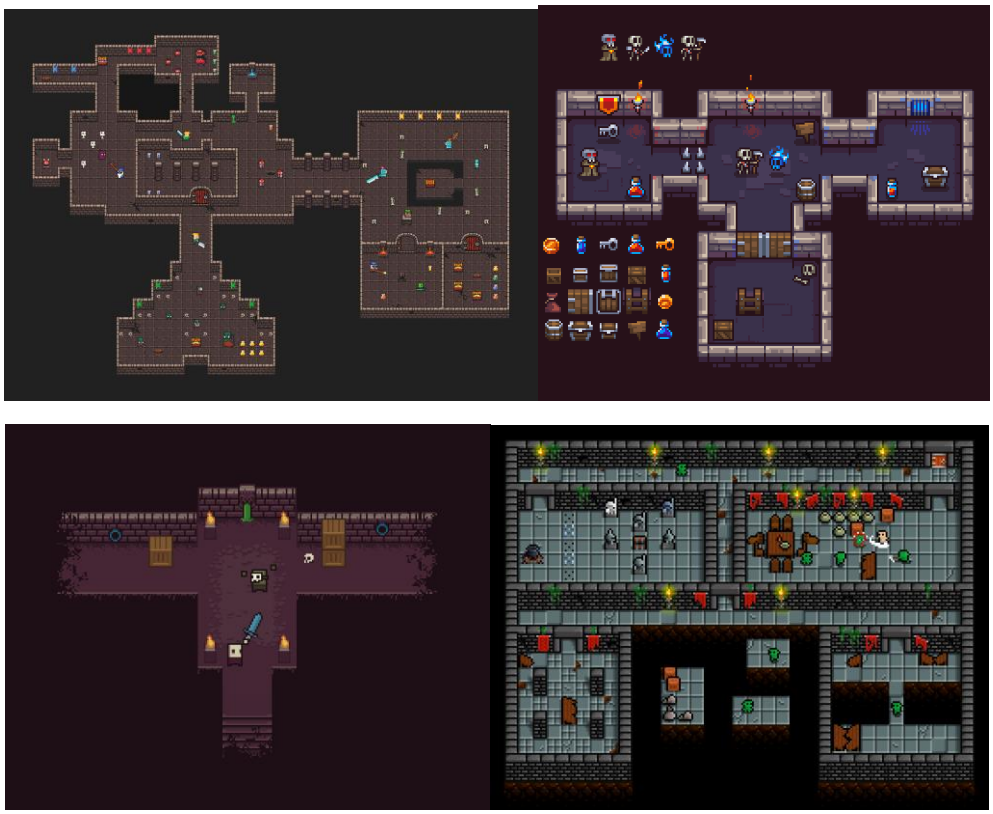
CS2340 Fall 2023 Project Outline

Project Description

The project theme this semester is a 2D Dungeon Crawler game. In this game, you will control a player character and navigate through dungeon rooms with different layouts and enemies. These rooms will be from a fixed viewpoint, so it will not change based on player position. You will be able to attack and destroy enemies, collect powerups, and reach exits that take you to the next room. The enemies will be able to attack the player and the player will lose health, and if they run out of health, the game is over. To win, the player must reach the exit of every room. The player will be able to earn a high score on a leaderboard displayed at the end of the game.



Ref1, Ref2, Ref3, Ref4

Your project will be implemented across five sprints. The proceeding descriptions are basic ideas of what each sprint should cover. The sprint descriptions are subject to change and requirements may be added or removed. *There may also be extra credit opportunities in certain sprints for certain extra features implemented.*

Sprint 1

- Create start screen
    - A way to start the game
    - A way to quit the game

- Create initial configuration screen
    - An input for player name
        - Name cannot be whitespace-only, empty, or null
    - A way to choose difficulty of the game
        - Will impact player's starting health (Sprint 1) and the amount of damage enemy does to player (Sprint 4)
    - A way to pick a character sprite to represent the player
    - A way to continue to the game screen
- Create game screen
    - Where the actual game will take place and most of the functionality will be implemented
    - For now, the screen will be mostly empty besides:
        - Next button to get to ending screen
        - Player name
        - Player character sprite depending on the selected character
        - Character health points depending on the difficulty selected
- Create ending screen
    - Where the leaderboard is displayed and whether the player won or lost the game
    - This screen will be empty for now; implementation will be covered in later sprints.

Sprint 2

- Generate game tiles for the game screen / map
    - There must be at least 3 distinctly different rooms
    - These should be implemented as separate screens
    - Navigate to the next screen with temporary next button
- Implement score
    - Score should be displayed on game screen
    - The score should be based on time
        - This is a temporary metric as score will be implemented further in future sprints
- Implement a leaderboard (singleton design pattern)
    - Should display scores in descending order
    - Should display each attempt made by the player
    - Located on the ending screen
- Add a restart button to the ending screen
- Optional but Highly Recommended: Refactor Character/Player to follow singleton design pattern

Sprint 3

- Implement movement (strategy and observer design patterns)
    - The player should be able to move left, right, up, and down
    - The player should not be able to move off the screen
    - Player should be able to move to different rooms by reaching an exit
        - Remove temporary next button from last sprint to navigate to different room
- Implement wall collisions
    - Character should not be able to pass through walls

- Update ending screen
    - Remove next button to navigate to ending screen
    - Navigate to ending screen if player successfully reaches the final exit

Sprint 4

- Implement enemies (factory design pattern)
    - There should be at least 2 distinct enemy types in each room and 4 different enemy types total
- Implement enemy movement
    - Each different type of enemy should have its own movement patterns
    - Enemies should not be able to move through walls
- Implement enemy collision with player (observer design pattern)
    - Nothing happens when enemies collide with each other, only with the player
    - The player should lose health when colliding with an enemy
    - The amount of damage the player takes should correspond to the difficulty selected
    - The player's health on screen should update after losing health
    - Health should update in real time
- Implement game over screen
    - If the player loses all their health, a different ending screen should appear with an appropriate message
    - This screen must contain the leaderboard

Sprint 5

- Implement a method for the player to attack and destroy enemies
    - The player should have the option to use a sword, projectile, etc. to eliminate enemies
    - Enemies should be destroyed after one attack from the player
- Implement score to be based off factors like destroying enemies, losing health, time spent to clear game, etc.
    - The score should update on the game screen in real time after each change
    - The specific implementation details will be left to the team
- Implement power ups for player character (decorator design pattern)
    - There should be at least 3 different types of power ups available throughout the rooms that the player can collect to gain some kind of gameplay improvement (ex. more health points, jump higher, etc.)
    - A power up should appear visually in the room until the player reaches it and prompts its ability