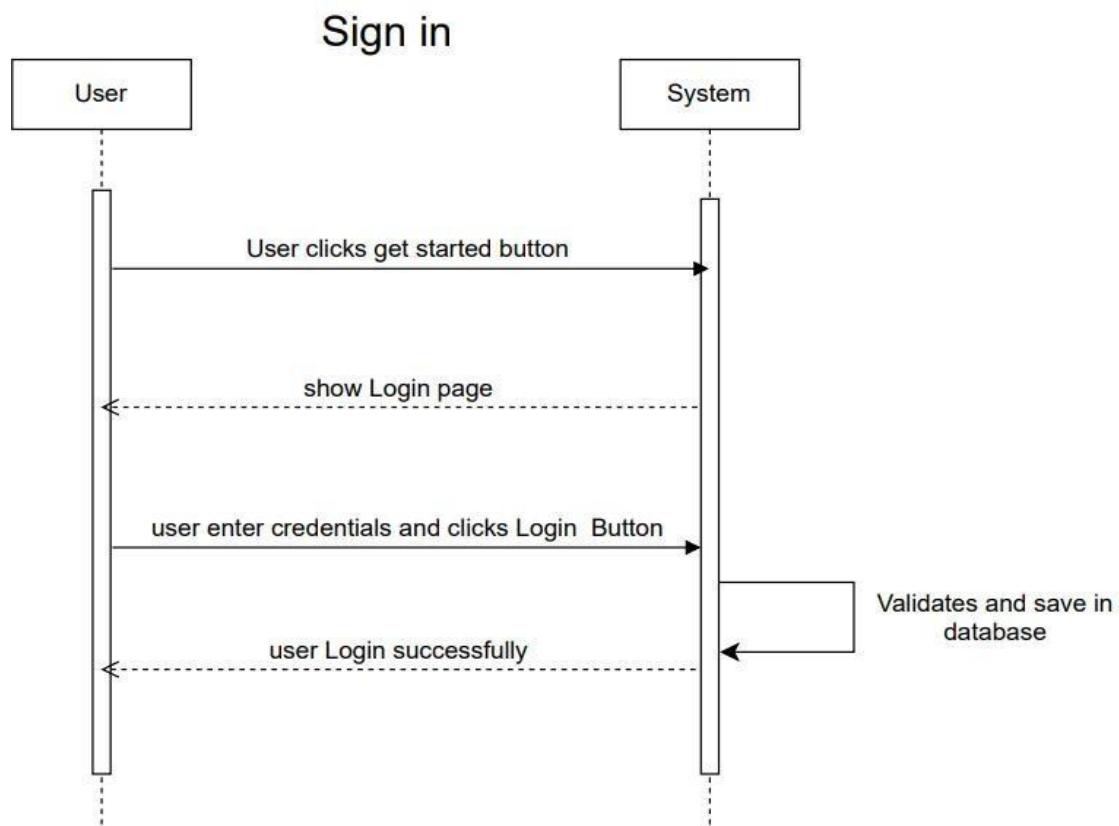


Fig 1.7: Online

6. SEQUENCE DIAGRAM:



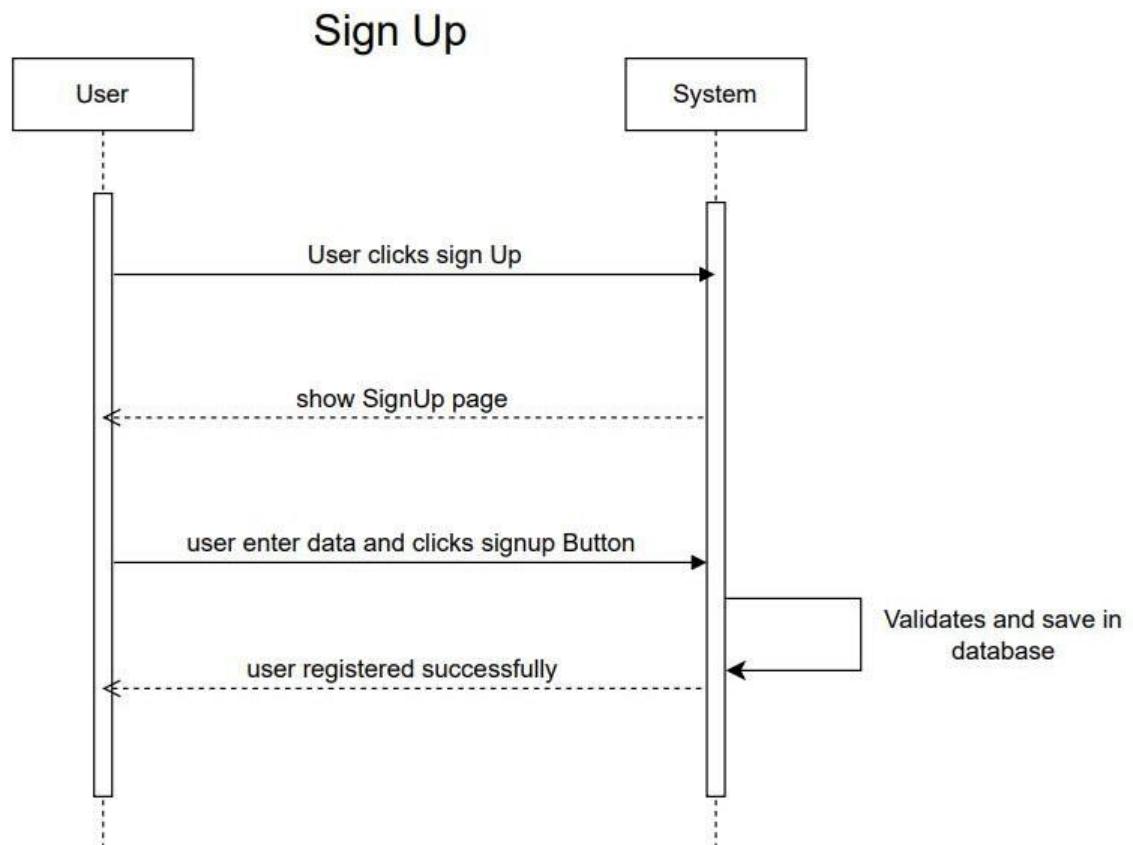


Fig 1.9: Sign Up

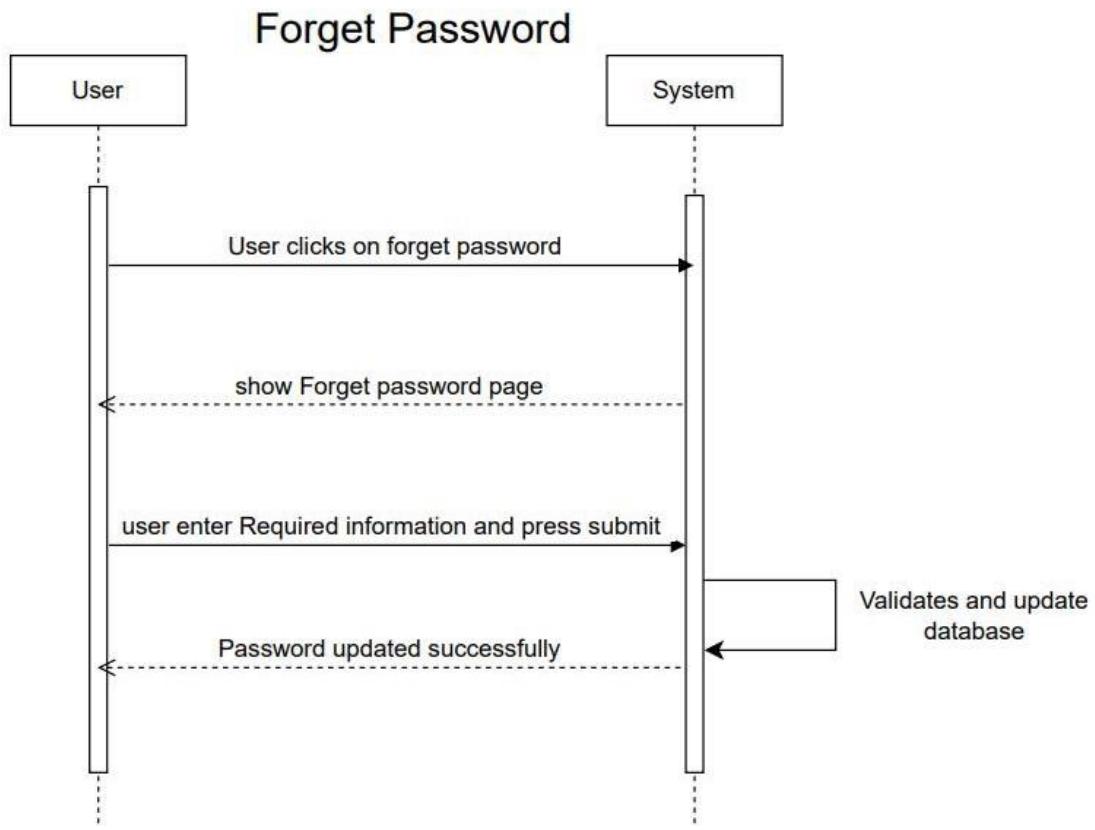


Fig 2.0: Forgot Password

SDS FOR FORCES OF PYRAMIDS

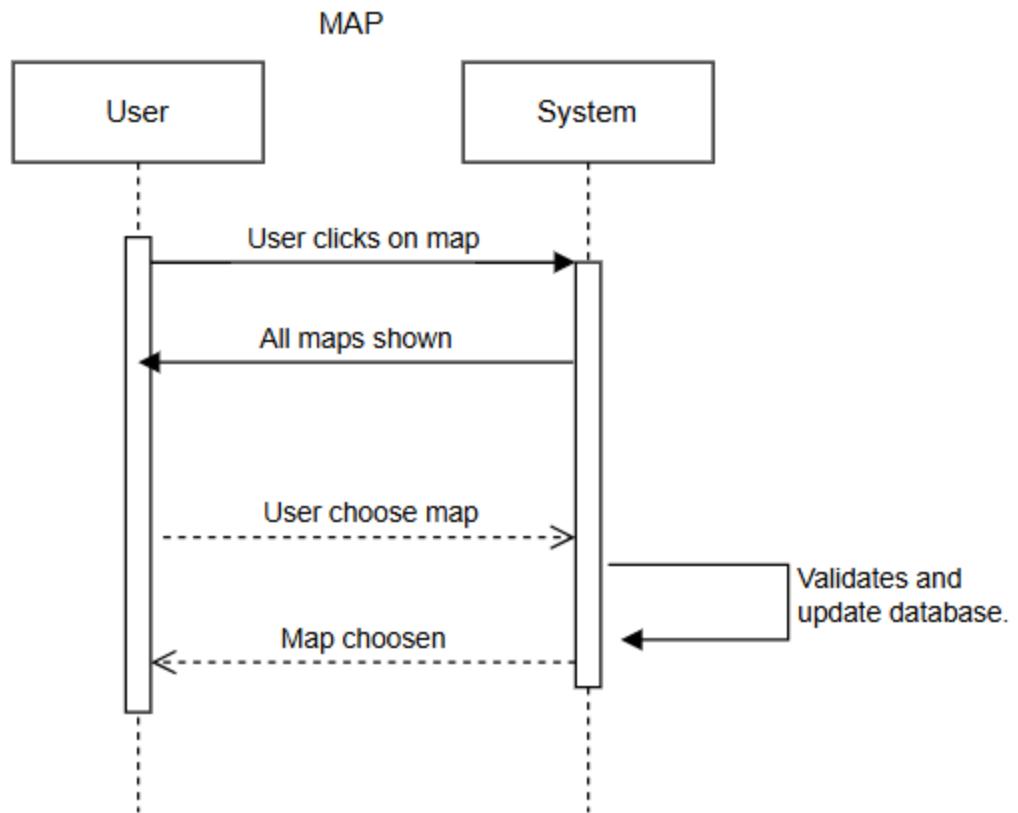


Fig 2.1: Map

SDS FOR FORCES OF PYRAMIDS

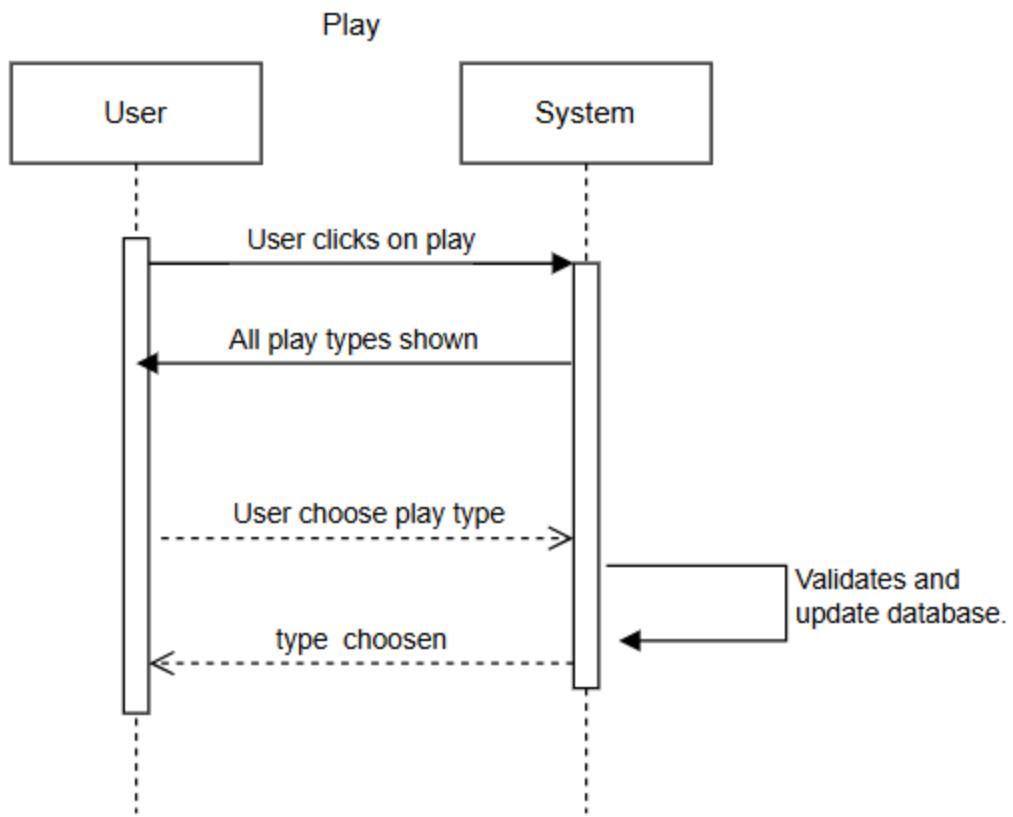


Fig 2.2: Play

SDS FOR FORCES OF PYRAMIDS

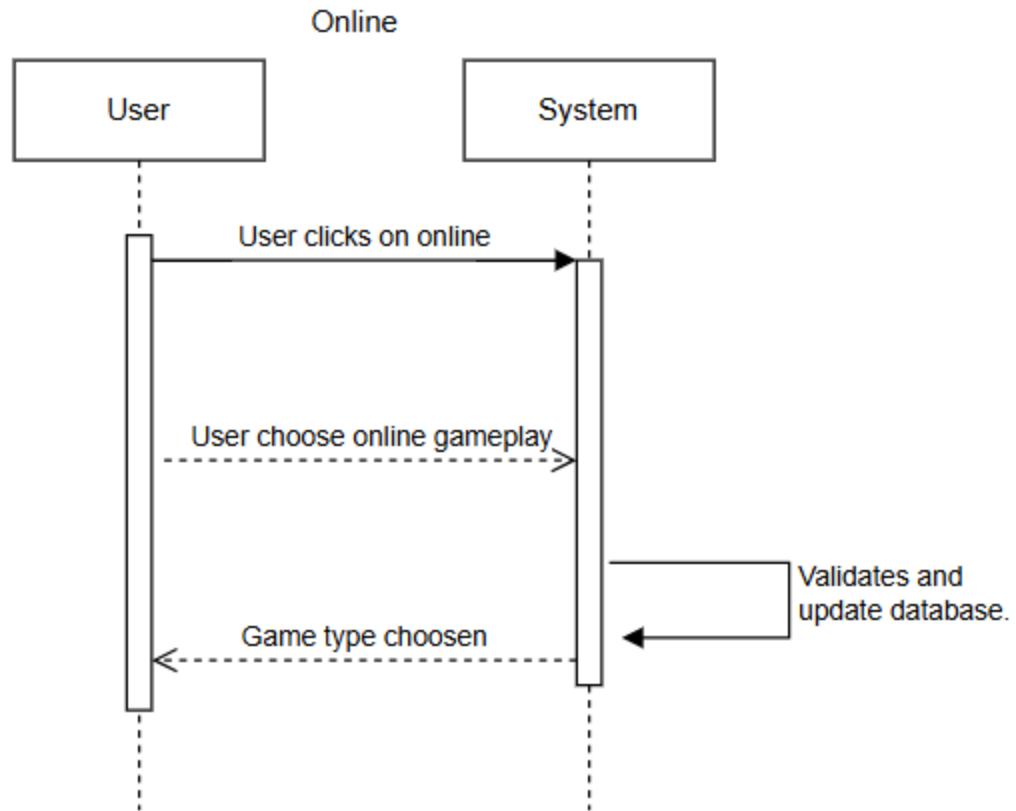


Fig 2.3: Online

7. USECASE DIAGRAM

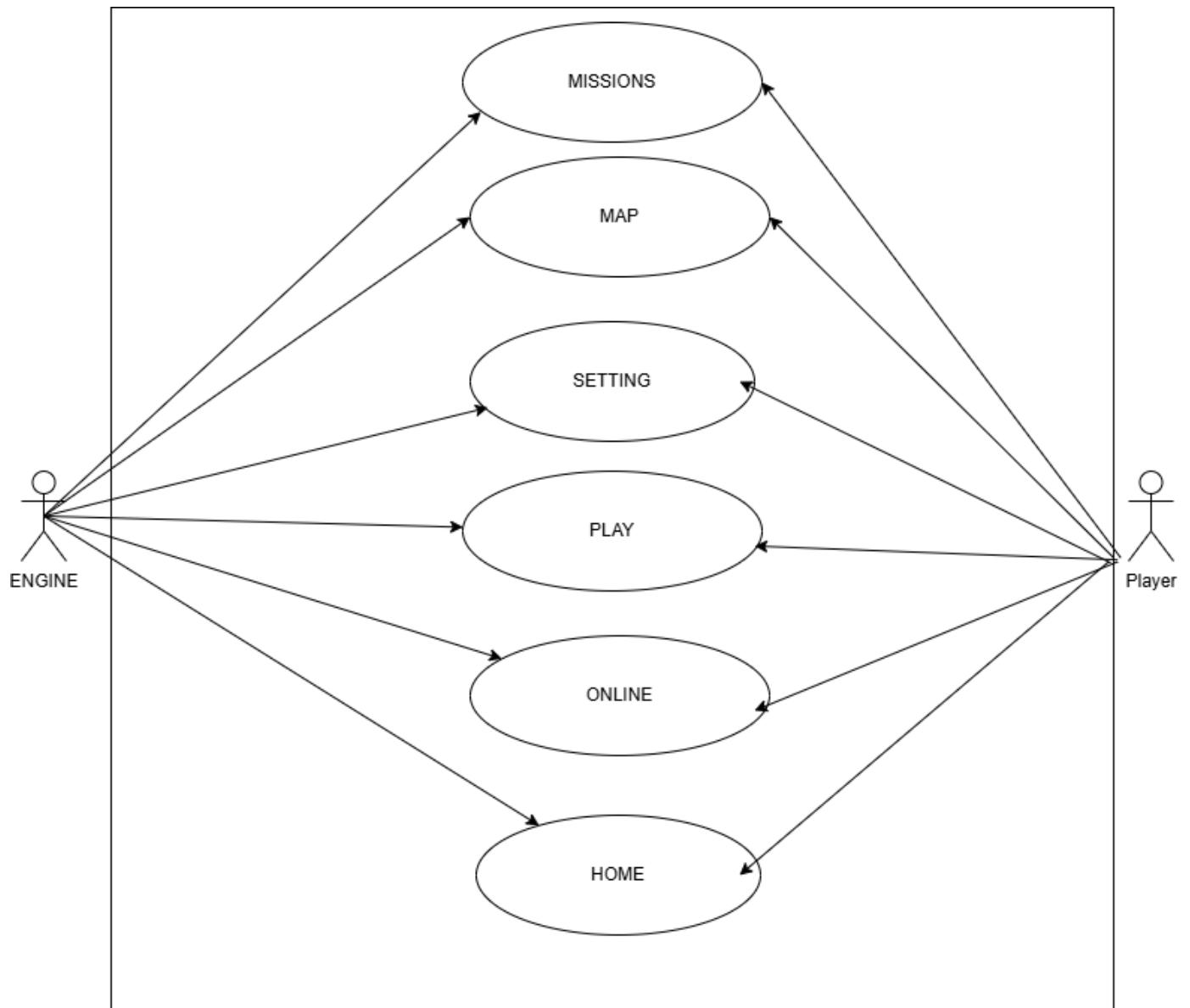


Fig 2.4: Usecase

8. State transition diagram

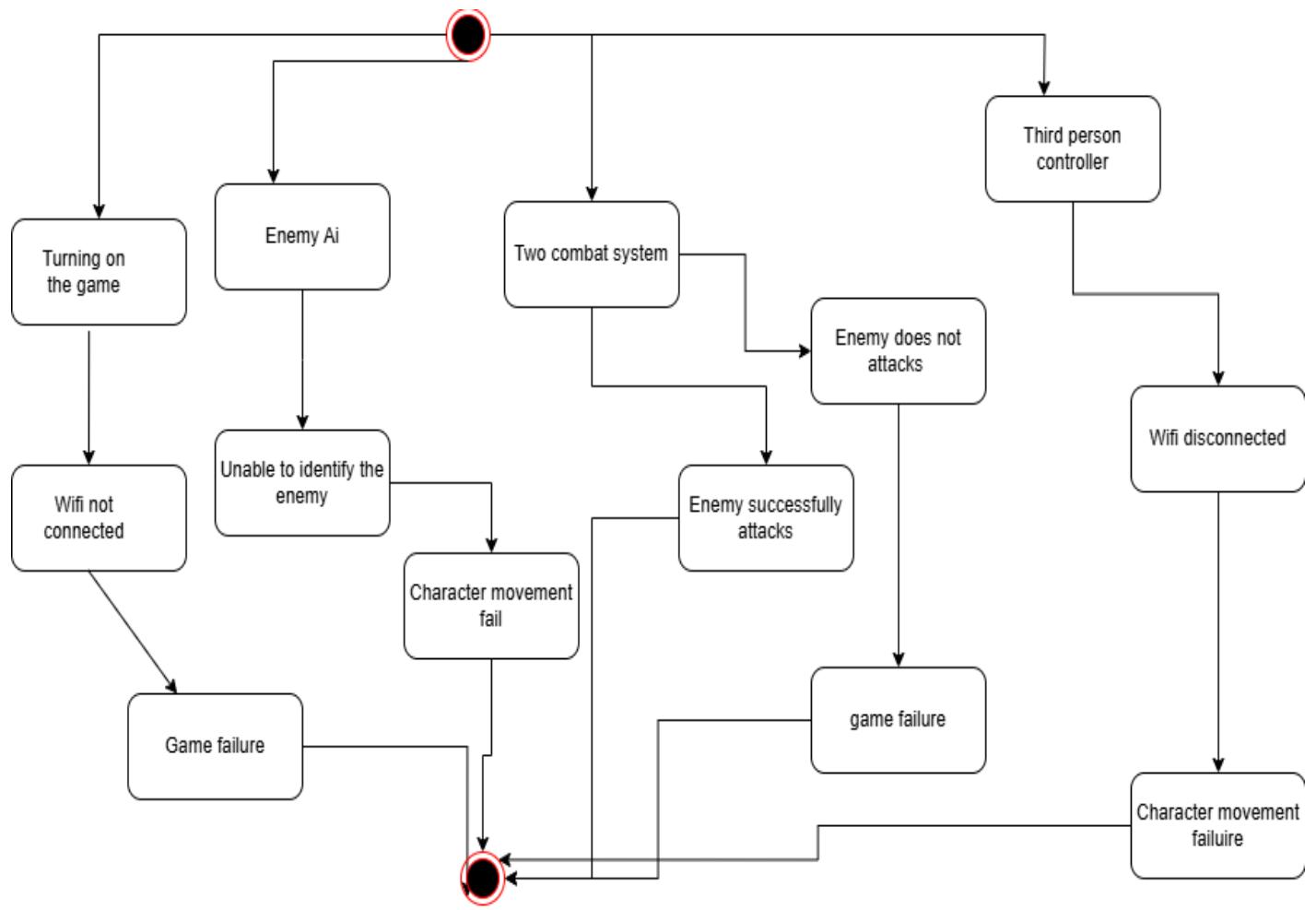


Fig 2.5: State Transition

9. State diagrams

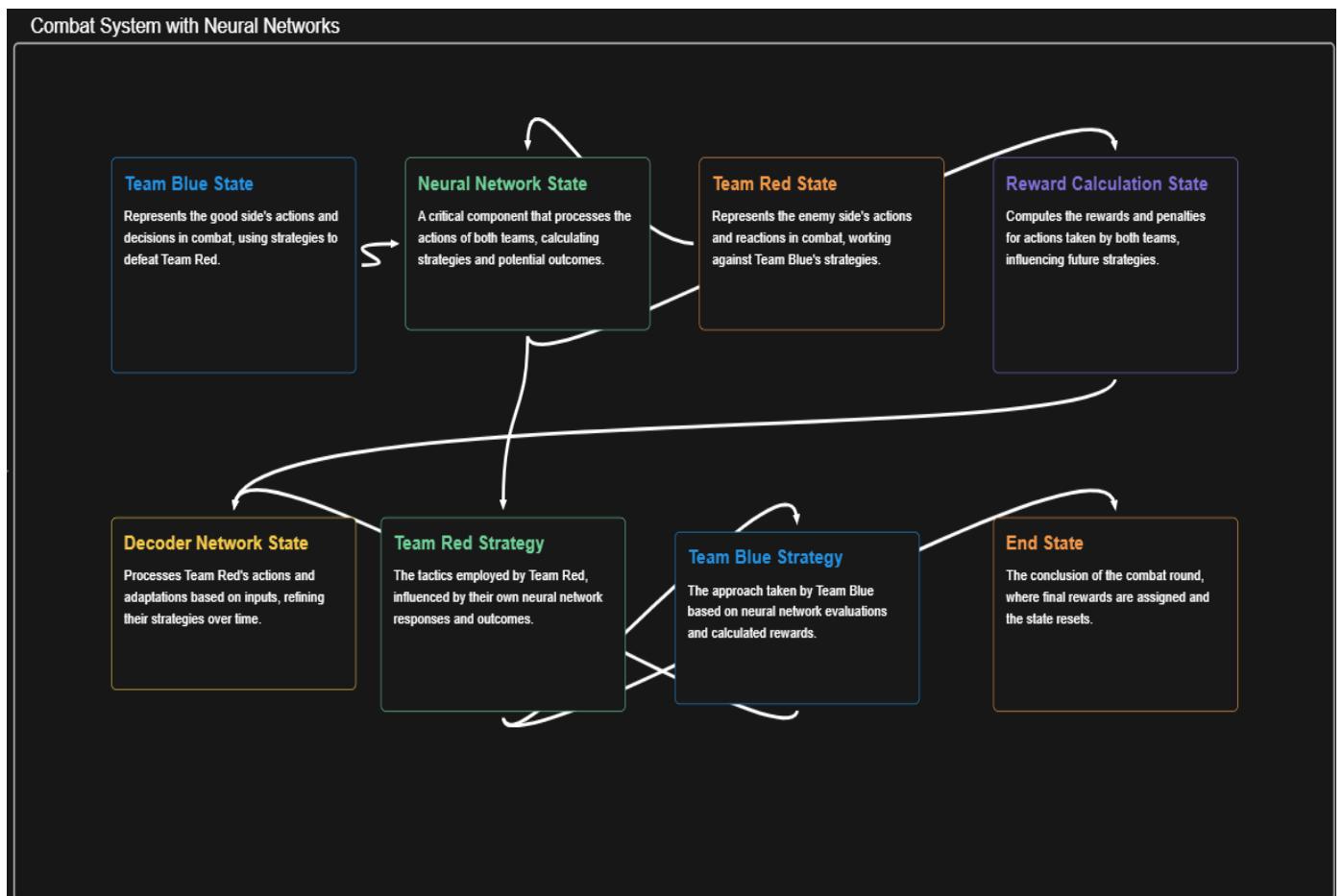


Fig 2.6: Combat system with neural networks

SDS FOR FORCES OF PYRAMIDS

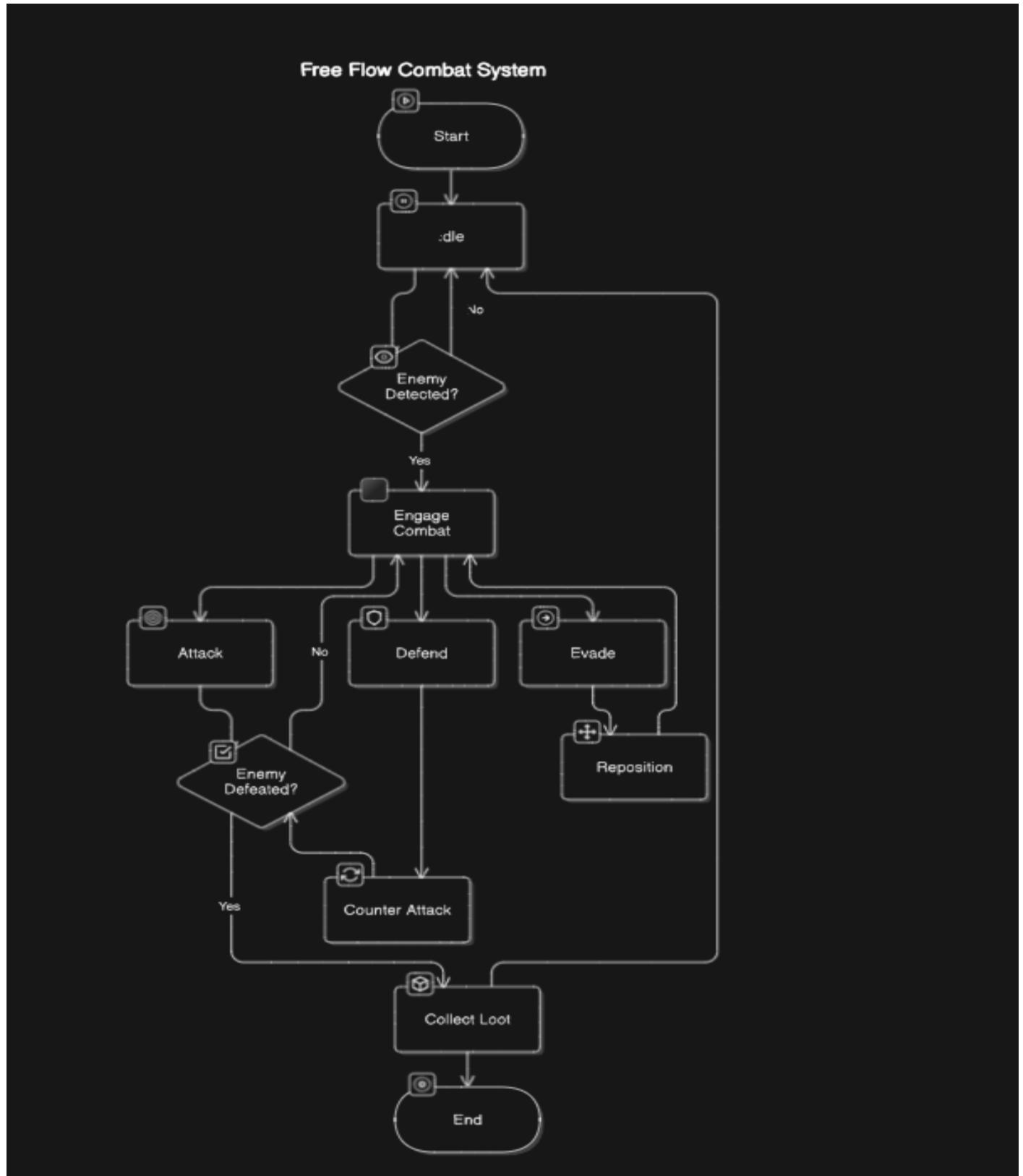


Fig 2.7: Free Flow Combat System

SDS FOR FORCES OF PYRAMIDS

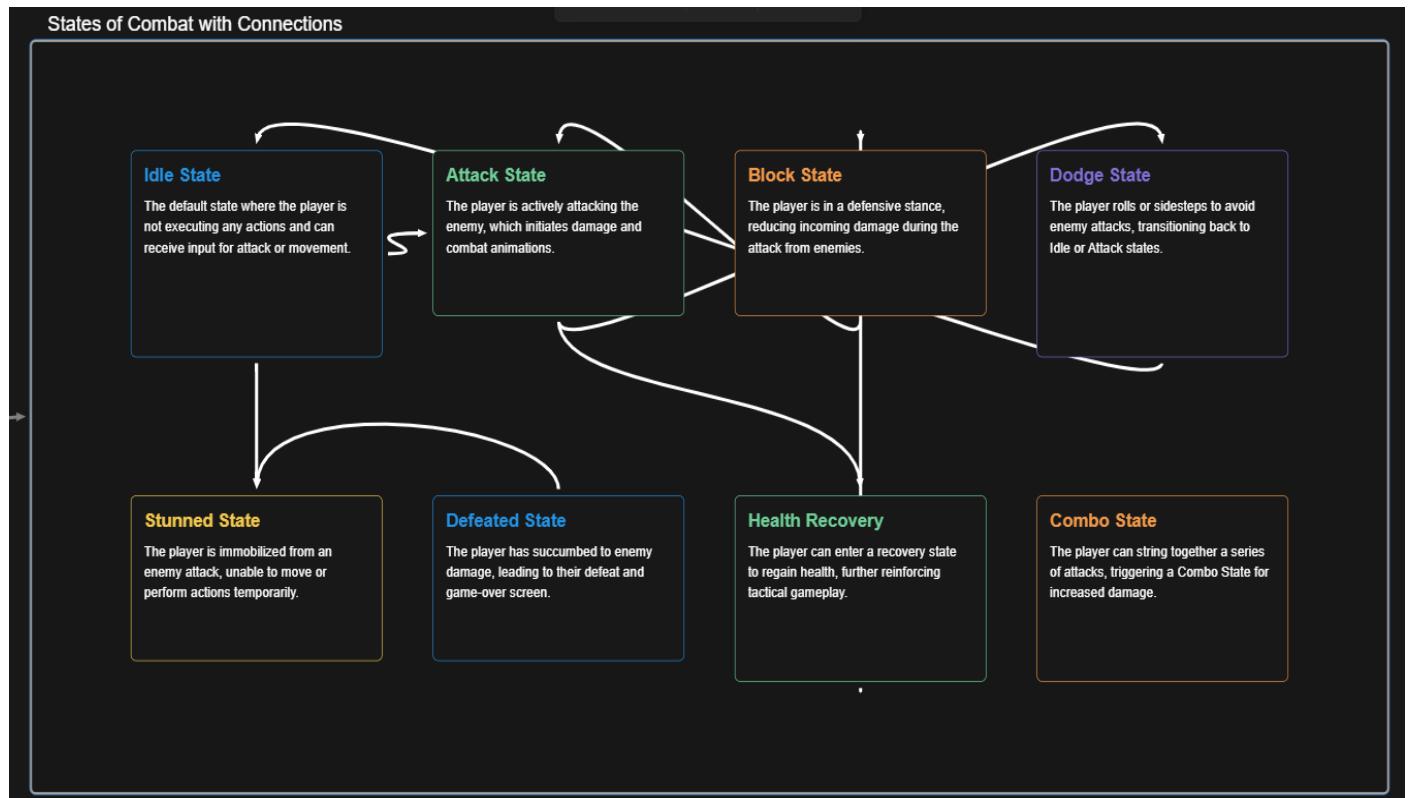


Fig 2.8: State of Combat with Connections

Test Cases

TEST CASES

1.1 GAME STARTUP AND OTHER FEATURES

a.

Test Case 01: Third Person Controller

Test Case ID	TC_001				
Test Case Name	Third Person Controller	Test Case Description	Test the functionality of movement of character		
Created By	Taha	Version	1.0	Date	25 Sep 2024

S.no	Prerequisites:
1	Game should be running in test mode
2	. Required plugins and systems must be enabled

<u>Test Scenario</u>	Verify that "Third person controller using Motion Matching" behaves as expected under typical conditions.			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	This will be available to player in gameplay	Character is present in the gameplay	Character is present in the gameplay	Pass
2	It will allow the player to control the movements.	It will allow the character to move	It will allow the character to move	Pass

Test Case 02: Enemy AI Random Behaviours

Test Case ID	TC_002	Test Case Description	This is used to verify the feature "Enemy AI random Behaviors system using Q-learning with plugin called Learning Agent" is working as intended.		
Created By	Taha	Version	2	Date	30 Sep 2024

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verify that "Enemy AI random Behaviors system using Q-learning" behaves as expected under typical conditions.			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Character is designed in a different attire than the character of the player	Character looks different	Character looks different	Pass
2	Enemy AI is then induced and area is demarcated in which the enemy follows the character	Enemy follows the character in the area	Enemy does not follow because area demarkation gone wrong	Fail
	Enemy AI is then induced and area is demarcated in which the enemy follows the character	Enemy follows the character in the area	Enemy follows the character in the area	Pass
3	Blueprints are edited so that player and enemy AI not only recognize each other but get ready to engage in combat and does random behaviours	It executes suitable random behaviours, suitable for combat situation	It executes suitable random behaviours, suitable for combat situation	Pass

Table 1.2: Enemy AI

SRS FOR FORCES OF PYRAMIDS

Test Case 03: Character switching system

Test Case ID	TC_003	Test Case Description	Can play with different characters of its own choice at a particular time at the run time of the game		
Test Case Name	Character Switching System				
Created By	Shoaib	Version	2.0	Date	30 Dec 2024

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verifies that character is being switched				
	Step no.	Step Details	Expected Results	Actual Results	
1	The user is allowed to select the particular character while playing the game	Character is selected	Login page is displayed with the "Sign in with Google" option.	Pass	
2	Player will be Also allowed to switch the character in the run time of the game but it will have to leave the previous one while switching to the new one	Character is being switched	Character selected to switch was dead	Fail	
		Character is being switched	Character is being switched after alive character is selected	Pass	

Table 1.3: Character Switching System

Test Case 04: Two combat system

Test Case ID	TC_004	Test Case Name	Two combat systems	Test Case Description	Two combat systems are implemented simultaneously	
Created By	Shoaib	Version	1	Dat e	2 Jan 2025	

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verify that "Two combat system free flow combat system and hack and slash combat system" behaves as expected under typical conditions.			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Attack is done using free flow by the user	User attacks the enemy	User attacks the enemy	Pass
2	Self defense and counter attack is done using hack and slash by the enemy	Enemy defends and counter attacks	Enemy defends and counter attacks	Pass

Table 1.4: Two combat systems

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Test Case 05: Character sculpting and modeling

Test Case ID	TC_005				
Test Case Name	Character sculpting and modeling	Test Case Description	Character models are made		
Created By	Taha	Version	2.0	Date	2 Feb 2025

S.no	Prerequisites:
1	3D modeling software such as Z-brush

Test Scenario	Verifies that character is designed as planned				
	Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Character model is designed	Character looks matches the desired design	Character looks doesn't match as the desired design as polygonal data lacked	Fail	
2	Character model redesigned	Character looks matches the desired design	Character looks matches the desired design when required polygons were used	Pass	
3	Shading and texturing of the model	Character is having the appropriate color with respect to the gaming environment	Character is having the appropriate color with respect to the gaming environment	Pass	

Table 1.5: Character Sculpting and Modeling

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Test Case 06: Character signature move animation

Test Case ID	TC_006			
Test Case Name	Character signature move animation	Test Case Description	Signature move of the character is demonstrated during the combat	
Created By	Taha	Version	1.0	Dat e 31 Dec 2024

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verify that the agency owner can successfully manage their plan through the billing page.			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Character shoots the final bullet on the enemy	The bullet strikes the enemy	The bullet strikes the enemy	Pass
2	The enemy dies	The enemy disintegrates and goes out of the game play	The enemy disintegrates and goes out of the game play	Pass

Table 1.6: Character signature move animation

Test Case 07: Sound effects and HUD and GUI

Test Case ID	TC_007				
Test Case Name	Create Agency	Test Case Description	GUI mainly includes main menu HUD mainly includes display units for two teams Sound effects of different activities and movements are induced		
Created By	Taha	Version	1.0	Date	5 Jan 2025

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verifies that the game is having appropriate sound effects and GUI and HUD(display units)			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Sound effects, HUD and GUI are induced	Appropriate head count of players in the gameplay with appropriate display of template in and out of the gameplay and the induced sound effects are played simultaneously with visuals	Appropriate head count of players in the gameplay with appropriate display of template in and out of the gameplay and the induced sound effects are played simultaneously with visuals	Pass
2	They are checked and made inline with the gameplay and the display	Appropriate head count of players in the gameplay with appropriate display of template in and out of the gameplay and the induced sound effects are played simultaneously with visuals	Appropriate head count of players in the gameplay with appropriate display of template in and out of the gameplay and the induced sound effects are played simultaneously with visuals	Pass

Table 1.7: Sound effects, HUD and GUI

Test Case 08: Health Bar System

Test Case ID	TC 008				
Test Case Name	Health Bar System	Test Case Description	Health bar of the character and the enemy is shown on the screen		
Created By	Taha	Version	1.0	Date	20 Feb 2025

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verifies that player's and enemy's health being shown as 100 at start and is reduced when bullet is hit			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Health bar is induced and max value is set to 100	Health bar shows the health of the player and enemy.	Health bar shows the health of the player and enemy.	Pass
2	The health is set to decrease on every bullet strike in the run time of the gameplay	Health bar reduces as bullet strikes the player and the enemy in the gameplay	Health bar reduces as bullet strikes the player and the enemy in the gameplay	Pass

Table 1.8: Health Bar System

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Test Case 09: Niagra Particle Simulation

Test Case ID	TC_009			
Test Case Name	Niagra Particle Simulation	Test Case Description	Tests if the particles system behaves correctly in when triggered in real time	
Created By	Shoaib	Version	2.0	Date 23 Jun2025

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verify that a user can successfully invite a team member via email.			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Niagra effects are induced	Particles simulate realistically, follow behavior graph and do not affect performance	Particle simulation failed due to unsuccessful execution of renderers in compile time	Fail
	Niagra effects are induced	Particles simulate realistically, follow behavior graph and do not affect performance	We integrated Niagra simulation with chaos physics and created the smoke simulation which was not done before. Hence, particles simulate realistically, follow behavior graph and do not affect performance	Pass
2	Level is opened with Niagra and event is triggered	Simulation becomes the part of the level at runtime	Simulation becomes the part of the level at runtime	Pass

Table 1.9: Niagra Particle Simulation

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Test Case 10: Nanite virtualized layered geometry system

Test Case ID	TC_010	Test Case Name	Nanite virtualized layered geometry system	Test Case Description	Nanite virtualized geometry is displayed with high detail	
Created By	Shoaib	Version	2.0	Date	26 Jun 2025	

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verifies that virtualized geometry nodes are displayed with high detail			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Loads a Nanite enabled asset in the scene	Geometry remains detailed at all distances without LOD popping. Performance remains stable	Geometry remains detailed at all distances without LOD popping. Performance remains stable	Pass
2	Move camera farther and closer	Geometry remains detailed at all distances without LOD popping. Performance remains stable	Geometry remains detailed at all distances without LOD popping. Performance remains stable	Pass
3	Monitor geometry LOD changes and performance	Geometry remains detailed at all distances without LOD popping. Performance remains stable	Geometry remains detailed at all distances without LOD popping. Performance remains stable	Pass

Test Case 11: Concept Art and Proper Level Design

Test Case ID	TC_011				
Test Case Name	Concept Art and Level Design	Test Case Description	Level is designed to align with concept art style and layout		
Created By	Taha	Version	1.0	Date	26 May 2025

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verifies that level aligns with the concept of the game.			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Compare Concept Art with in-game level	Level visually matches concept art and provides intuitive flow and gameplay	Level visually matches concept art and provides intuitive flow and gameplay	Pass
2	Check key structures and visual style	Level visually matches concept art and provides intuitive flow and gameplay	Level visually matches concept art and provides intuitive flow and gameplay	Pass
3	Walk through the level to test flow and design	Level visually matches concept art and provides intuitive flow and gameplay	Level visually matches concept art and provides intuitive flow and gameplay	Pass

Table 1.11: Concept art and proper level design

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Test Case 12: VFX and Timeline Sequences

Test Case ID	TC_012				
Test Case Name	VFX and Timeline Sequences	Test Case Description	Triggering of VFX is set according to the timeline sequence		
Created By	Taha	Version	1.0	Date	27 Jun 2025

S.no	Prerequisites:
1	Game should be running in test mode
2	Required plugins and systems must be enabled

Test Scenario	Verifies the triggering of VFX with respect to sequencer timeline			
Step no.	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Open sequencer for an event	VFX play smoothly, synchronized with timeline events. No frame drops or visual glitches.	VFX play smoothly, synchronized with timeline events. No frame drops or visual glitches.	Pass
2	Play timeline and observe visuals	VFX play smoothly, synchronized with timeline events. No frame drops or visual glitches.	VFX play smoothly, synchronized with timeline events. No frame drops or visual glitches.	Pass
3	Check timing, sync and rendering of effects	VFX play smoothly, synchronized with timeline events. No frame drops or visual glitches.	VFX play smoothly, synchronized with timeline events. No frame drops or visual glitches.	Pass

Table 1.12: VFX and Timeline Sequences

User Manual

MAIN MENU

OVER VIEW

This is the main menu of the game containing four options

- QUICK PLAY
- START A GAME
- BROWSE
- BACK

It gives users an option of selecting any game type or starting a new game online

INSTRUCTIONS

- User will access the main menu
- User will get different options to select the game type
- In quick play user will have an option to select a game type or play a new game online
- In start a game feature the user have a access to create a new session of any type with other players online locally
- In browse feature the user will get an access to search the gaming environment

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- User should be connected to the internet to access this feature.
- By clicking on back button the game will be switched off



Fig 1.0: UI/UX

HOST A GAME (levels)

OVER VIEW

These are the different types of levels of the games some of them are single player and some of them are multiplayer with different gameplays.

- BOTS ENABLED
- ONLINE
- CONVULATION
- COMBAT
- LOCAL MULTIPLAYER
- CHECKERED

INSTRUCTIONS

SRS FOR FORCES OF PYRAMIDS

- In bots enabled feature the enemy can be enabled or disabled by using this feature
- Network online feature provides access to the user of the internet or LAN user can choose between them
- Convolution feature is the level 1 of game, this is single player level in which user control one character
- Combat feature provides single player level but it increases the numbers of character then the basic level
- Local multiplayer feature provides a multiplayer experience single level and more than 1 character of the team can be controlled by multiple users playing at the same time
- Checkered feature provides the access single player game play, but have the checkered floor



Fig 1.1: UI/UX

HOST A GAME (levels)

OVER VIEW

These are the different types of levels of the games some of them are single player and some of them are multiplayer with different game plays.

- BOTS ENABLED
- ONLINE
- CONVULATION
- COMBAT
- LOCAL MULTIPLAYER

SRS FOR FORCES OF PYRAMIDS

- CHECKERED

INSTRUCTIONS

- In bots enabled feature the enemy can be enabled or disabled by using this feature
- Network online feature provides a access to the user of the internet or LAN user can choose between them
- Combat feature contains a different types of 2 terrains 1st terrain is unknown as ancient dunes and this is known as Australian desserts
- Dark side feature feature allows the user to Access the final level of the game
- Expanse elimination allows user to access the game play of indoor environment
- Convolution feature is the level 1 of game, this is single player level in which user control one character.



Fig 1.2: UI/UX

LYRA

OVER VIEW

This is a 1st page of game includes

- PLAY LYRA
- OPTIONS
- VREDITS

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- SHOW REPLAY
- QUIT LYRA

INSTRUCTIONS

- Play lyra allows user to access the 2nd page of game which contains the game levels
- In option feature user can access the game control settings and language settings
- In Credits feature the user can access to the performance and points user contains
- Show replay allows user to check the game records replays and demo of the game
- Quit LYRA allows the user to quit the game.



Fig 1.3: UI/UX

Australian Dessert

OVER VIEW

This is the terrain of the Australian dessert and this is a level of game in which user can play a single player combat gameplay.

INSTRUCTIONS

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- User can access this gameplay environment from the game levels page



Fig 1.4: UI/UX

Ancient Dunes

OVER VIEW

This is an Ancient dunes game environment of the game play, user can access this game environment from the game levels page

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INSTRUCTIONS

- user can access this game environment from the game levels page

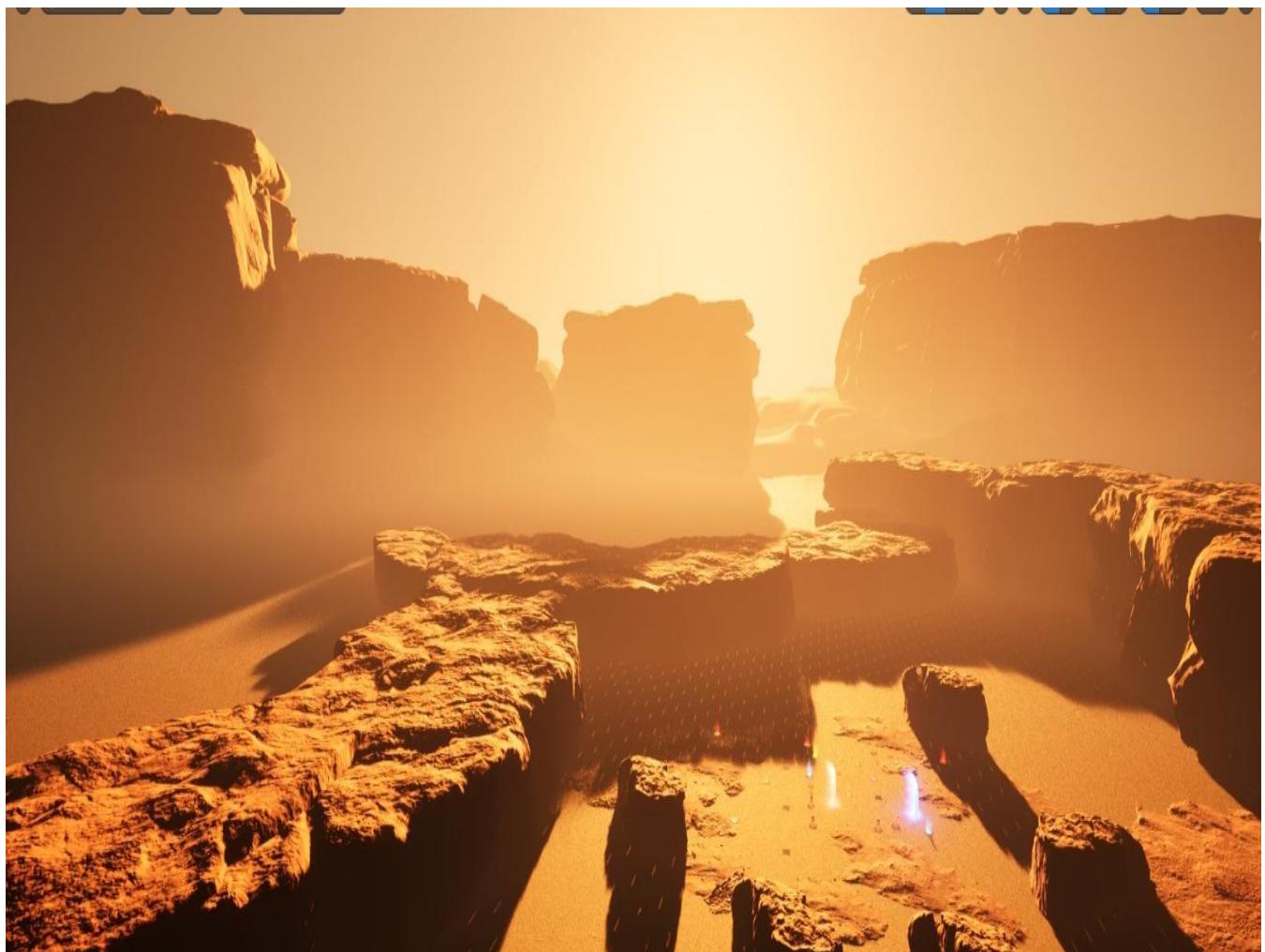


Fig 1.5: UI/UX

DARK RUINS

OVER VIEW

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This is the last level of the game known as Dark Ruins

INSTRUCTIONS

- User can access this category level from the game levels page of the game



Fig 1.6: UI/UX

Australian Dessert Environment

OVER VIEW

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This is the team combat fight of Australian dessert going on in the gameplay , showing players fighting as well as players are picking up weapons as well as kills of both teams are being shown in points as well as time duration is also shown.

INSTRUCTIONS

- User can access these game plays by having strong internet as well as user should know the controls to play the game.



Fig 1.7: UI/UX

Dark Ruins Environment

OVER VIEW

This is also a picture of user standing away from the enemies and its team members, picture being taken randomly, this picture shows the options of weapon selection at the right bottom corner.

INSTRUCTIONS

- This is the game play environment of dark ruins
- Time duration is being shown that how much time had been passed in the combat
- Weapon selection is shown in the right bottom corner that player can choose a weapon which can be switched during the gameplay
- Maximum Number of bullets are being displayed with each weapon includes maximum number of bullets and remaining bullets left in the weapon.
- Kills are shown on the top along with the time.
- Health bar of the player is being shown in the bottom middle of the screen



Fig 1.8: UI/UX

Ancient Dunes Environment

OVER VIEW

This is also a picture of user standing away from the enemies and its team members, picture being taken randomly, this picture shows the options of weapon selection at the right bottom corner.

Image shows

- Health
- Number of kill
- Time
- Weapons
- Bullets max and remaining

INSTRUCTIONS

- This is the game play environment of the Ancient Dunes.
- Time duration is being shown that how much time had been passed in the combat
- Weapon selection is shown in the right bottom corner that player can choose a weapon which can be switched during the gameplay
- Maximum Number of bullets are being displayed with each weapon includes maximum number of bullets and remaining bullets left in the weapon.
- Kills are shown on the top along with the time.
- Health bar of the player is being shown in the bottom middle of the screen



Fig 1.9: UI/UX

MAIN VILLIAN

OVER VIEW

This is the main and final villain character of the game

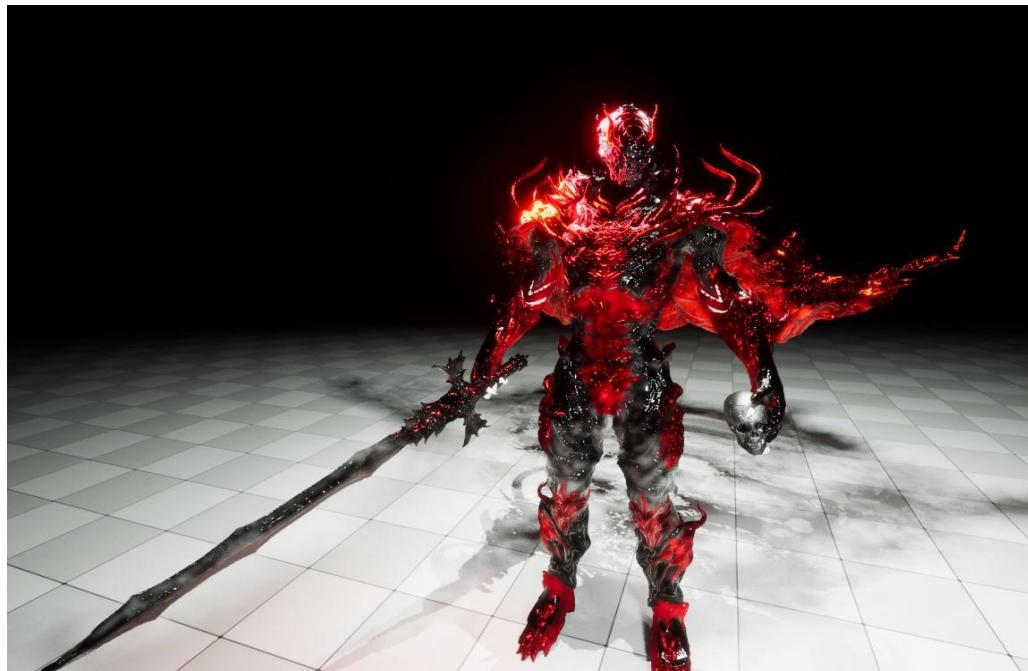


Fig 2.0: UI/UX

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