

**ECOLE POUR L'INFORMATIQUE ET LES  
TECHNIQUES AVANCÉES**

UNDERGRADUATE 1<sup>st</sup> Year SEM. 2



**Project Q**  
**FAUST**

**POLLO Y PAPA**

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# Chapter 1

## INTRODUCTION

A “roguelike” as the name suggests, makes reference to the 1980 game *Rogue*, which is a dungeon crawling and role-playing game. In simple terms, it is a story-based game in which the player fights through dungeons or rooms to reach the end goal.

The roguelike game genre has gained a lot of popularity in recent years, for once because of the high amount of replayability some of these titles offer. This comes in the form of “runs” that differentiate themselves drastically from one another giving overall a unique experience, but also because more often than not they tell a story, which lets the player further submerge into the gameplay.

And this is exactly what we want to accomplish with our game, *Faust*, that is, creating a roguelike that hooks the player with an interesting story as well as carefully crafted weapon interactions and mechanics that allow for replayability.

The general specifications we have chosen for our game are:

- 2 dimensional and “sideways” point of view.
- Pixel-art style.
- Levels with premade structures and some degree of randomness.
- Progressively increasing enemy difficulty.
- One character option for singleplayer and the possibility for another in a multiplayer run.

The ultimate goal we have is to deepen our collective knowledge on what are all the moving parts that make a game work, not only the technical aspects such as connectivity or the physics carried on, but also how to make a compelling story and soothing graphics.

In the following report we will discuss the origin of the game, the influences and the benefits it brings to the team and lastly, the major specifications, planning and work distribution.

## Chapter 2

# ORIGIN AND TYPE OF PROJECT

Originally, the idea came to us because we all play the same video game, Hades, and talked about how interesting it would be to try to do something with the same concept, that is, a roguelike. And finally, after some discussion we came up with Faust.

Faust, a small town librarian finds amongst other things, a burnt piece of paper which, on contact, bestows him with a small portion of all the world's knowledge. Seduced by this, Faust embarks on a quest to meet with a devilish creature who goes by the name of Mephistopheles just so he can get more of this mysterious power.

Naturally, in order to make a roguelike we must follow some basic principles of the genre, such as progression through levels. Which in our case will work by getting a specific amount of "blood" from our enemies so that we can unlock the next stage. In practical terms this means slaying a certain amount of adversaries per level in order to move on.

A quintessential aspect of roguelikes is also the ability to get stronger in order to deal with tougher enemies. To do that, we want to implement a weapon and power-up upgrade system. What this means is that when defeating a boss for example, you are able to pick up the weapon that boss was using, or when fighting the levels you might find pieces of paper that make you stronger, because you "gain more knowledge".

Of course the game must also offer replayability, which is integrated into the story itself. For example, in the game, everytime the player dies, he is able to start a new run due to him having the ability to reset time; which allows for a consistent and fluid storyline.

## Chapter 3

### OBJECT OF STUDY

When working on this project, we want to not only manage to make a good game, but also gain experience while doing so. Having skills and experience in useful tools is something that will make future projects progress much faster and give us the opportunity to make the game more refined.

#### 3.1 Game Making Experience

Our primary goal with this project is to have a first experience in coding as a group. For example, when coding with other people, it becomes more important to add comments and to make written code as understandable as possible for quick comprehension. It is also important to learn how to divide the tasks so that everyone can be as productive as possible.

We are also trying to get more experience at coding video games, which is a major industry in Computer Science. This project can help us understand what it is like to code a video game and find what part of the coding can prove to be challenging. The project can also help us understand which parts of creating a video game we would see ourselves doing more of later on, helping with later projects or jobs.

#### 3.2 Software Experience

While working on this project, we will have the opportunity to work with tools like Unity and get familiar with them as we work with them. Unity is a major game platform that is used by many game developers, so knowing how to work on it efficiently can be very helpful. We will also need to use tools to implement visuals and animations to our game, these tools can often be very confusing to use and any experience on them can prove to be very useful when using them in the future.

Finally, this project will be our first experience in coding game AIs for both NPCs or enemies and random map generators. Computer AIs are an essential part of most video games today, they allow the player to enjoy playing games without having to be online, and smarter AIs help make games much more enjoyable for the user. Random map generators allow many repetitive games to implement variety into levels and into the gameplay, which is very important for the rogue-like category of video games.

## Chapter 4

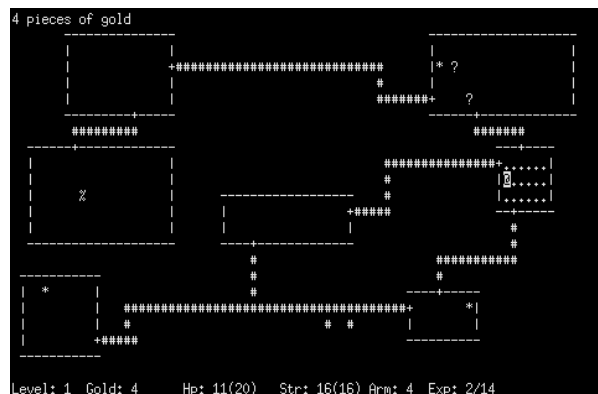
# STATE OF ART

“Faust” is a roguelike that will combine the aspects of games like Dead Cells and Hades. However, to better understand what type of game Faust is, it is important to discuss what Rogue is as well as Hades.

### 4.1 Rogue

Rogue, the first of its kind, follows the story of a character whose job is to descend to the utmost bottom level in the game, retrieve a special item and reach back to the surface. This is what coined the term Roguelike, a game that has those 2 features. In Rogue, the player needs to fight monsters in a dungeon and vanquish them without losing his or her life, because once the player dies, they need to restart the game from the beginning.

In the image below, we see a dungeon from Rogue. The room itself is made from just ASCII, and which does not contain any graphics. The entire game was played on keyboard and mouse was not used at all. This game was later improved by Atari where the ASCII characters were removed and actual graphics were put in place such as tiles. Rogue, one of the most simple games ever made, still impacts the games industry today 40 years later.



*Image I: Dungeon from Rogue*

## 4.2 Hades

A perfect example of this is the game Hades, from the company Supergiant. Hades is the embodiment of what Roguelike games are today. As described by its creators, it is a story about Zagreus, the son of Hades, as he makes his way through the depths of hell and tries to reach the surface. Hades brings together the elements of Roguelike games and Greek Mythology in an exciting and fast-paced game.

Just like Rogue, everytime Zagreus dies, he restarts from the beginning and the player loses all of his progress. However, unlike in Rogue, during his espases in the underworld Zagreus can collect items that can permanently strengthen him for his future runs, bestowing it the title Roguelite, since it is like Rogue but with some different aspects.

However, one of the biggest aspects of Hades is its focus on the storyline. During his runs Zagreus is capable of conversing with NPCs or non-player characters. These characters advance the storyline of the game, providing the hero with nuggets of information about himself and those around him.

For example in one conversation Zagreus finds out that the one he believed to be his mother is actually not. This encourages him to start a quest to find the truth about his real mother. This is only one information he gets from one character, however, in Hades, the story is not linear meaning that multiple characters provide the player with different types of information and the player himself has to piece these informations together to complete his quest. This type of narration is referred to as fragmented narrative.

This is what makes Hades different from its Roguelike counterparts, the extremely entertaining narrative. The reason fragmented narrative is a success is because it is akin to just reading a detective book, where the character tries to piece together the different clues of not one but multiple puzzles. However, receiving a great deal of information at once can be overwhelming, which is why in Hades, the player can focus on only one puzzle at a time and come back to the other ones when they feel ready.



### 4.3 Binding of Isaac & Dead Cells

Isaac, a son of an abusive mom, decides to leave her and run away. However, in his efforts to find a peaceful life, Isaac encounters monster-filled dungeons, whom he has to battle to find a safe way out. The story is inspired by a biblical story of the same name in which God orders the sacrifice of Isaac.

Image III below is a screenshot of a dungeon in the game, while it looks simple, the game is extremely hard to play especially against bosses, in which the player requires good eye-hand coordination. As it can be seen, all of the presented games are 2D, hence making the game even harder since the player has limited room to fight against their opponents.



**Image II:** *Dungeon in Binding of Isaac*

The element that makes Binding of Isaac special and which is also its strength is that the players have many choices. To better understand this it is important to explain how the weapons work in the game. The only weapon used in the game are Isaac's tears, however, you never feel limited due to the game allowing you to combine different aspects that you find mid-run. For example, the player can gain a laser power and can later find the ability that makes the laser follow the enemy. The game contains a multitude of these combinations so each run feels fresh and new for the player as they explore the adventure of Isaac.

A last example of a modern-day Rogue is Dead Cells, a story of a mass of cells that occupy the body of a deceased prisoner, who died from a plague. The possessed prisoner now tries to make his way out of a castle. Dead Cells has the same aspects as both Rogue and Hades, meaning that the player loses most if not all the things accumulated in the run after their death. The game has a vibrant 2D pixel art style, and like Binding of Isaac, Dead Cells has a variety of choices because it is directly influenced by the game.

One of the most important aspects of this game is that it is incredibly hard especially in boss fights. While this is not an aspect of roguelike games, it is one from Isaac of Binding. Dead Cells has very similar aspects to Isaac, however in Dead Cells the player is allowed to equip multiple weapons that they find during their runs.



*Image III: Prisoner fighting*

## 4.4 Strengths

As mentioned in their respective sections, Hades focuses on its storyline while Binding of Isaac and Dead Cells focus on the numerous choices provided. However, the greatest strength that roguelike games have is their randomness. Unlike in games where the game is situated in a specific setting, which has no variation in biomes, in roguelike games, the player will experience a multitude of biomes ranging from Phlegethon, the river of fire that flows through the underworld to the sewers filled with rats. The randomness also extends to the enemies that the player battles. The player never knows exactly which enemies they will fight next even if they replay the game multiple times. Each run of the game feels new, and feels different from the previous ones.

## Chapter 5

# THE NETWORK

Video games are always fun, but it is when you can play them with friends that they become really fun, which is why we decided to implement a multiplayer feature into our game. Fundamentally roguelike games tend to be in single player but that doesn't mean it's not doable.

In the case of "Faust" the game is primarily going to be in single-player mode, but if he wants to, the player will be given the option to create a multiplayer lobby in which they will be able to invite another person to the game.

To do this we are going to use either the unity multiplayer networking solution or the Photon networking solution. Using the unity multiplayer networking would allow for the first player to host a server on their computer and a second player would then be able to join the server as a client, when this is done the client cannot execute any actions but has to request action from the server which then executes them.

However, using photon would allow both players to connect to an external server which would be created by one of them.

Also, since the game is made primarily with a single player in mind, the difficulty of the game will be slightly increased when in multiplayer for balance purposes, that is by giving enemies more HP or damage, or by changing their behavior.

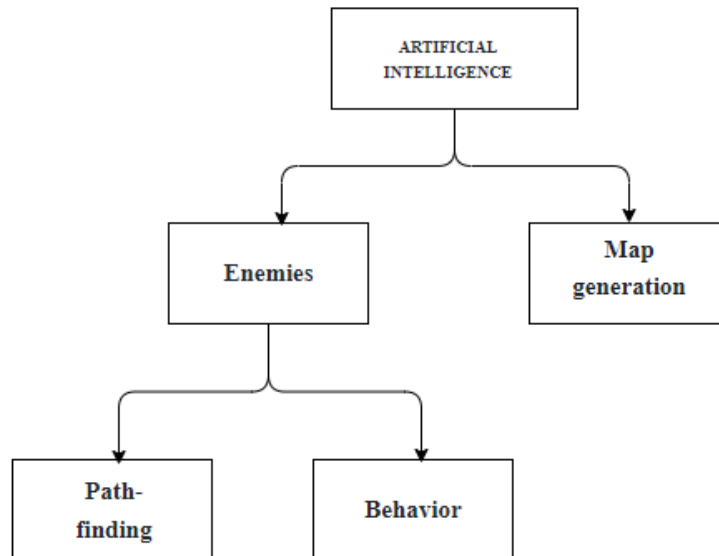
## Chapter 6

# ARTIFICIAL INTELLIGENCE

### 6.1 Artificial intelligence in video games

Even though many call it AI , the AI that is used in video games is not actually the artificial intelligence that people think of, since it lacks one of its most important aspects which is deep learning. This is mainly done because game developers wouldn't be able to control how their AI evolves which in turn could impact their game in unpredictable ways. This is why when people usually mention AI in video games it refers to the predefined actions and reaction of NPCs depending on the behavior of the player.

Artificial intelligence is an important part of every video game which is why "Faust" will use AI for Map generation and Enemies.



**Figure 1:** *The Use of AI in the game.*

## **6.2 Map Generation**

In roguelike games, the areas that the player explores usually differ from one playthrough to the other which is an important aspect for games of this genre, so they don't get repetitive and boring quickly. To achieve this we rely on AI to randomly generate a different terrain or dungeon every time the player starts a game. This is done by pre-making various room layouts, which the game then chooses from at random to create a unique combination of rooms everytime.

## **6.3 Enemies**

Another important part of video games is enemy interactions, which here splits into 2 parts, the first is pathfinding, that is to give the enemy the ability to follow and approach the player. The other one is behavior which is essentially the actions that the enemy needs to take depending on the situation i.e (attack, or block).

## Chapter 7

### DISTRIBUTION OF WORK

This section states the distribution of the major elements that will be worked on for the Game. The word “Head” implies that the person is in charge of the task while, “Vice-Head” is someone that will be helping the person complete it.

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<b>Project Manager</b>			X	
<b>Storyline, Character, Stage Design</b>		Head		Vice-Head
<b>Physics of the Game</b>	Vice-Head		Head	
<b>Map Generation AI</b>		Vice-Head		Head
<b>Animation</b>		Vice-Head		Head
<b>Interface</b>	Vice-Head	Head		
<b>Network</b>	Head		Vice-Head	
<b>Pathfinding</b>				

## Chapter 8

# PLANNING

The following table describes the different tasks that will need to be completed by the dates for the presentations.

Presentation	Tasks
7 - 11 March, 2022	<ol style="list-style-type: none"><li>1. Finish Storyline<ol style="list-style-type: none"><li>a. Where<ol style="list-style-type: none"><li>i. Where is the game taking place</li><li>ii. Different Biomes</li></ol></li><li>b. What &amp; Why<ol style="list-style-type: none"><li>i. Concrete In-game Storyline</li><li>ii. Goal and reasoning of the characters</li></ol></li></ol></li><li>2. Stage &amp; Character Design<ol style="list-style-type: none"><li>a. 1 Character, few Enemies</li><li>b. Implemented into the game</li><li>c. Stage design</li></ol></li><li>3. Basic Physics &amp; Learn Unity<ol style="list-style-type: none"><li>a. Be able to navigate Unity, create 2D Objects, add physics to them</li><li>b. Learn Unity Game Syntax</li></ol></li><li>4. Prototype<ol style="list-style-type: none"><li>a. Single room</li><li>b. Character able to perform basic actions</li></ol></li><li>5. Start Building Website<ol style="list-style-type: none"><li>a. Summary of the progress so far</li></ol></li></ol>

25 - 29 April, 2022	<ol style="list-style-type: none"> <li>1. Interface <ol style="list-style-type: none"> <li>a. Main Menu</li> <li>b. In-Game UI</li> </ol> </li> <li>2. Basic Map Generation <ol style="list-style-type: none"> <li>a. Function Program but not necessarily optimized</li> </ol> </li> <li>3. Character Animations <ol style="list-style-type: none"> <li>a. Movement and action animations of characters</li> </ol> </li> <li>4. Character Design <ol style="list-style-type: none"> <li>a. All character, NPCs and weapons are designed and</li> <li>b. implemented into the game</li> </ol> </li> <li>5. Intelligent AI <ol style="list-style-type: none"> <li>a. Enemy Pathing and Attacking</li> </ol> </li> <li>6. Network <ol style="list-style-type: none"> <li>a. Finish All Research</li> <li>b. Start implementation (as the game enters its finishing phase)</li> </ol> </li> <li>7. Operational Website <ol style="list-style-type: none"> <li>a. Website Interface</li> <li>b. Summary of the Game</li> <li>c. Track of Progress</li> </ol> </li> </ol>
6 - 17 June, 2022	<ol style="list-style-type: none"> <li>1. Installation Manual and Operating Manual</li> <li>2. Map Generation <ol style="list-style-type: none"> <li>a. Fully operational and optimized map generation AI</li> </ol> </li> <li>3. Network <ol style="list-style-type: none"> <li>a. Be able to host 2 player online game</li> </ol> </li> <li>4. Save File <ol style="list-style-type: none"> <li>a. Progress save after game exit</li> </ol> </li> <li>5. Audio <ol style="list-style-type: none"> <li>a. Ambient Sounds</li> <li>b. In-Game Music</li> <li>c. Sound Effects</li> </ol> </li> <li>6. Finish website <ol style="list-style-type: none"> <li>a. Downloadable versions of the game (with and without audio)</li> <li>b. Timetable of the game progress</li> </ol> </li> </ol>