

A Mid-Term Progress Report

On

THE SURVIVORS

Submitted in partial fulfillment of the requirements for the award of the

degree of

BACHELOR OF TECHNOLOGY

COMPUTER SCIENCE AND ENGINEERING



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PROJECT GUIDE

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1. Introduction

The Survivors is a game created as a Major Project for the Computer Science and Engineering Department.

The Survivors is a 3D virtual environment game in which single or multiple players will fight/survive using weapons (eg. guns) against a random number of artificially intelligent enemy bots until either all bots are eliminated or all players are eliminated/quit.

The idea of developing a game is not new for us. We also developed a game during our Minor Project and did our 6 Months industrial training in Game development.

As everyone knows, there are several types of computer games. Shooter is one of the best-known game genres. A shooter game is a game which makes the player feel within the game world. After the success of Doom, which is accepted as the first shooter game, many companies took a crack at this type of game. Nowadays, the best selling game is a kind of shooter.

Technology Used

- Game Development Engine
- 3D Modeling Software
- C++
- Texturing software

This project comes under the field of game development.

2. System Requirements

Hardware requirements are:

- Processor - intel i5 or greater (or similar to this)
- Ram - 8gb or greater
- Graphic Card - Nvidia GTX with Vram 4gb or greater (or similar)
- Storage - 1TB or greater

Software requirements are:

- Epic Game Launcher
- Unreal Engine 4 or greater
- Autodesk Maya
- Blender
- Photoshop

3. Software Requirement Analysis (Game Design Document)

3.1 Game Design Overview

The Survivors is a 3D game in which single or multiple players fight/survive using weapons (primarily guns) against a random number of artificially intelligent enemy bots in a virtual environment map until either all bots are eliminated or all players are eliminated.

3.2 Core idea

Single or multiple players will enter a virtual 3D environment equipped with weapons (primarily guns). The objective for victory is to eliminate all the artificially intelligent enemy bots to survive and take over the location where the enemy bots operate. If the player(s) die or if the player(s) do not defeat all enemy bots in time, the game will be lost.

The players can move freely in a large virtual 3D environment. Players have to save their health and defeat their enemies in order to win the game.

3.3 Key-features

"The Survivors" is a Third-person, 3D shooter game. The player character is visible on-screen. The player can move freely within a large virtual environment. The gameplay consists primarily of roaming the 3D game map to find and defeat enemy bots.

This video game may actually foster brain plasticity and learning. Such video games may also improve visual and mental focus. Fighting in a game is real-time intensive and requires quick physical response from the players.

3.4 Genre

This game is a Shooter Game, specifically Third Person shooter (TPS).

Third-person shooter (TPS) is a genre of 3D action video game in which the player character is visible on-screen, and the gameplay consists primarily of shooting.

3.5 Target User/Player Base

The targeted users are 14 years old or above. At this age, they are able to think creatively to achieve their objectives. They also do not have to be pro in every category to fully enjoy “The Survivors”.

3.6 Detailed Design Document

- Core Mechanic: Shoot down a random number of highly skilled AI bots.
- Secondary Mechanic: Explore the central station.
- Narrative: Survive and capture the central station.

3.7 Rules

After starting the game, the player's attention is directed to the timer which drops from 10 minutes. When the timer reaches zero, the player is simply defeated and must restart the game to retry. When the timer hits 5 minutes, all the lights flash quickly with red lights to warn the players and add urgency to their play. To win the game, the players must eliminate all the bots and capture the location in time. All the elements in the 3d virtual game map react naturally to physics such as gravity and collision.

3.8 Mechanics

The players can hit artificial bots while holding weapons in the game. Each controller (representing different movements in the game) separately can hold weapons. Players move forward, backward, left and right by pressing (W) (S) (A) (D). By pressing the left click button of the mouse players can fire. Previously locked paths may open up if certain rooms/parts of the map are cleared of enemy bots.

3.9 Technical Design Document

There is a need for a computer system that has the following technical capabilities (at least):

- Processor: Intel™ Core™ i5-4590 or AMD FX™ 8350, equivalent or better
- Graphics: NVIDIA GeForce™ GTX 1060 or AMD Radeon™ RX 480, equivalent or better
- Memory: 8 GB RAM or more

- Video output: 1x HDMI 1.4 port, or DisplayPort 1.2 or newer
- Operating system: Windows™ 7 SP1, Windows™ 8.1 or later or Windows™ 10

3.10 Aesthetics

Game models are high poly and 3D. With the "hardedge" and the colorful style, which is very different, it connects with science fiction. While playing the game the player will feel a realistic view and will enjoy the background music included in the game.

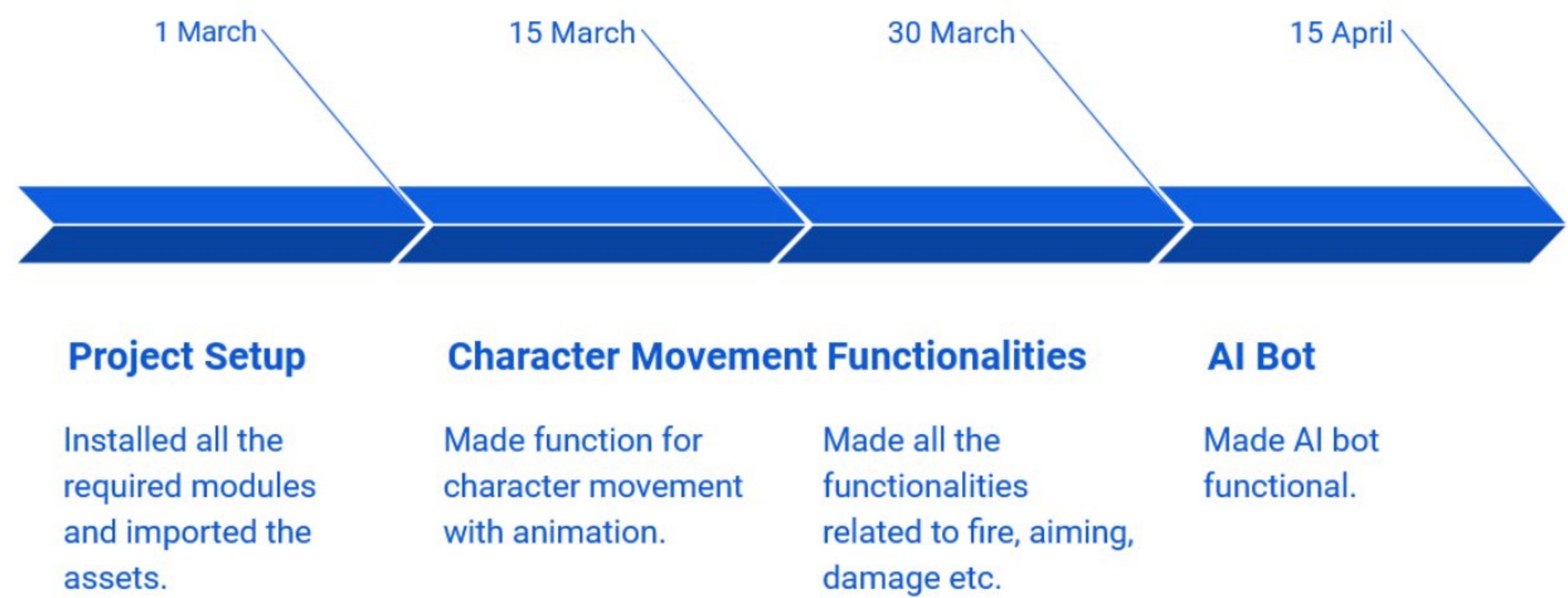
4. Game Design

"The Survivors" is a 3D Third-person shooter video game. It incorporates a crosshair icon for aiming the shots to compensate for the difficulty of aiming from a third-person camera.

The game shows the player from a "behind the back" perspective. The third-person perspective allows the game designer to design more personalized player characters and directs the player's attention like watching a film.

"The Survivors" allows players to see the area surrounding the player character clearly. This viewpoint facilitates more interaction between the character and their surrounding environment, such as maneuvering tight quarters. The third-person perspective is better for interacting with objects in the game world, such as jumping on platforms or engaging in close combat.

Third-person perspective allows for the design of a large and spacious environment with numerous possibilities.



5. Coding / Core Module

When the game starts this function is called immediately.

```
void AShooterCharacter::BeginPlay()
{
    Super::BeginPlay();

    Health = MaxHealth;

    Gun = GetWorld()->SpawnActor<AGun>(GunClass);
    GetMesh()->HideBoneByName(TEXT("weapon_r"), EPhysBodyOp::PBO_None);
    Gun->AttachToComponent(GetMesh(),
FAttachmentTransformRules::KeepRelativeTransform, TEXT("WeaponSocket"));

    Gun->SetOwner(this);
}
```

This function is used to check whether a player has died or not.

```
bool AShooterCharacter::IsDead() const
{
    return Health <= 0;
}
```


This function is used to move the player in a forward and backward direction.

```
void AShooterCharacter::MoveForward(float AxisValue)

{

    AddMovementInput(GetActorForwardVector() * AxisValue);

}
```

This function is used to move the player in the right and left direction.

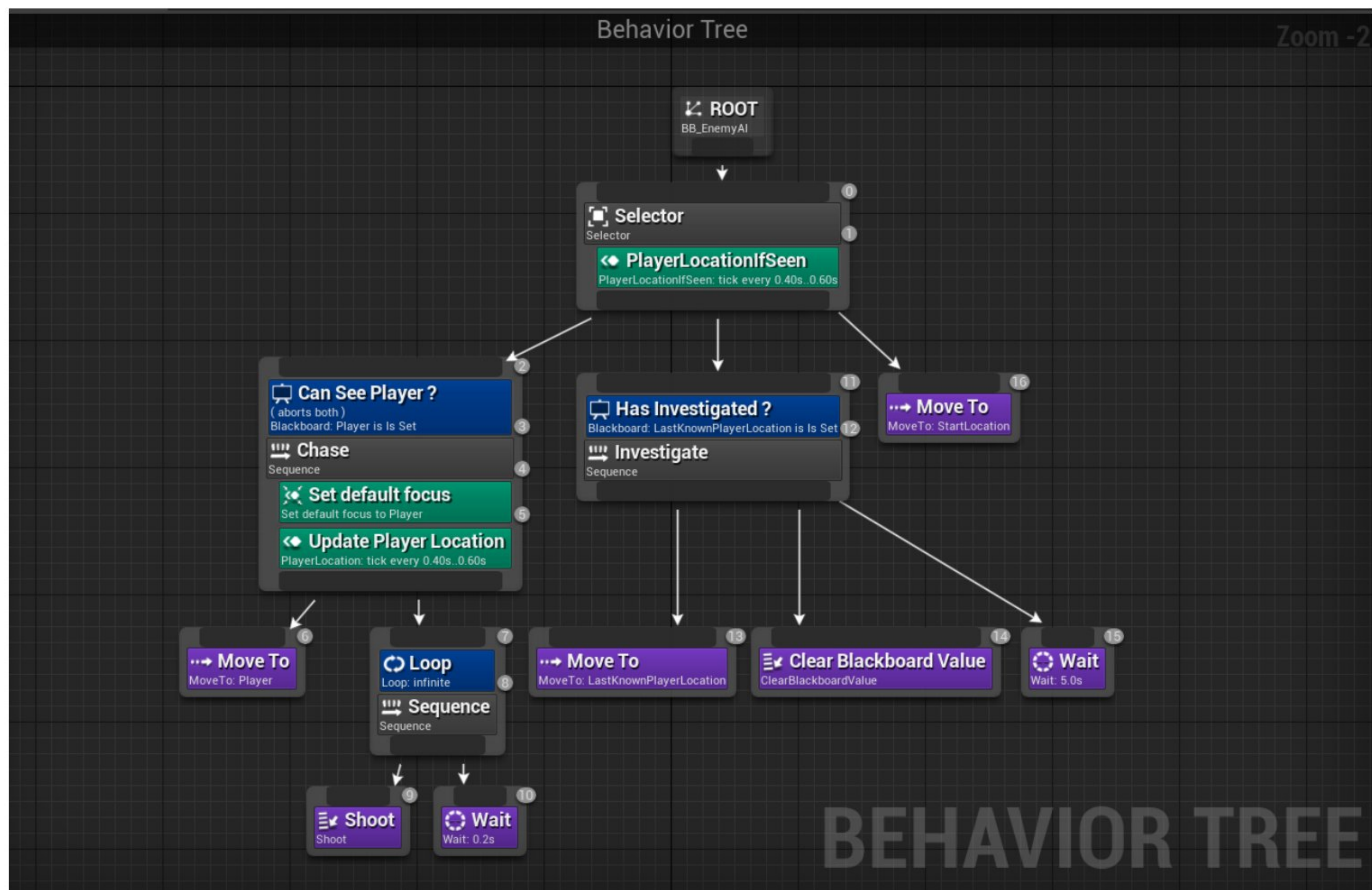
```
void AShooterCharacter::MoveRight(float AxisValue)

{

    AddMovementInput(GetActorRightVector() * AxisValue);

}
```

Behavior Tree On How AI Works:



6. Performance of the Project Developed

Project Objectives

- To design and implement a 3-dimensional game written in C++ using a game development studio. **(ACHIEVED)**
- To facilitate multiple players in a single session/room **(IN PROGRESS)**
- To implement enemy bots with the help of Artificial Intelligence **(ACHIEVED)**

An initial game map has been designed. The player character and enemy bots have been designed and added to the game. Game timer and conditional paths have been enabled. Game win/loss conditions have been implemented.

7. Output Screens

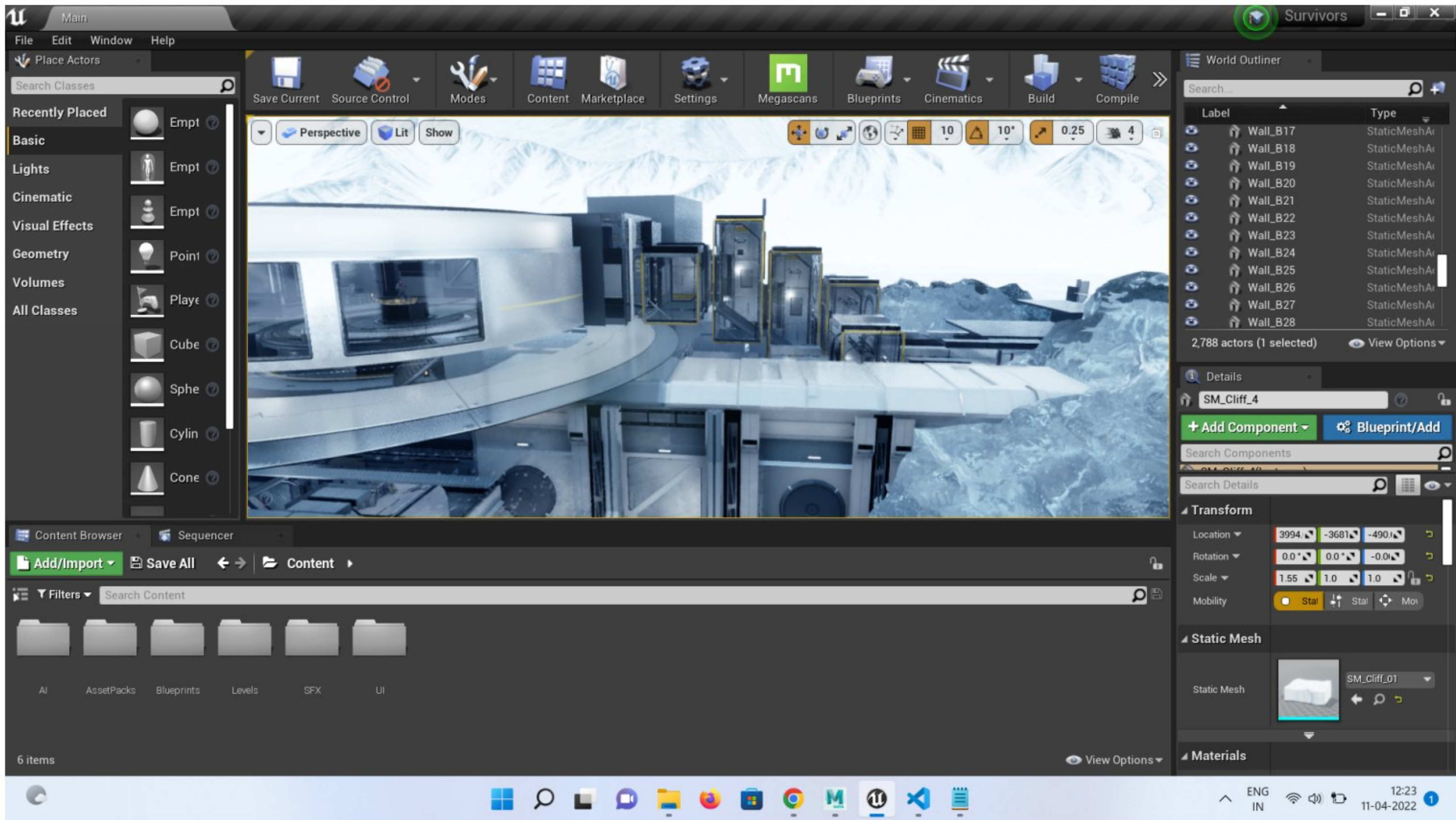


Fig 1: Level

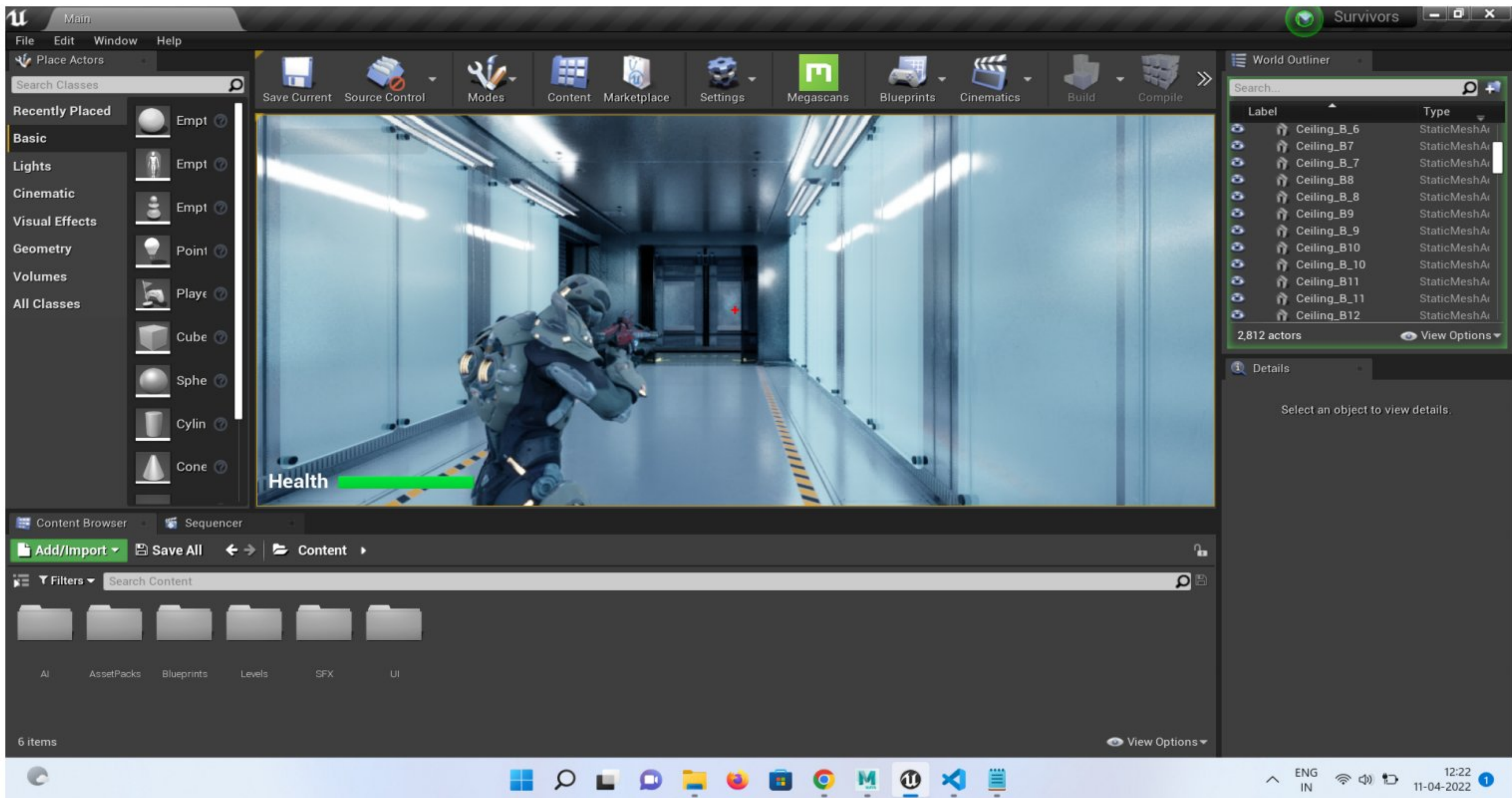


Fig 2: Main Player

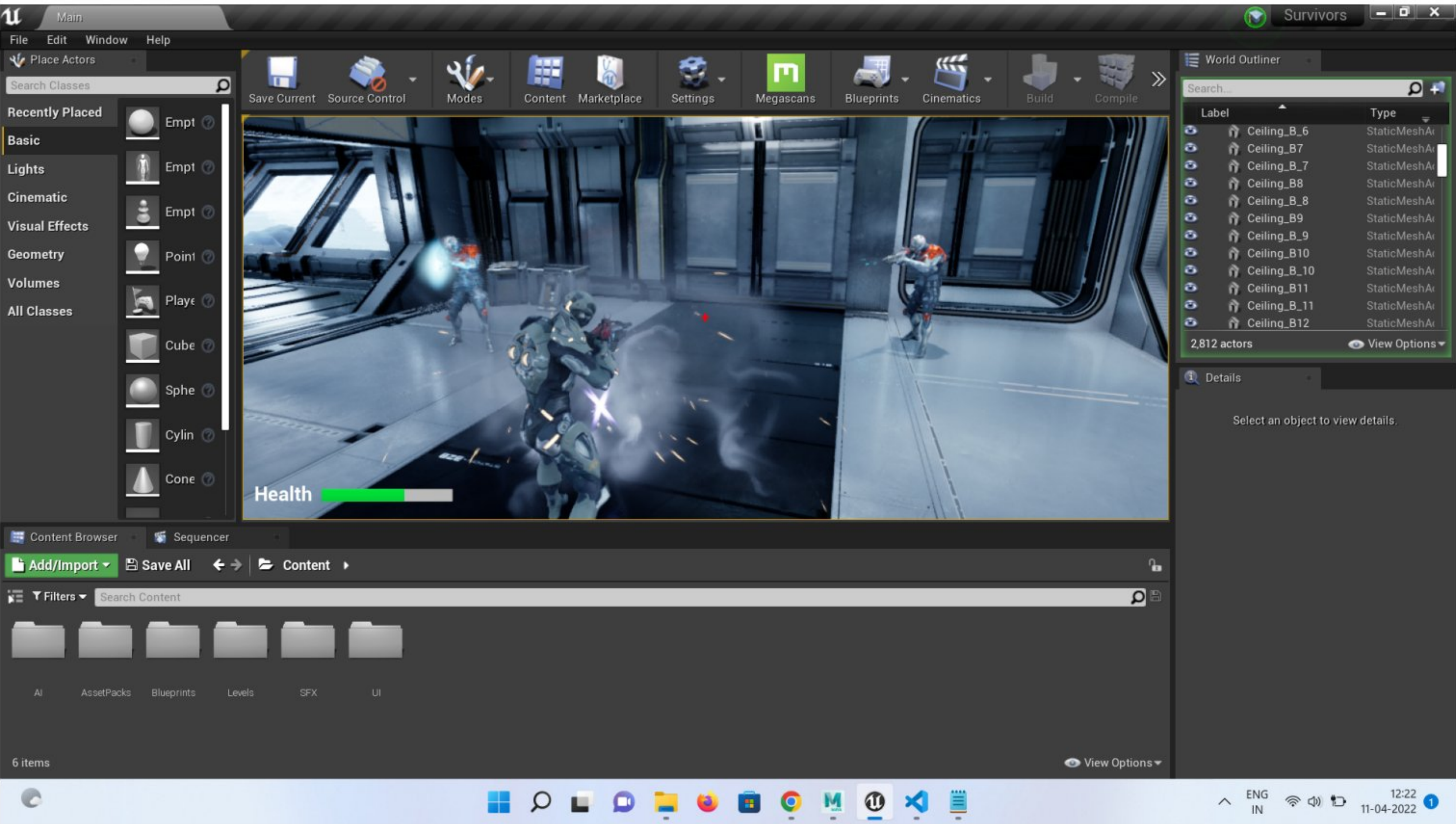


Fig 3: Enemies

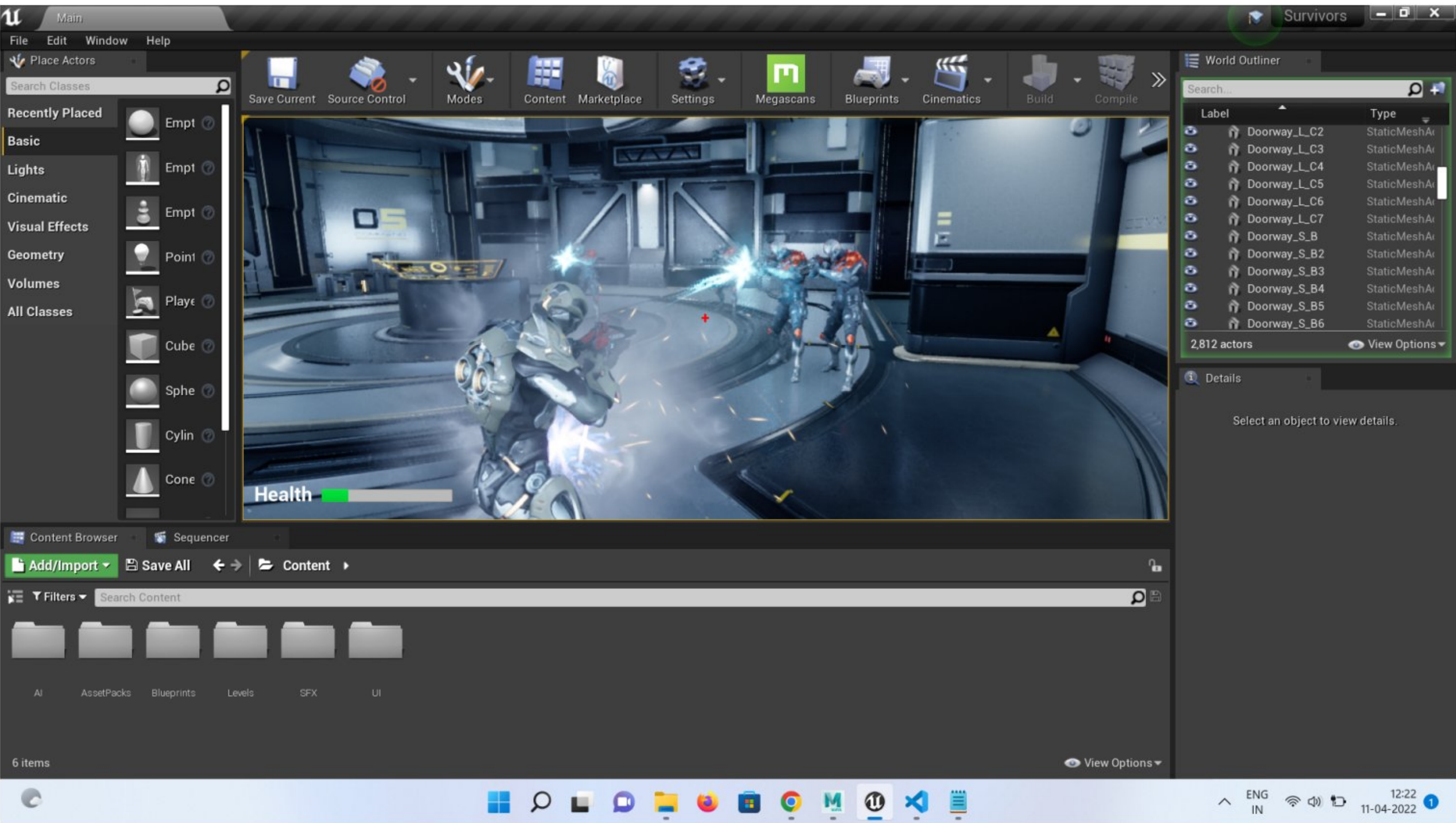


Fig 4: Enemies

8. References

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