

COMP 476:

Advanced Game Development

Grim Tale

by the Legendary Septet

Link to video demo: <https://youtu.be/x8DpQPhuYhs>

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1. Executive Summary

1.1. What is *Grim Tale*?

Grim Tale is a 3-D top-down fantasy single-player action game where the player must clear the arena by eliminating the hordes of enemies as they try to take him down. Each level comprises a variety of enemies, with each class having their own fighting style such that the player has to strategize to effectively battle against them. Though it may become too much of a challenge; luckily for the player, there are collectable items inside the arena which provide aid to the player. Lastly, the game is divided into five levels, showcasing the different combinations our AI system has to offer.

1.2. Where is the game set?

The game starts off the level by teleporting the player into a closed arena created with runic magic surrounded by old ruins where mobs of enemies await. The action starts right away with monsters hunting the player down, and conversely the player does what he does best: kill.

1.3. Who is the target audience?

This game is targeted toward casual gamers who enjoy fast-paced action-packed games which rely on quick reflexes and no plot whatsoever. Whomever likes shoot-em up games and merciless murders will enjoy this short and straight-forward game.

1.4. What are the game's selling points?

The goal of the game for each level is to stay alive after a certain amount of time has elapsed in the arena. Levels have incremental difficulties.

The player fights off the intelligent enemies with various abilities which can be bought with the golds acquired by killing enemies or looted in the arena.

For a heavy price, the player can hire allied NPCs to assist him throughout the game. They all have their own special attributes. The game AI makes use of many aspects learnt in class.

2. Overview

2.1. Basic Information

Title: Grim Tale

Tag line: 'Survive the horde'

Genre: Survival-action

Platform: PC

Market: Everybody

Setting: Fantasy

Plays like: Enter the Gungeon meets Killing Floor

2.2. Summary

Grim Tale is a 3-D top-down fantasy single-player action game where the player must clear the arena by eliminating the hordes of enemies as they try to take him down. The player can hire allied NPCs to fight along, take possession of randomly spawned bonuses in the arena and must survive all five rounds of the game.

2.3. Game Mechanics

This top-down game allows the player to move around the flat arena to evade enemy attacks and to collect dropped items. The player can fight the enemies by casting spells which require both accuracy and precision.

3. Related Games

3.1. Enter the Gungeon (2016) by Devolver Digital

Enter the Gungeon is a bullet hell roguelike video game which shares a similar top-down fast-paced combat style. Enemies have different abilities which allows them to fight in different ways. Similarly, the player can acquire new abilities throughout the level.



3.2. Call of Duty: Black Ops Cold Wars Zombies (2020) by Activision

Call of Duty: Black Ops Cold Wars Zombies is a first-person survival shooting game featuring zombies. Our game is similar such that the player has to fight hordes of enemies every round in order to progress. The longer the player plays, the harder it gets.



3.3. Plants VS Zombies 1 (2009) by PopCap Games

Plants vs. Zombies is a tower defense video game where the player can place plants in front of his lawn to protect his house against successive waves of zombies. The player can buy more plants with the golds dropped by zombies as they die. Our game also features a shopping system which encourages the players to hire allies to assist them throughout their journey.



3.4. Killing Floor 2 (2015) by Tripwire Interactive

Killing Floor 2 is a first-person shooter video game where the player is fighting against different kinds of zombies with their own unique AIs. They make brilliant use of the environment to surround the players.



4. Player Composites

Two samples of our target audience are described below.

Jojo Peperoni	
Age	22
Occupation	Pizza maker
Description	Jojo works in a Brazilian pizzeria for a living from the time he wakes up at 5 AM until the end of his shift at 5 PM. He is financially broke so he sneaks oily pizzas inside his pockets to bring them home and to eat them for supper. He lives inside his parent's basement where he can finally relax and meet his closest friends on Discord. It is to no one's surprise that Jojo only plays free games from Steam and Epic Game Store. After spending countless hours of his life playing video games, he is left with only a short-termed attention span which is conveniently shown through his choice of games. In fact, he only plays arcade or rhythm games such as Osu!.

Sylvester Saloon	
Age	37
Occupation	Part-time birthday clown
Description	Sylvester is a fantasy nerd who collects Warhammer figurines, and he considers himself a professional painter, for he spends most of his day adding colors with his little brush over these small figurines. He is a huge fan of Diablo and he enjoys killing goblins and watching them perish in gruesome manners.

5. Game World

5.1. Narrative

The player immerses into this mystical new world as he takes the body of a male sorcerer on a quest to reach Valhalla. But to prove his worthiness, the male sorcerer must face challenges that will require skills beyond human limitations. That is, challengers must clear five levels meticulously crafted by the god Odin, known for his great wisdom and otherworldly knowledge about war.

5.2. Setting

Grim Tale takes place in the mythical world created by the Norse gods. The player enters an arena bound by runic spells, trapping him with dangerous monsters that must be defeated in order to progress, while Nordic gods witness the battles from Asgard.

5.3. Area Descriptions

The arena is a closed place with several obstacles inside of it. Enemies surround the player and will attack him on the spot.

6. Game Characters

6.1. Main Character

The main character of the game is the male sorcerer *Audacious Vice* who specializes in spell casting. He has trained his body through centuries in mental cultivation and went on countless journeys to forge his strongest spells that he now has in his disposition.

6.2. Allies

The player can recruit allies to come to his aid throughout the level.

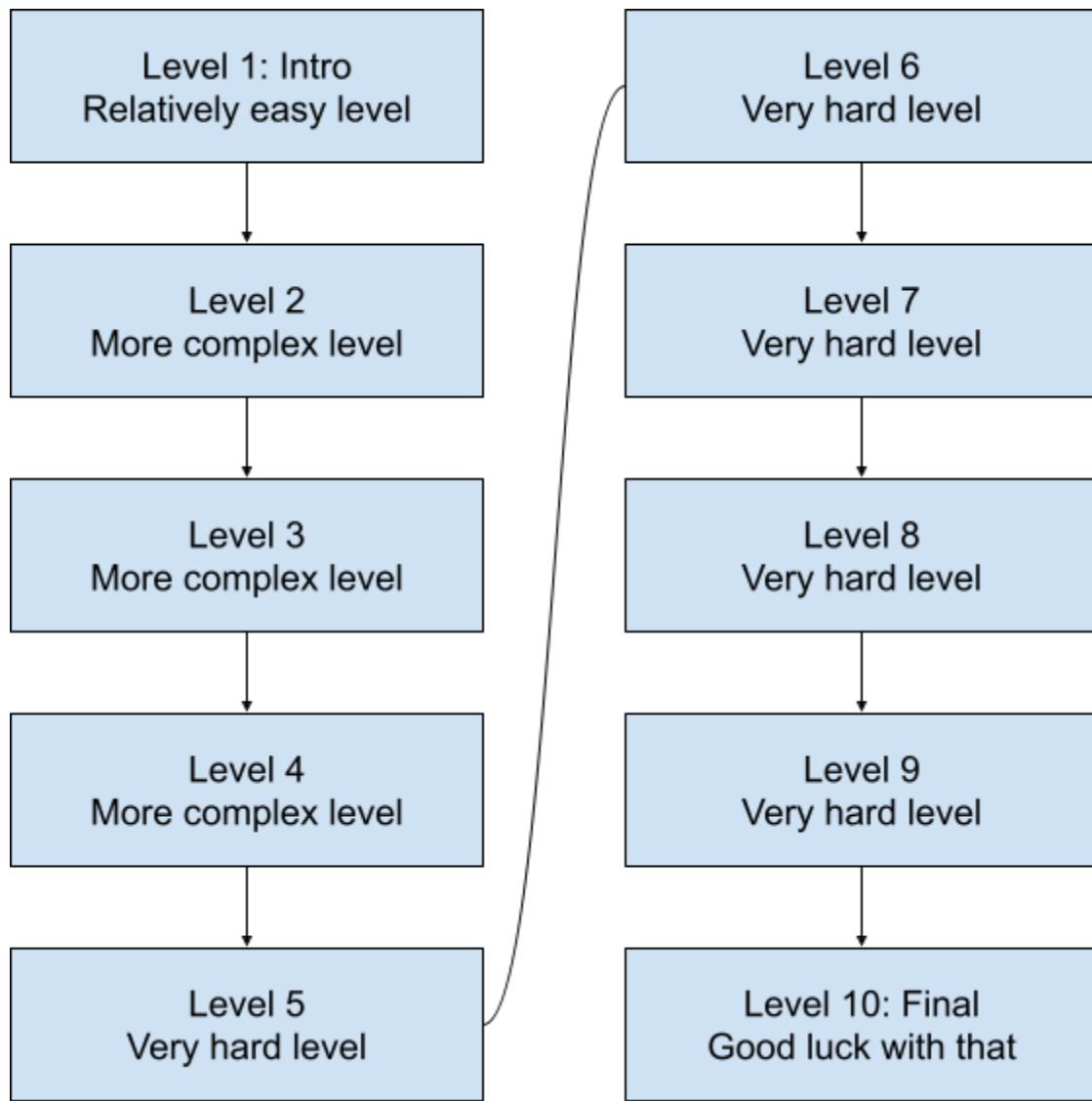
Ally Name	Description
Healer	Healers will cast healing magic to restore some health to one of their allies.

6.3. Enemies

The arena is filled with enemies with otherworldly strength. They have their own strengths and weaknesses, and failure to make use of their weaknesses will be the cause of the player's demise.

Enemy Name	Description
Mutant Charger	Mutant chargers are not very smart, but they are big and strong. They will find their target, and charge at them until they hit something, and fall on their back as they give themselves a concussion.
Goblin Warchief	Goblin warchiefs give buffs to their companions. They have the most health although they will not directly attack the player.
Goblin Shaman	Goblin shamans attack using long distance spells. As a group, they can be quite a nuisance, as they fire so many projectiles at the same time. They can upgrade into Goblin warchiefs after a while.
Skeleton	Skeletons are the weakest and slowest enemies. Though, they can group and transform into a Mutant Charger.

7. Plot Graph



8. Art Direction

8.1. Concept Art

There was no concept art for this project as the assets used were not made by the team but rather purchased through the unity asset store.

8.2. Reference Art

The art was not made by the team but rather purchased through the unity asset store, the art assets chosen however were chosen while being influenced by the related games.

The links to the art assets used are:

[RPG Character Mecanim Animation Pack | 3D Animations | Unity Asset Store](#)

[POLYGON Dungeons - Low Poly 3D Art by Synty](#)

8.3. Music

The track used in the main menu is called “No More Good” by David Fesliyan released in 2021 and copyrighted by Feslyian Studios.

9. User Interface Storyboards

9.1. Title Screen



The title screen as seen when first entering the game.

9.2. Options Screen



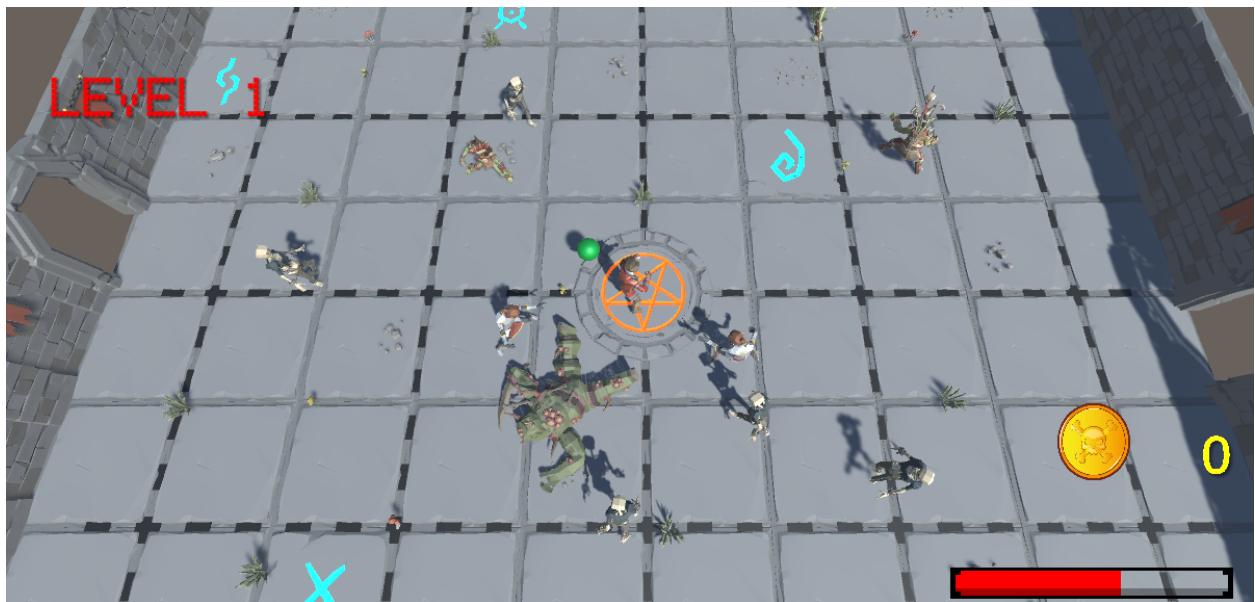
The option to adjust the volume is given in the Options section.

9.3. Pause Screen



After starting the game, the user can press [ESC] to pause the game.

9.4. Heads Up Display



The HUD shown above displays the current level on the top-left, the player's gold amount and health bar on the bottom-right.

9.5. Shop Screen



The shop menu allows the player to buy consumables, upgrades, and more.

10. Technology Plan

10.1. Programs Used

C Sharp (C#): General-purpose, multi paradigm programming language.

GitBash: A Microsoft Windows environment that provides an emulation layer for Git commands.

GitHub: Web-based version-control and collaboration platform for software developers.

GoogleDocs: Web-based word processor.

GoogleDrive: File storage and synchronization service.

SourceTree: Git client that offers an easy to handle graphical user interface.

Unity: Cross-platform game engine.

Visual Studio: Integrated development environment for Windows.

10.2. Hardware

Laboratory workstation

CPU	Intel core i5-2400 3.1 GHz
GPU	NVIDIA Quadro 600 1GB
HDD	250 GB
OS	Windows 7 Enterprise
RAM	4GB

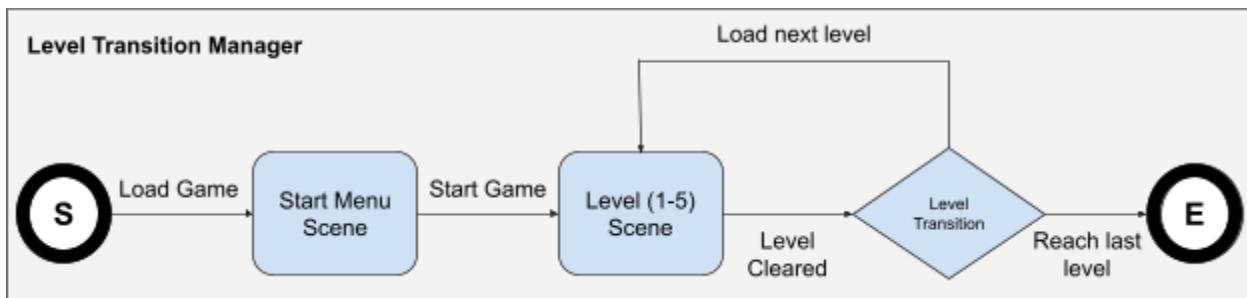
11. Software Architecture

Target Unity version: Unity 2019.2.17f1 (64-bit)

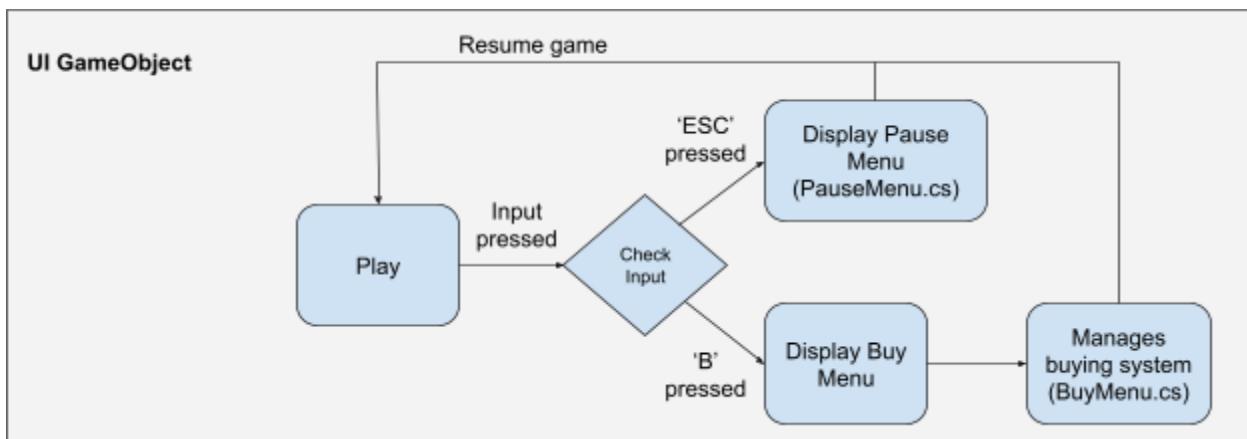
Programming language: C Sharp (C#)

Control Flow

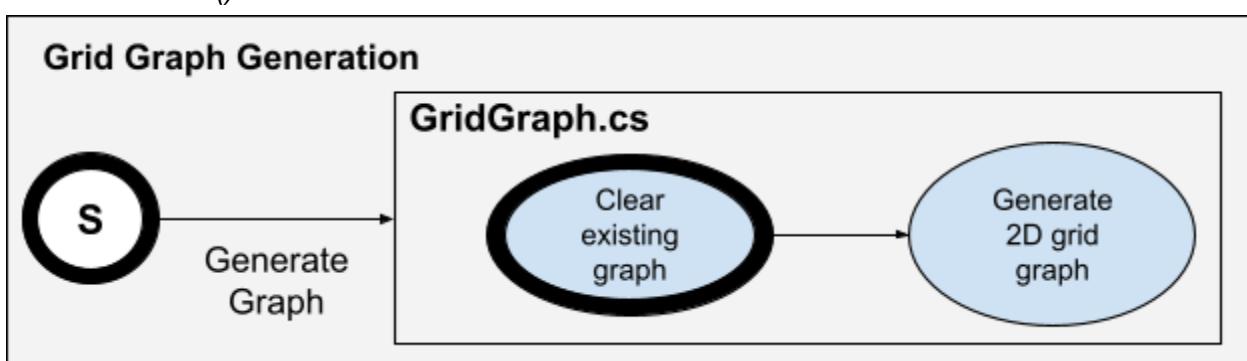
After selecting “Start game” in the main menu, the first level will be loaded. Every level has a *levelTransition* gameObject which keeps track of the level progression.



The *UI* gameObject manages the views *PauseMenu* and *BuyMenu*, and switches to them accordingly during playtime.



The *Graph* gameObject generates a 2D grid graph of the arena as learned during the lab lectures on *Start()*.

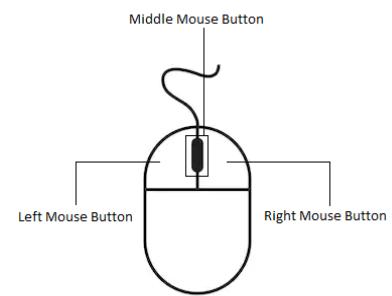


The *PlayerController.cs* script attached to the player manages the player stats, animation, and combat.

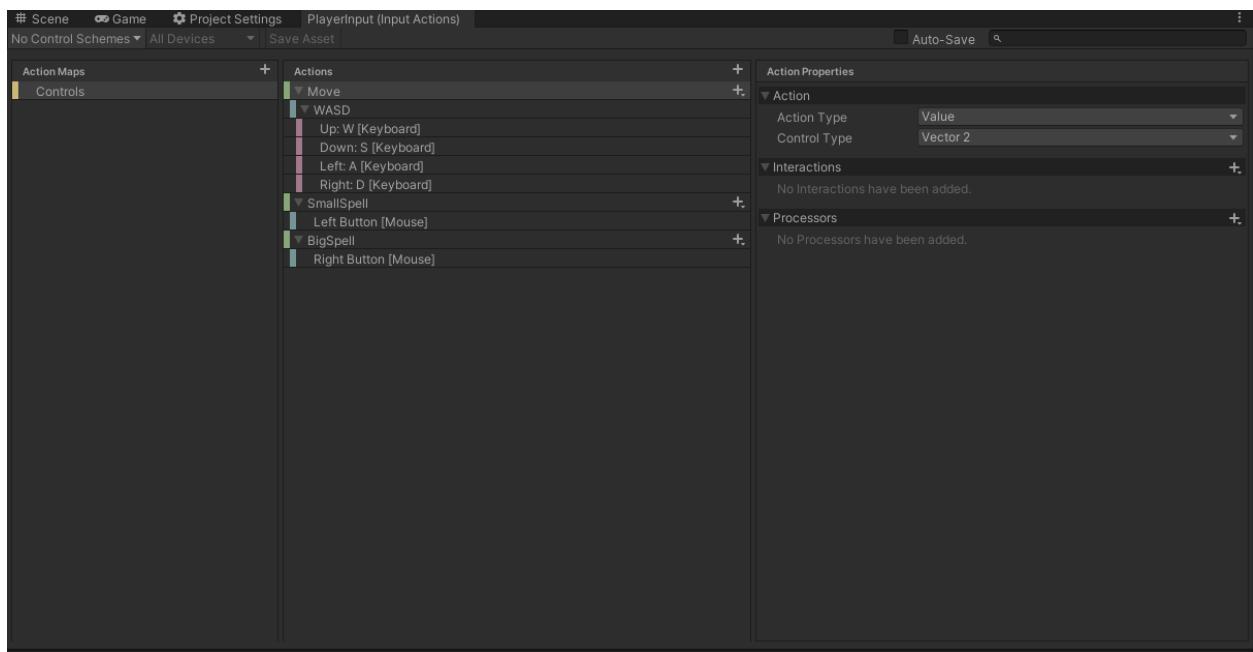
Enemies have a base class *Enemy* attached to them, some extending with their own script. It holds the finite state machine for their AI decision, keeps track of their stats, and defines their attacks.

12. Controls

12.1. PC Controls



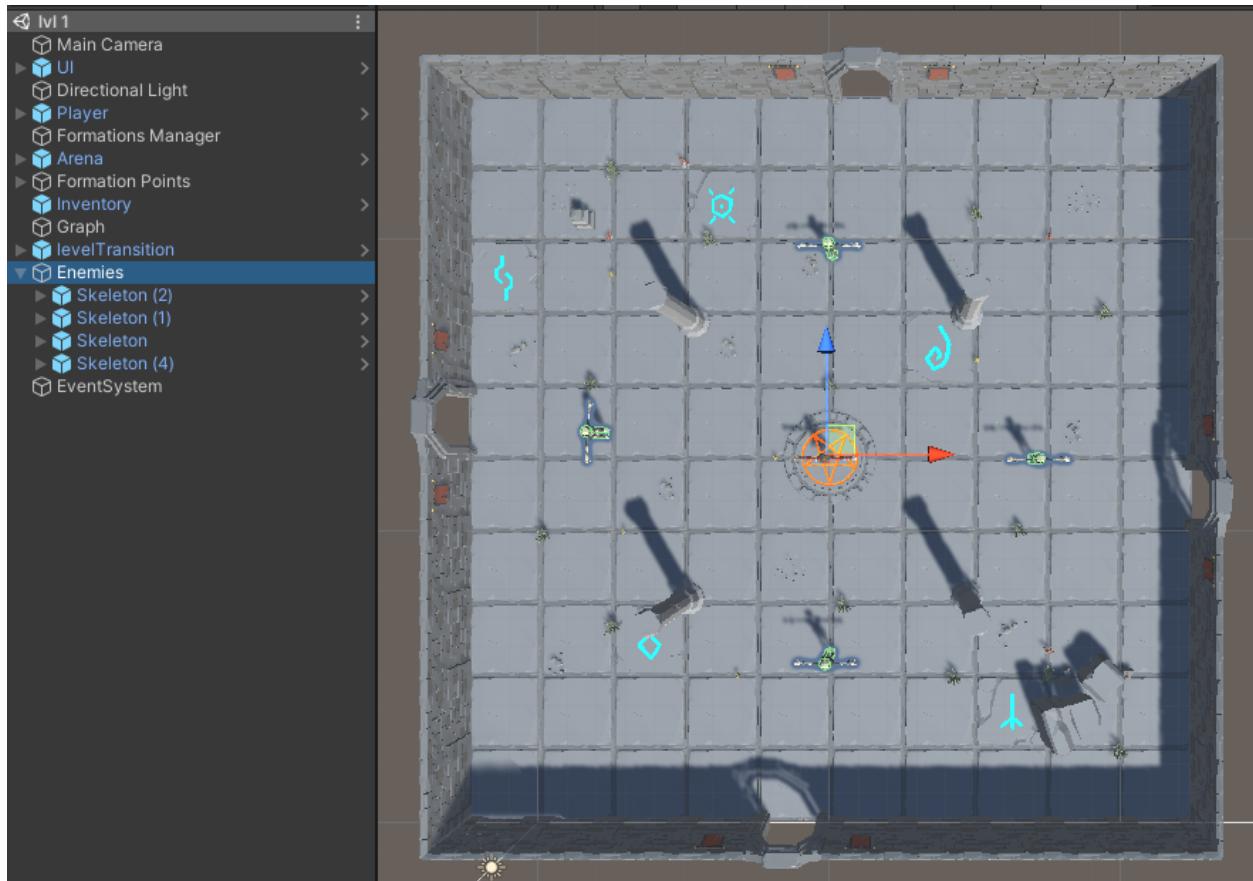
We make use of Unity's Input System which uses WASD and the mouse buttons.



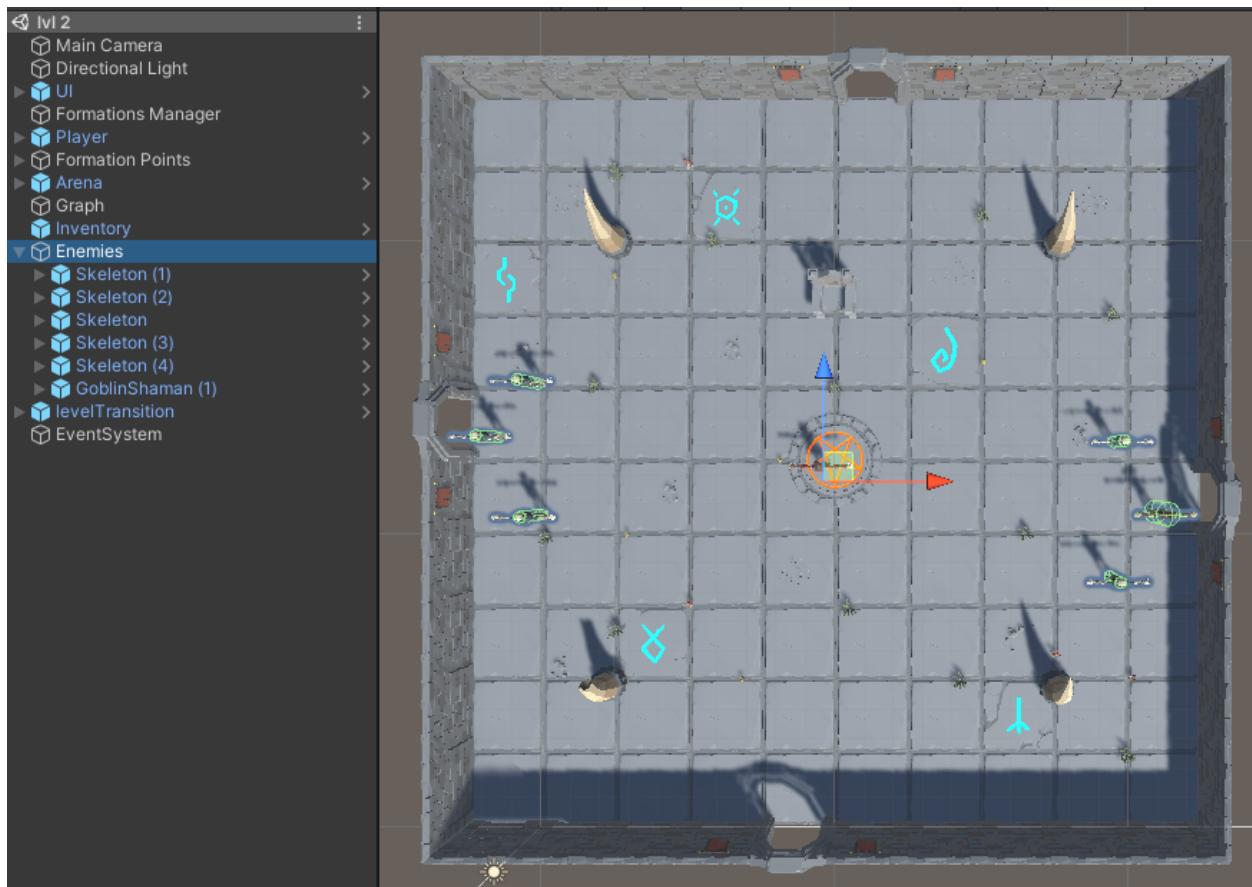
13. Level Design

A differing combination of enemies as well as the locations of obstacles vary for each level.

13.1. Level 1



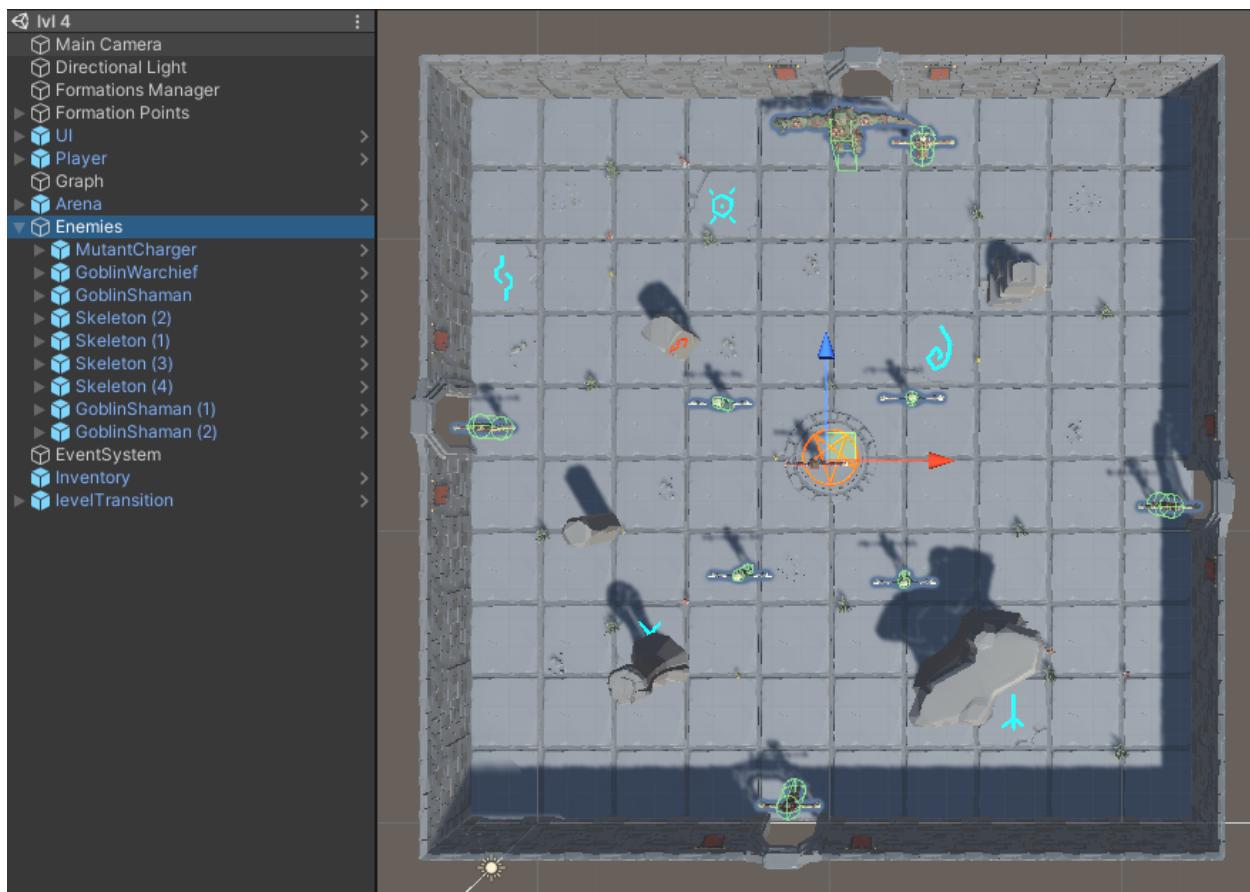
13.2. Level 2



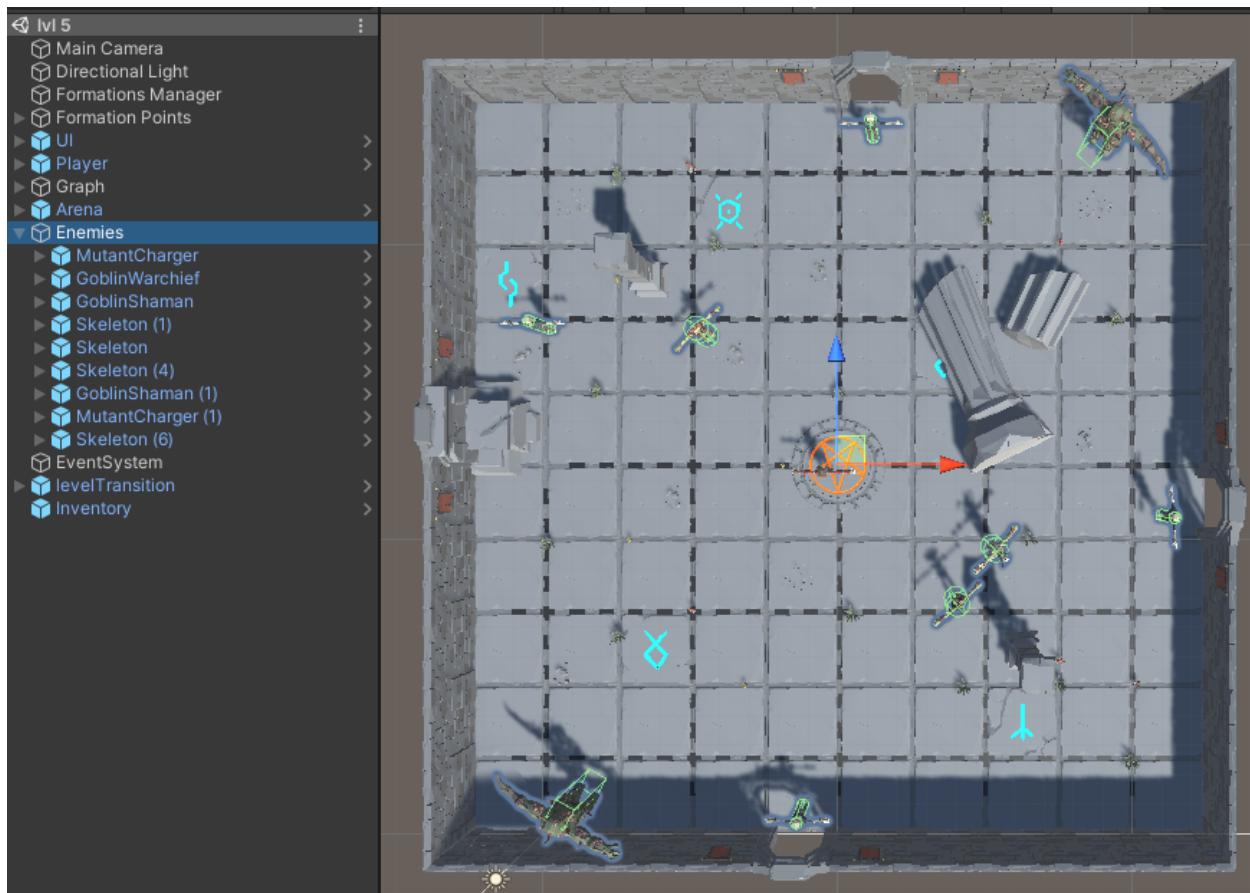
13.3. Level 3



13.4. Level 4



13.5. Level 5



13.6. Level 6



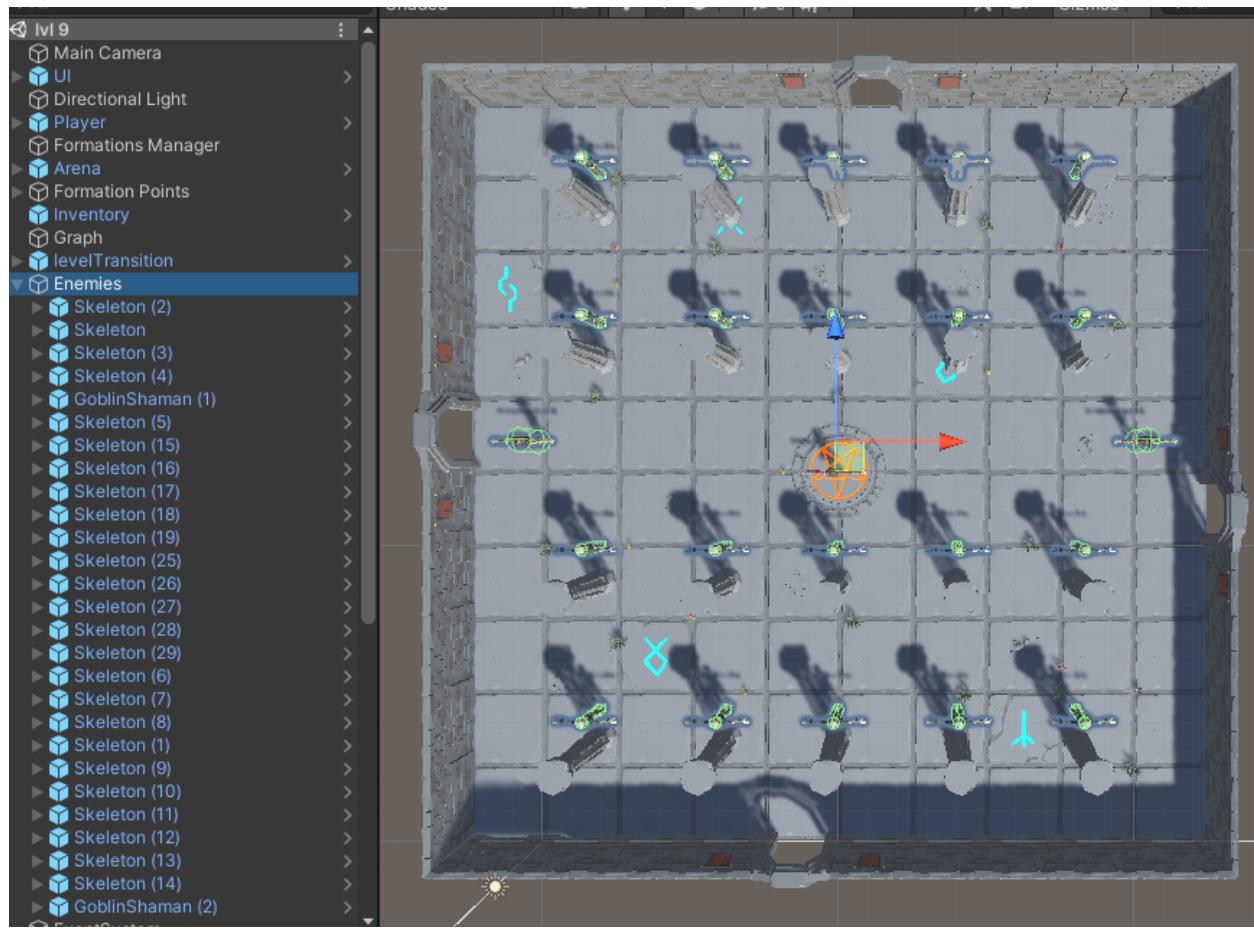
13.7. Level 7



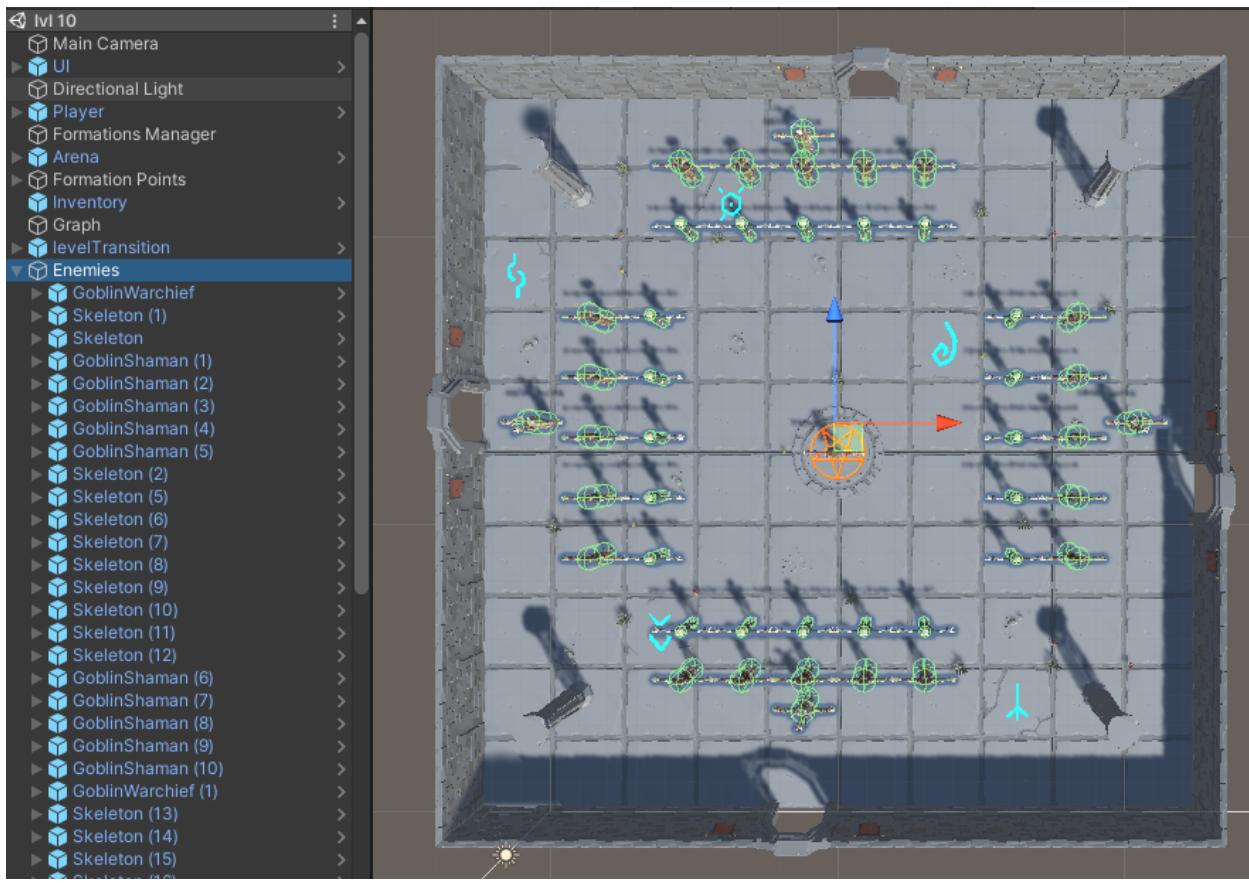
13.8. Level 8



13.9. Level 9



13.10. Level 10



14. Mechanics Analysis

14.1. Attack

The attack mechanic has 2 types, casting a small spell and a big spell. To cast a small spell the left mouse button is pressed and to cast a big spell the right mouse button is pressed. Small spells do not consume any mana and the frequency of the attacks are based on the attack speed stat and the amount of damage they do is based on the attack damage stat. The big spells on the other hand consume mana and are cast by holding the right click for 2 seconds and they do more damage and have a larger hitbox. The damage they do is based on the attack damage stat.

14.2. Buy

The buying mechanic is accessed by pressing 'b', a UI overlay is then open pausing the game from which you can buy stats such as a 10% increase in attack speed or attack damage or a restoration of 25% of the player's mana or health. The gold to utilize this mechanic is obtained by killing enemies.

15. Artificial Intelligence

15.1. Enemy

Enemies have a base class *Enemy* attached to them, some extending with their own script. It keeps track of their stats, defines their attacks, and holds the finite state machine for their AI decision.

Enemies take damage when a projectile enters their colliders.

15.2. Formation

Certain mobs follow a group-based AI which permits them to cooperate together in order to become stronger and make the player's life more miserable.

For instance, a specific number of skeletons can seek a *formation point* when they are a certain distance away from the player and *transform* into a mutant charger.

That being said, two gameObjects are required: *Formation Points* and a *Formation Manager*.

FormationsManager.cs communicates with the enemy AI to return a formation point to seek.

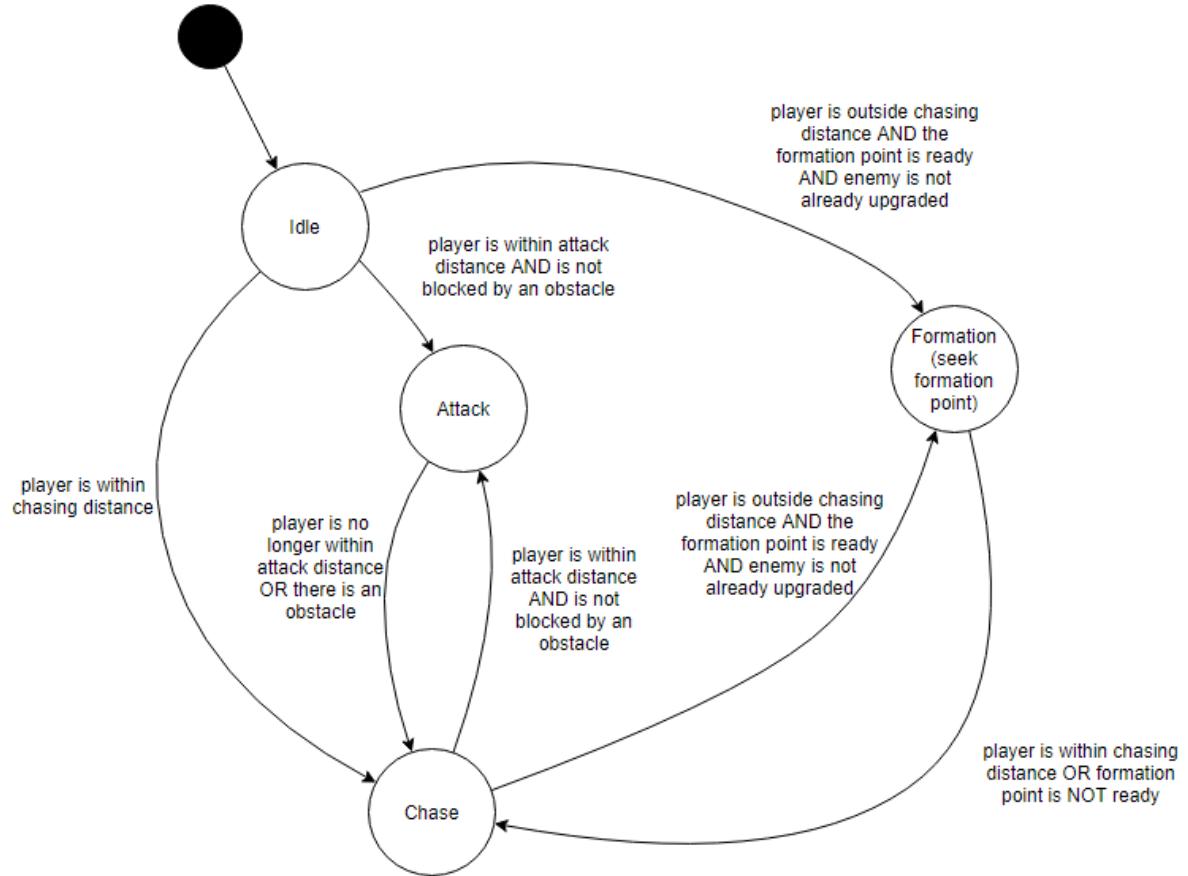
FormationPoint.cs performs the calculations required to find whether a certain number of enemies with the same type are regrouped inside an area of a specific size. If the player is not closed by interrupting them, those enemies will transform into a single unit.

15.3. FSM

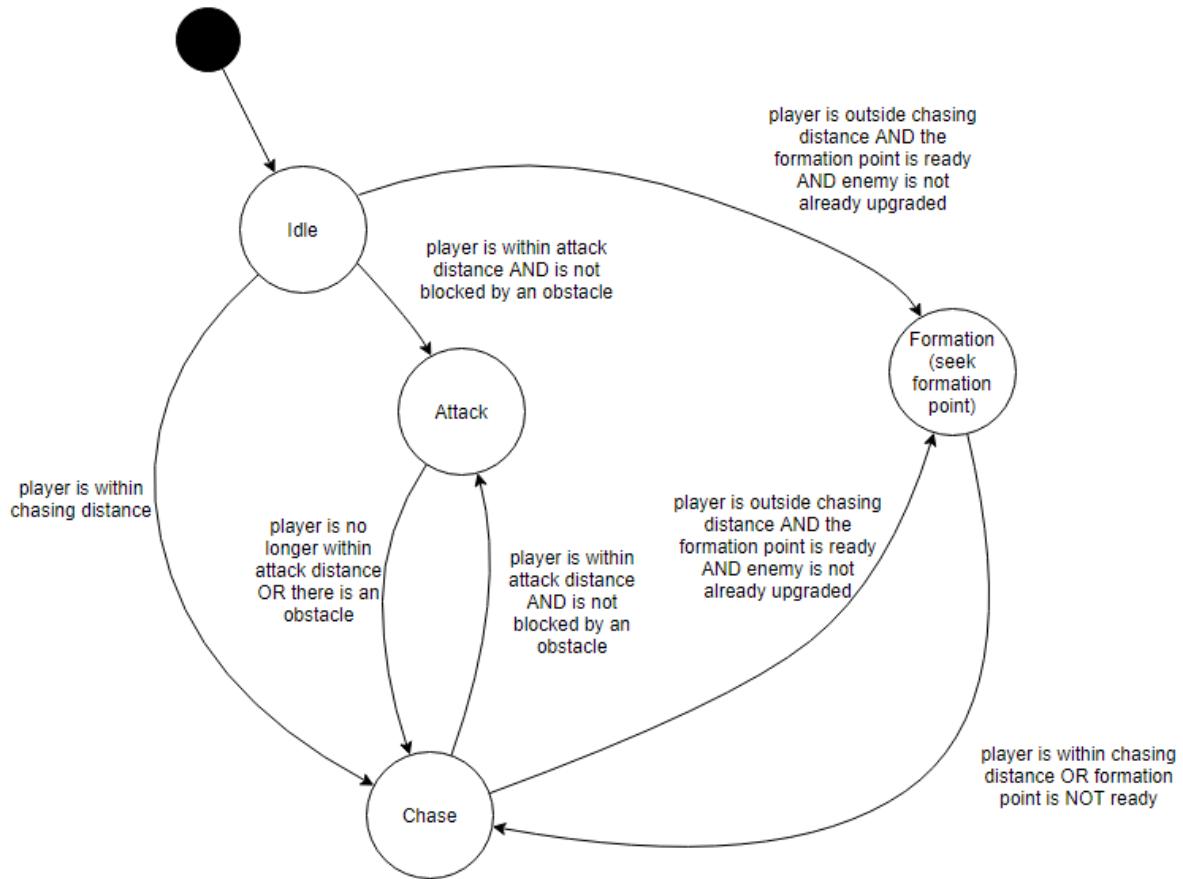
The AI's FSM is based on the class *State* (*State.cs*). It is notified upon *entering*, *updating*, and *exiting* a state which can be one of the following enum states *Idle*, *Chase*, *Formation*, *Attack*, *Charge*, and *Follow*. Actions will perform according to the respective state.

The FSM of each enemy type is illustrated below.

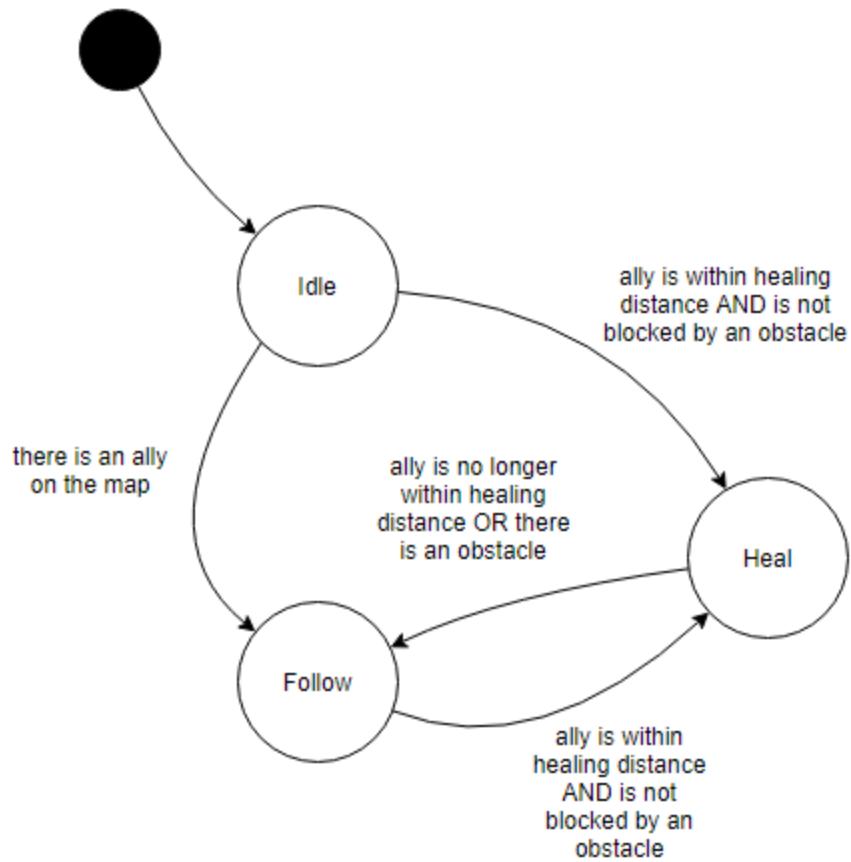
Skeleton



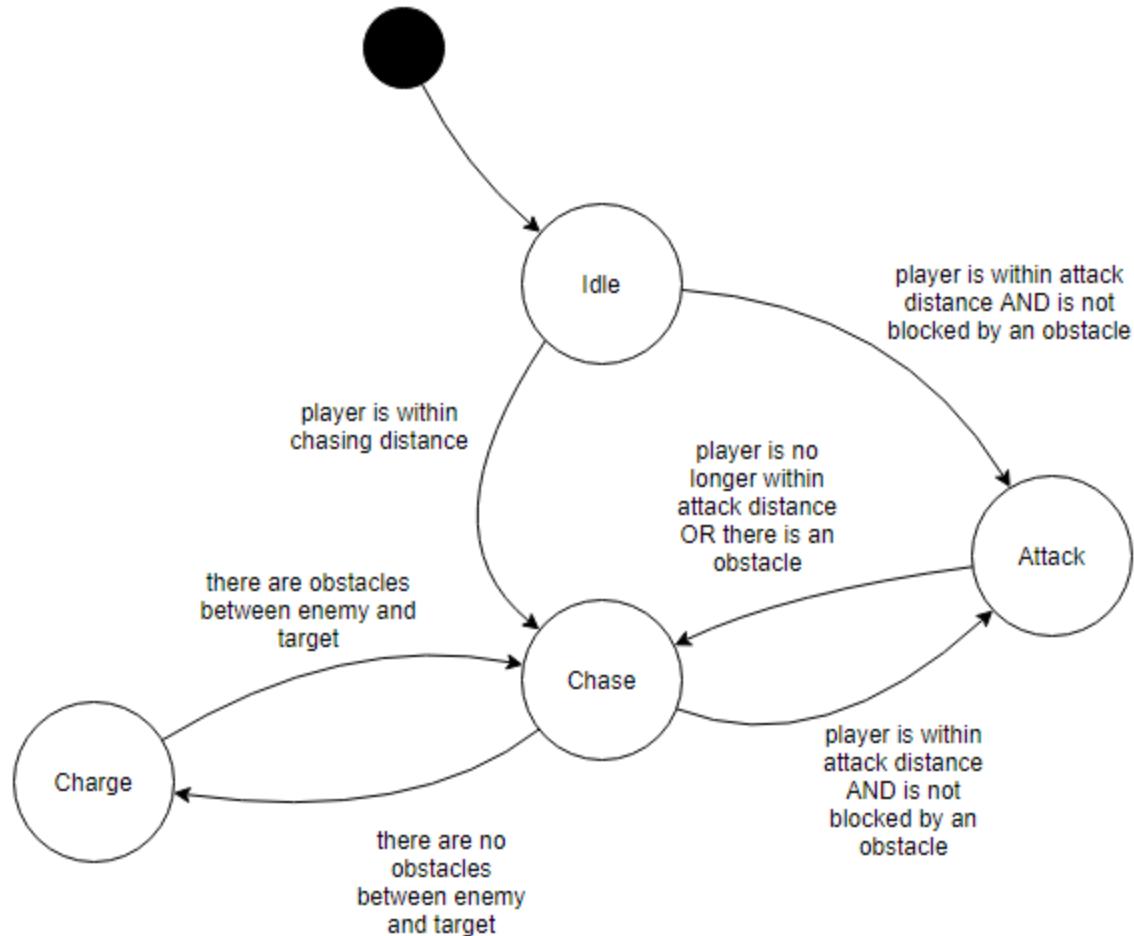
Goblin Shaman



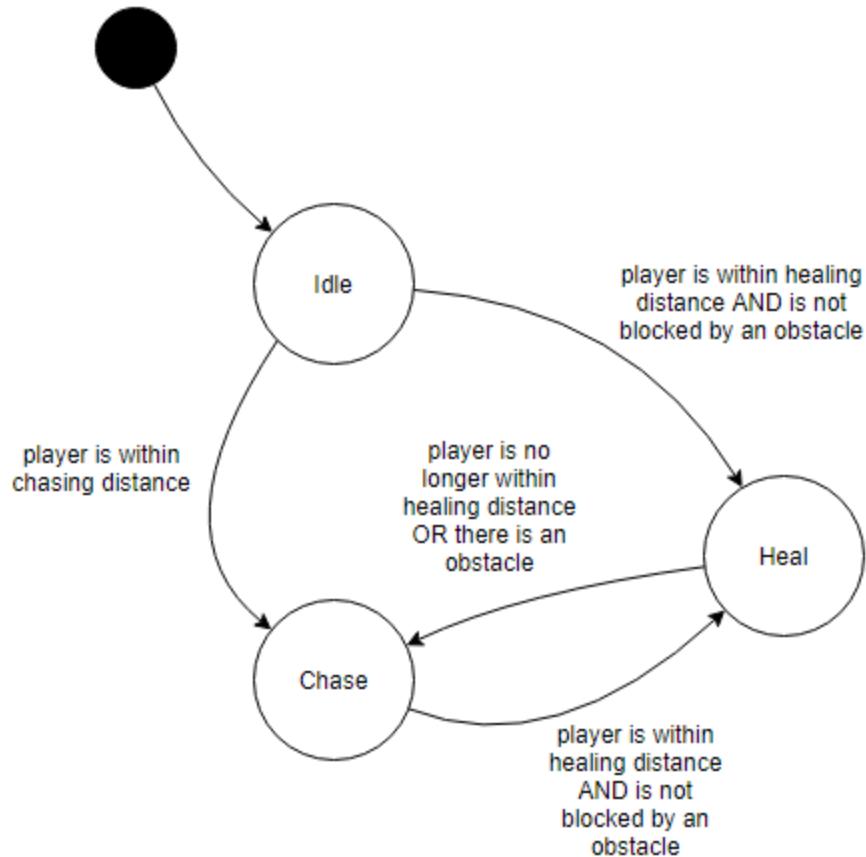
Goblin Warchief



Mutant Charger



Healer



15.4. Path Finding

They also have a path finding agent (`PathFindingAgent.cs`) which updates their position based on the target. On every `Update()` call, the enemy generates a path to their target, smooths them, reaches there, and rotates as well. It follows the same logic as used in our programming assignment 2.

16. Schedule & Related Elements

16.1. Developers

Name	Task
Kai Washer	Player Combat
Shi Xuan Deng	Level Design
Richard Nguyen	Documentation
Julien Picard	AI NPCs
Marc Hegedus	Game manager
Abdallah Said	Stats and inventory

16.2. Schedule

Team Meetings are held every Monday to review, merge and plan following sprints throughout the course of the project. The team used Discord as a way to communicate and share their screens. In the event that more gatherings are fundamental, they will be arranged as needs be. The issue tracker will be updated routinely throughout all the achievements.

Meeting 1	January 04
Items Discussed	
Bring ideas and discuss our strengths	

Meeting 2	February 07
Items Discussed	
Select game idea	

Meeting 3	February 21
Items Discussed	

Divide tasks

Meeting 4	March 21
Items Discussed	
Correct bug	

Meeting 5	April 10
Items Discussed	
Show progression	
Divide new tasks	

Meeting 6	April 19
Items Discussed	
Show progression	

17. Issue Tracking

For issue tracking we used GitHub issues as shown in the screenshot below:

The screenshot shows a GitHub Issues page with the following details:

- Filters:** is:issue is:open
- Count:** 15 Open, 1 Closed
- Issues:**
 - Add AI formation based on game state** (enhancement) #17 opened on Mar 14 by richardnguyen1234 → AI Logic
 - Add enemy AI logic+design** (enhancement) #16 opened on Mar 14 by richardnguyen1234 → AI Logic
 - Add boss every a fix interval of rounds** (if time allows) #15 opened on Mar 14 by richardnguyen1234 → Game Logic
 - Add game rounds with incremental difficulty and end condition** (enhancement) #14 opened on Mar 14 by richardnguyen1234 → Game Logic
 - Add special events** (if time allows) #13 opened on Mar 14 by richardnguyen1234 → Game Logic
 - Add rare spells** (if time allows) #12 opened on Mar 14 by richardnguyen1234 → Game Logic
 - Add special cast on right click** (enhancement) #10 opened on Mar 14 by richardnguyen1234 → Player Core Gam...
 - Add player magical attack on left click** (enhancement) #9 opened on Mar 14 by richardnguyen1234 → Player Core Gam...
 - Add ally classes** (enhancement) #8 opened on Mar 14 by richardnguyen1234 → Game Logic
 - Add monster classes** (enhancement) #7 opened on Mar 14 by richardnguyen1234 → Game Logic
- Buttons:** Labels (7), Milestones (3), New issue

18. Change Log

18.1. Major Changes

Major changes were implemented on GitHub and can be shown in the GitHub commit history of the repository.

18.2. Minor Changes

Minor changes have been communicated and tracked either on GitHub commit history or through the discord server made for the project.