WENZHOU-KEAN UNIVERSITY

CPS4951: Senior Capstone

Software Design Document

A 2D-Rougelike Game: WKU Underground Adventure

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1. Introduction

1.1 Rougelike Game

A Roguelike game is a type of role-playing game that typically features procedurally generated levels, permadeath, and turn-based gameplay. The term "Roguelike" originated from the 1980 game Rogue, which was known for its complex dungeon-crawling gameplay and harsh difficulty.

Roguelike games often have a high level of challenge and require careful planning and strategy from the player. The games are known for their punishing difficulty, as death often means starting over from the beginning of the game.

In addition to the randomly generated levels, Roguelike games also typically feature a large variety of items, weapons, and enemies. The games often have a fantasy or sci-fi setting, with the player character navigating through dungeons or other dangerous environments.

1.2 Game Summary

The game will be developed using Unity and will be playable on multiple mobile devices. The game will be played on a 2D grid, with the player's character represented by a single tile. The player will be able to move their character up, down, left, or right, and will be able to attack nearby monsters using various weapons.

The game will have randomly generated levels, with each level consisting of a set of interconnected rooms. The rooms will be randomly generated and will contain various objects such as monsters, treasure, and obstacles.

1.3 Game Mechanics

The player's character will have a health bar and will lose health when attacked by monsters. The player will be able to restore their health by finding and consuming various items such as food and potions.

The game will have a turn-based combat system, where the player and monsters take turns to attack each other. The player will have a variety of weapons to choose from, each with its own attack range and damage.

The game will have a progression system, where the player can level up by defeating monsters and earning experience points. Leveling up will increase the player's stats, such as health and damage.

2. Design Sketch

2.1 Technical Design

2.1.1 Engine

The game will be developed using Unity and will be written in C#. The game will use Unity's 2D tilemap system for the game grid and the various objects on it.

2.1.2 Modules

The game will have a modular architecture, with each game object implemented

as a separate component. The game will use the Entity-Component-System (ECS) architecture to manage the game objects and their behaviors.

2.2 System Design

2.2.1 Use Case Diagrams

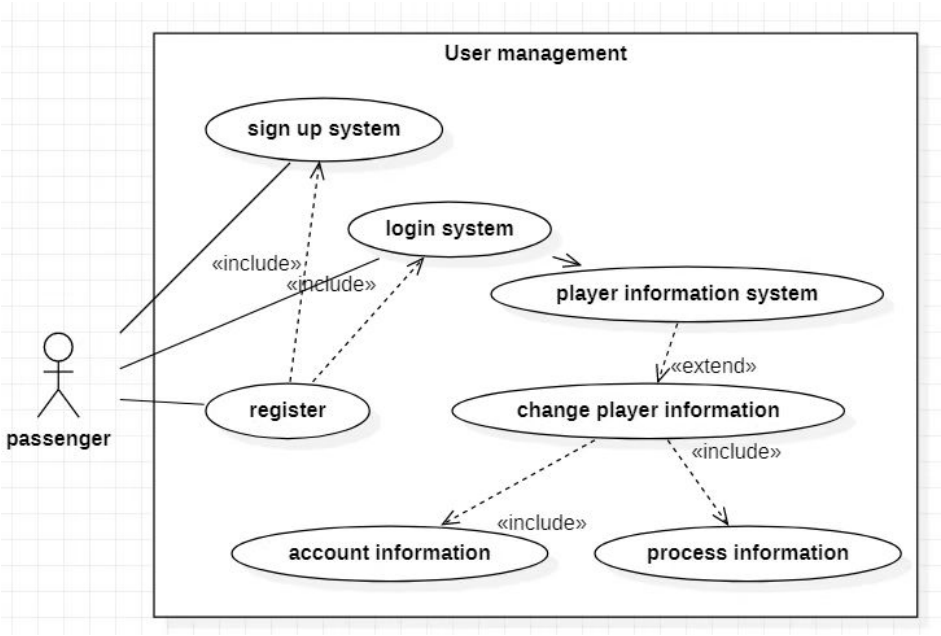

Figure 1: User Management

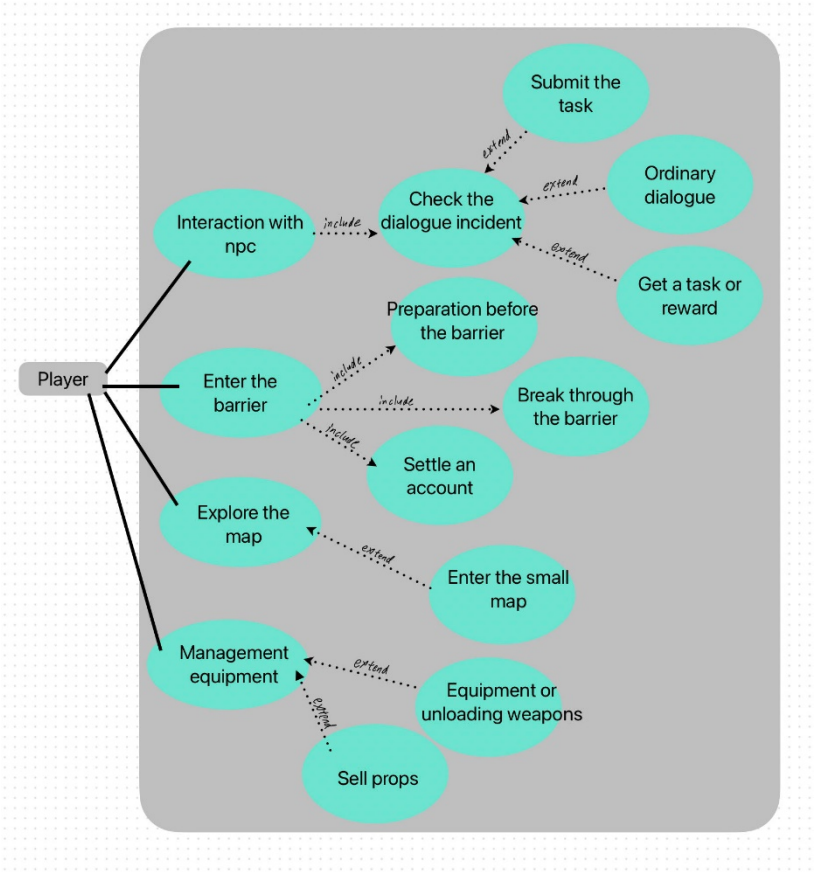

Figure 2: Player Actions

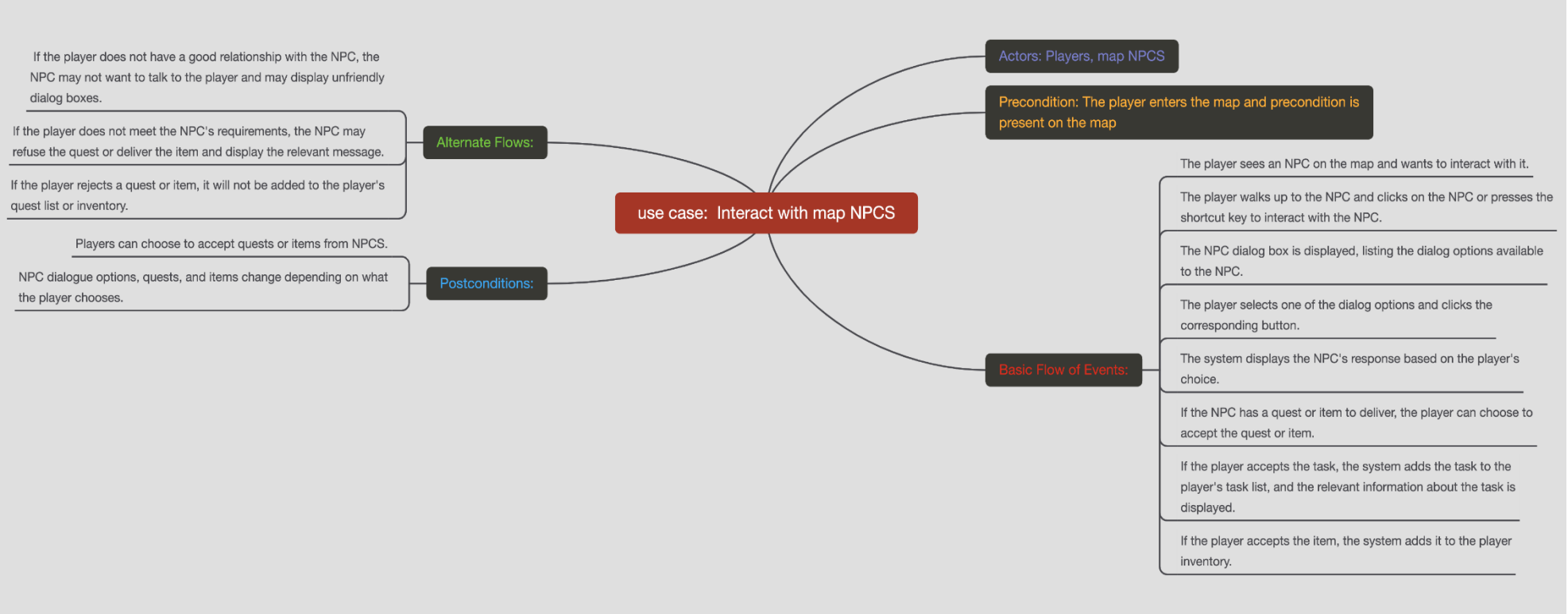

Figure 3: Interact with Map NPCs

2.2.2 Sequence Diagrams

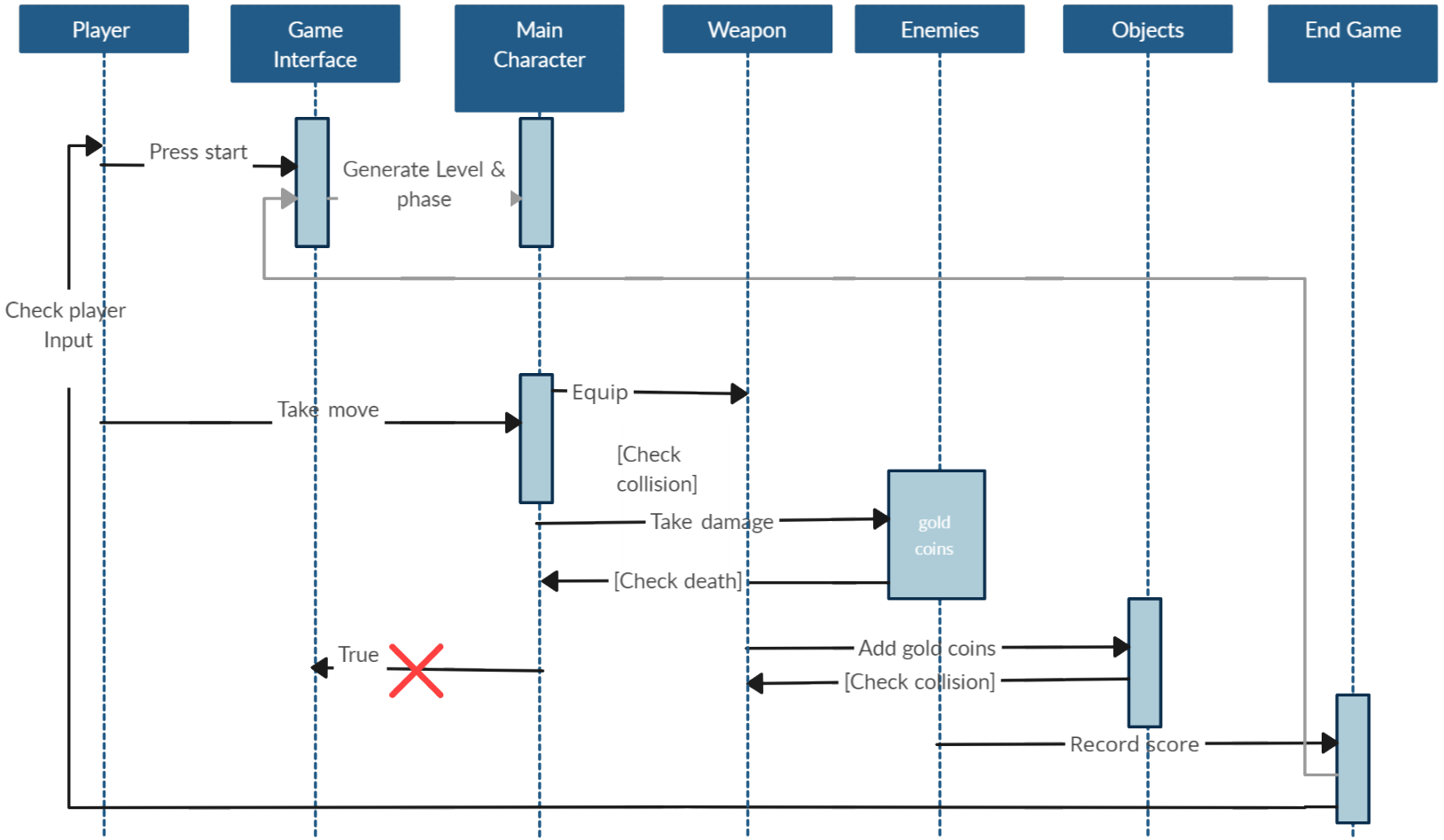

Figure 4: Overall Sequence

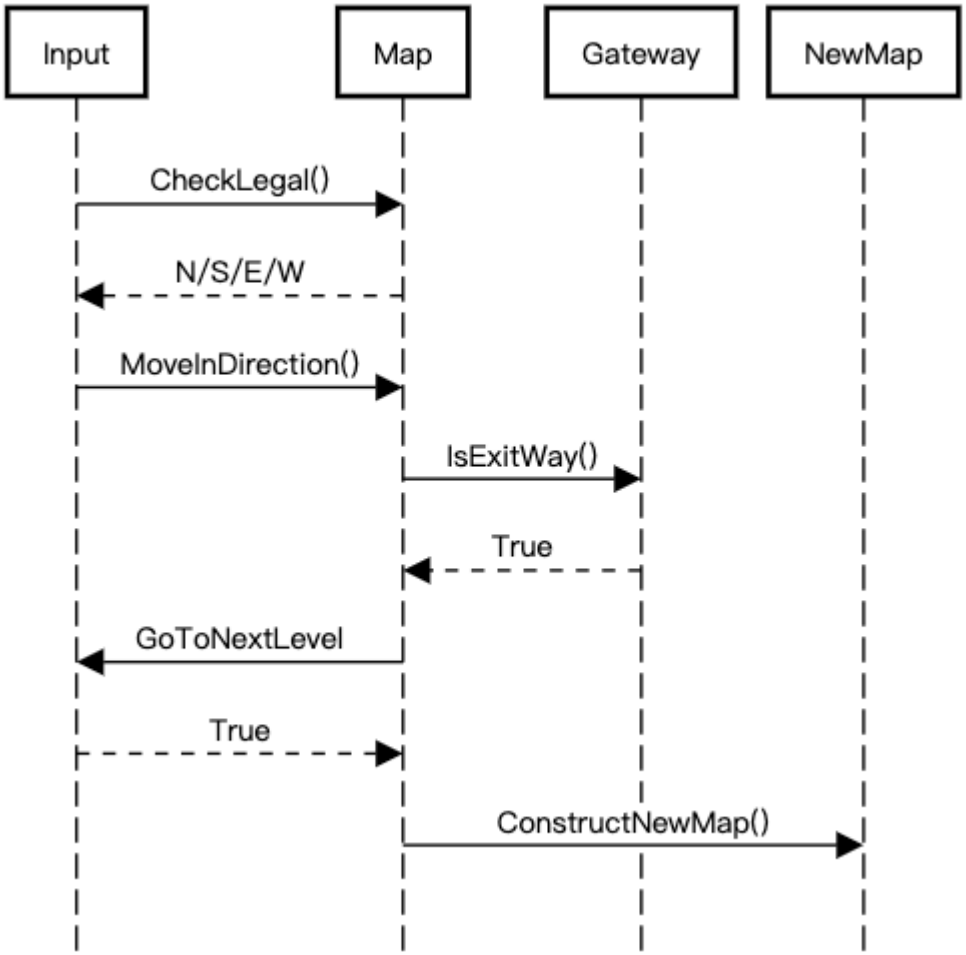

Figure 5: Map & Level Sequence

2.2.3 Class Diagrams

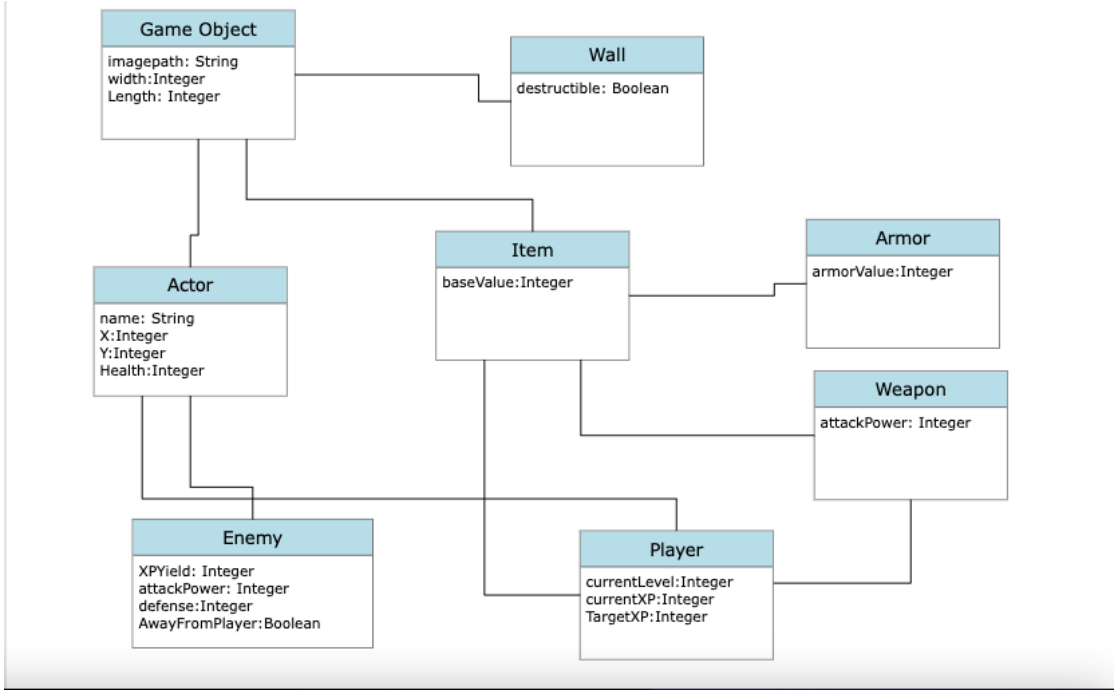

Figure 6: Major Classes

2.3 Map & Level Design

The map design of a Roguelike game typically consists of interconnected rooms and corridors that are randomly generated each time the player starts a new game. The levels often have multiple paths and secrets to discover, rewarding players who explore every corner of the dungeon. We planned to design the maps according to these classical examples:

(1) The game "Enter the Gungeon," each level is made up of several interconnected rooms, with the layout changing each time the player starts a new game. The rooms contain enemies, traps, and other obstacles that the player must overcome to progress to the next level.

(2) Another example is "Spelunky," where the levels are randomly generated and consist of a series of interconnected rooms. The rooms contain enemies, traps, and treasure that the player must navigate through to reach the end of the level.

In terms of level design, Roguelike games often feature multiple levels or dungeons that become progressively more difficult as the player progresses through the game. Each level typically has a unique theme or setting, adding to the game's overall atmosphere and narrative.

(3) For example, in "Darkest Dungeon," the player must navigate through a series of dark and foreboding dungeons, each with its own unique challenges and enemies. The levels become progressively more difficult as the player progresses, requiring careful strategy and planning to overcome.

3. Art Style & Design

3.1 Pixel Art

The expected art style for this game is pixel art. Pixel art in games is that it allows for a wide range of visual styles, from cute and colorful to dark and gritty. Pixel art is known for its simplicity and retro feel, evoking nostalgia for classic video

games from the past. Despite its limited color palette and resolution, pixel art can be incredibly detailed and expressive, allowing game developers to create intricate and beautiful game environments, characters, and animations. The use of pixel art can also help to create a cohesive aesthetic for a game, tying together all of the visual elements and creating a unique and memorable experience for the player.

3.2 Art Tools

(1) Adobe Photoshop, the powerful design tool

(2) Pixilart, an online platform for creating and sharing pixel art. It provides a user-friendly interface that allows users to create pixel art using a variety of drawing tools and colors and easily export png and gif images.
Free to use at:
https://www.pixilart.com/draw?gclid=EAIaIQobChMIrJXMgYbK_QIVkfLjBx2NWw3MEAAYASAAEgKju_D_BwE
See tutorials at:
https://www.bilibili.com/video/av48145205/?zw&spm_id_from=888.80996.embed_old