## Overview

Summarized in one sentence, the game is a cooperative networked dungeon crawler enriched with native virtual reality support.

The main objective is to create a cooperative dungeon crawler with VR and rogue-like elements. During a game, up to four diablo-like crawlers must work together to survive and work their way through a procedurally generated dungeon, supported by a dungeon master. The dungeon master is a god-like entity that can observe and influence the dungeon from a giant’s VR perspective as well guide and support the other players. The crawlers as well as the master working alongside each other to achieve a common goal will realize the theme of “Together” for this project.

This document will discuss the basic structure and mechanics of the game in question. As such, it is divided into the following sections: Dungeon Setup, Crawler and Master Gameplay, Overall Mechanics and Technical Details.

## Dungeon Setup

The dungeon will be generated randomly each time. Crawler players will be placed in different rooms separated from each other. The map will feature fog of war, thus every player will only be able to see areas previously explored by him. The master, however, will be able to see the entire layout of the generated dungeon in order to make it possible for him to plan the best courses of actions and routes to the end goal.

Enemies and traps will be spawned inside the dungeon, invisible to both the master and the crawlers. Enemies will be visible only when a crawler player comes in visual range of them. This will ensure an element of surprise for all players. If the need to locate enemies within the dungeons arises for the master player, they will be granted abilities to see enemy locations for short durations.

## Crawler Gameplay

The crawlers will be played on a standard PC using keyboard and mouse. Each crawler will have a unique perspective of the map containing a real time view of their immediate surroundings and a structural view of the dungeon rooms they have explored thus far (i.e. Fog of War). This necessitates the presence of an intermediary party (the master) to act as a coordinator between the crawlers. Their primary tasks will be defeating foes, interacting with objects inside the dungeon, reaching certain locations, collecting loot and the like.

Each crawler will have special abilities depending on class like mage, knight, archer, etc. Each specialized classes will have its strengths and weaknesses. Thus, a single crawler will not be able to master the dungeon alone. These classes will not only provide a different experience for each player but also give him or her a specific role in the team. A squad of multiple players will ideally pick different classes to complement each other’s strengths.

No levelling system, or a very rudimentary one, will be implemented to avoid programming complexity. The objective of classes and abilities will be to provide the feel of a role-playing game without actually creating an entire “Dungeon and Dragons”-like stat system.

## Master Gameplay

The master will ideally be a player using virtual reality headset like the Oculus Rift or HTC Vive. The dungeon will be mapped to the VR space of the system, so the master can look at the entire dungeon and focus on areas of interest intuitively. From the crawlers’ perspective, they will be able to see him as two floating hands and an abstract face representation floating just above the dungeon.

The role of the master player can be summarized in two words: “Support” and “Logistics”. He is the guide that lead the crawlers to their destination. This can be in the form of helping isolated crawlers avoid combat, bringing them together to form teams, aiding them in combat, coordinating their individual movements and so on. As such, the master player can be seen as the strategist of the group. The survival of the crawlers within the dungeon will rest ultimately on the master’s decisions.

The master players will have a complete layout of the dungeon along with the real–time positions of the crawlers. Enemies will not be visible to the master though to provide a challenge and an element of surprise. Hence, it will be important for the master to plan in case his plans go awry.

The master’s set of actions will include pointing in certain directions or placing physical markers to hint to players what they deem to be the correct course of action. This will allow them to coordinate the crawlers’ movements and guide them through the dungeon. The master player will also have his own set of abilities that can be used to assist the adventuring crawlers. These abilities can include radar to view enemy positions for short durations, traps and attacks to aid in combat, buffs like increased speed or damage for crawlers and perhaps even altering the structure of the dungeon! The goal of this is to provide the master player more to do than just being a passive observer. These abilities will be the means of the master player to interact indirectly, or directly, with the world and keep him engaged.

The master will perform his actions using gestures and placing or tossing physics-based objects within the VR space. The abilities of the master can have area of effect that affects both enemies and players. This way the accuracy of the gestures, support item placement and dungeon navigation is directly related to the actual movement of the player, giving them a much better feel of being the god-like entity inside the game.

## Overall Mechanics

Battles against enemies will be essentially similar to that of most dungeon crawling games like “Diablo” and “Pillars of Eternity”. Crawlers will use abilities and basic attacks against enemy units until they are defeated or vice versa. However, the master player may also aid the crawlers fight off enemies using his own abilities. For example, the master player can hurl a fireball into an enemy group before the enemies engage them, effectively weakening them and making the fight easier for the crawlers.

Initially, all crawler players will be dispersed randomly in the dungeon. They will be isolated from each other and have no knowledge of the other’s location. The dungeon master will need micromanage navigation and support in this phase. They will explore the dungeon either following the master’s directions or of their own will. Although “going rogue” is possible, players will be incentivized to form groups and cooperate by scaling enemy difficulty and/or employing debuffs on isolated players.

The master will not have unlimited power despite being god-like. He will have to manage his abilities carefully in order to be able to use them when they are needed most. However, the crawlers may be able to restore some of the master’s abilities by performing specific actions or completing a side quest within the dungeon.

Once the crawlers are together, all players will work to accomplish a given goal such as defeating a boss, solving puzzles, finding treasure, eliminating all monsters in the dungeon, etc. They will receive rewards upon completion of the goal after which they may continue to the next level of the dungeon and start again.

## Technical Details

The game is to be implemented using Unity3D, using Unity networking for player synchronization and a virtual reality headset for the master. The master player is also expected to have hand-tracking controls to fully immerse him into the role of the god-like entity. The game will be 3D, most likely using minimalistic visuals.

From the gameplay and setup description, the following are the main technical challenges to tackle to implement the game:

1. Procedurally generate interesting and different dungeons
2. Set up stable and efficient networking between all players
3. Set up and tweak virtual reality with hand tracking
4. Adapt physics engine for a semi-realistic virtual reality experience
5. Balance the game for crawlers and master