Report (COMP311 - Assignment 1)

Introduction

The task of this assignment is to develop a childern oriented game with the assist of multimedia components. I have created my prototype from scratch in Python already in the command line mode as following.

```
0 - Elf (ATK: 1  HP: 1) [2]
1 - Elf (ATK: 1  HP: 1) [5]
2 - Goblin (ATK: 1  HP: 1) [1]
3 - Ghost (ATK: 1  HP: 1) [1]
4 - Ghost (ATK: 1  HP: 1) [1]
5 - Cinderflayer (ATK: 5  HP: 5) [20]

X X X X X X X X X X X
X A X               X
X   X C X X X X X   X
X   X   X   X       X
X   X   X G X   X X X
X       X     E X E X
X X X X X   X W W W X
X     G X   W       X
X   X X X X W       X
X         G W C   e X
X X X X X X X X X X X
```

Due to the application of multimedia, I searched from Google and get a result of Python package called "pyglet" (installed by `pip install pyglet`), that is, my first playable release came out.
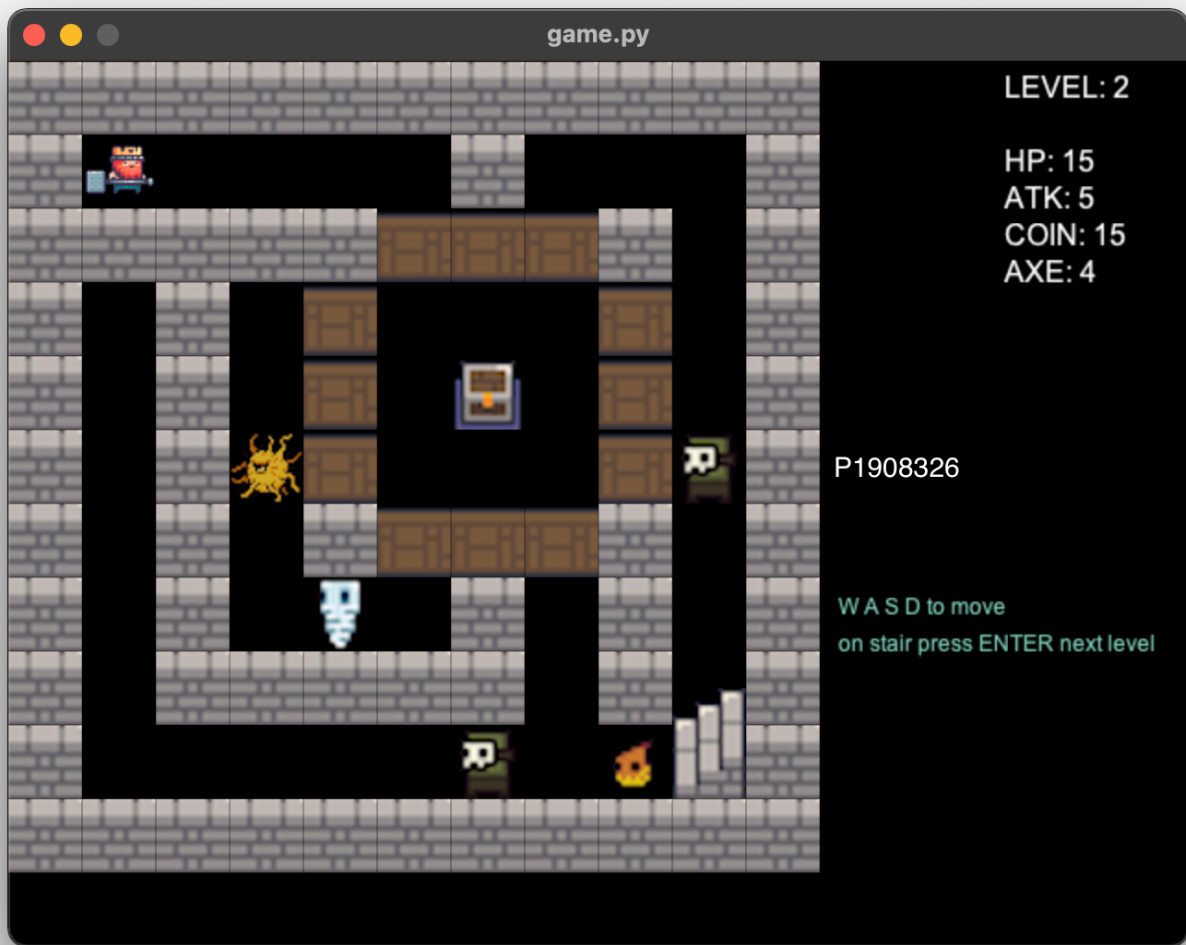
Moreover, there are some requirements that Professor provided. For a clear reference, here is the table.

Status	Requirements	Comment
☑	Implement a small game that is suitable for children, such as Joint the Dots, Mastermind and Sokoban.	
☑	The game should be good and beneficial to children, to encourage them to think more.	The game is designed to encourage children to think about the distribution of resources and decision making
☑	Different media is expected to be adopted in the game.	

☑	Any platforms like mobile or flash is acceptable.	PC (.exe) / Linux and macOS (run from source code)
☑	The game should not have bugs.	Not bugs 🐛
☑	In the game interface design, you need to deal with the design issues with knowledge learned. For example, you need to test the tonal contrast.	
☑	You need to submit a report stating the design issues (which covered in Chapter 1) you encountered.	Right here 😀
☑	The game should be deployed, do not simply submit the source code.	Both **src** and click-to-play **exe** is available.
☑	For game that requires plug-ins, you need to submit the plug-ins together with installation instruction written in readme.txt.	No plugins needed.
☑	Guideline for playing the game should be given	Guideline.md
☑	All assets in the game could be found from the internet, but the sources should be listed inthe report for copyright issues.	https://itch.io/game-assets/free

You can have a look at the Guidelines of how to play around it at next section.

Guidelines

This Rougelike game is developed by **Steve Yan (P1908326)** for the intention of Assignment 1 in COMP 311 Multimedia Application Development. This instruction contains the Guideline for playing the game.

Characters

The game is themed on dungeon adventure. Player (act as the King) can break the wooden wall, beat the enimies (, ,) and the boss as well as gain some enhancement from the chests or the merchants .

Player Properties

There are three dimension of player properties. Respectively, **HP**, **ATK**, **AXE**.

HP (Health Point)

Player's initial **HP** is 20, during the battle (When you pass through the enemies) Player's HP will deduct by the **ATK** of that enemy. In addition, the **HP** of that enemy will also deduct by Player's **ATK**.

ATK (Attack)

Player's initial **ATK** is 4, calculation method has been explained in **HP Section**.

AXE (Number of axe for breaking wooden walls)

Player's initial **AXE** is 5, the **AXE** will deduct by 1 when Player walk through the wooden wall. If the **AXE** is 0, the Player cannot access the wooden wall.

Merchant

In this game, Merchant is a key NPC that is game changing. The Player should have a wisely decision in store interface in order to be alive for more levels.

Difficulty

The difficulty of level is gradually increase, which means that the **ATK** and **HP** of enemies will be increase (quantatively by plus (2, 2)). The price of each components in the store is fixed. But the coins that enemy given will not be increase.

Evolution

Design Issue

[Issue#1] Choice of programming language

Python is a script programming language, it is good for me to develop the prototype. However, in the deployment stage, I can say that Python is not a good programming language for source code packaging. Actually, on of the core dependencies `pyglet` is second developed from `OpenGL` which is a Open source graph library for C and C++. It is easy to build and compile code in C and C++ program. In addition, if the game is developed in C or C++, the executable file is no larger than 10MB. Unfortunately, I use Python for propotyping and just use it for deeper development due to the limitied time scope. As a consequence, the packaged executable is not available in a small, easy to distribute size. And the packaging process is very slow compared with `g++` compiling command.

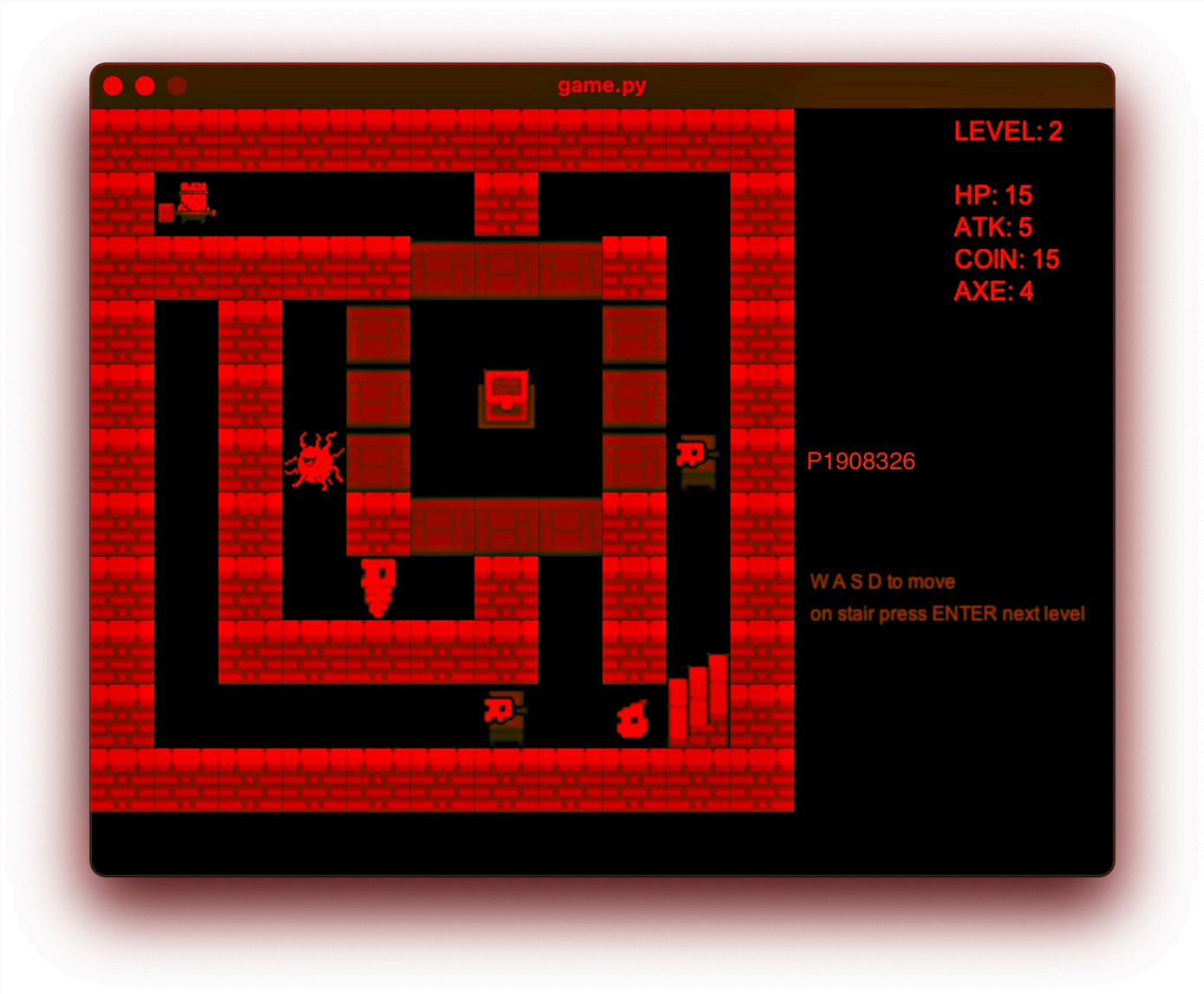### [Issue#2] File structure is not standard

Source code of game is not well structured in this project. The 5 files `game.py`, `map.py`, `maze.py`, `name.py`, `npc.py` works dependently to make sure the game run. But not subfolders, just simple python files. The one hand is that the game is not complex enough. On the other hand, is that my file management skills is not mature. So the game project did not have a excellent file structure.
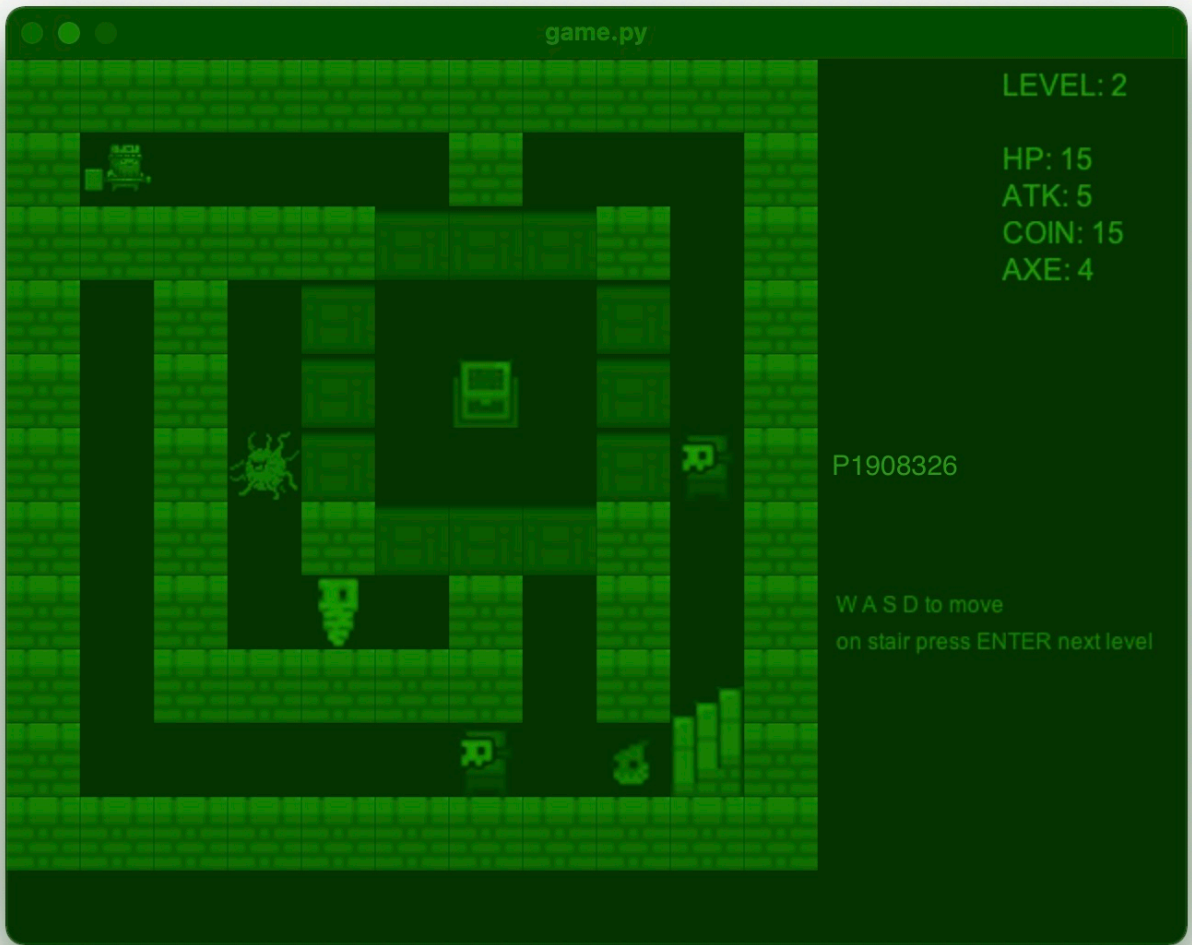
```
 1   Permissions Size User      Date Modified Name
 2   drwxr-xr-x      - ex10si0n 30 Oct 15:01   .git/
 3   drwxr-xr-x      - ex10si0n 30 Oct 15:16   assets/
 4   drwxr-xr-x      - ex10si0n 24 Oct 18:27   screenshots/
 5
 6   .rw-r--r--   12k ex10si0n 30 Oct 15:00   game.py
 7   .rw-r--r--  3.8k ex10si0n 23 Oct 14:57   map.py
 8   .rw-r--r--  1.5k ex10si0n 23 Oct 14:41   maze.py
 9   .rw-r--r--  3.2k ex10si0n 23 Oct 11:04   name.py
10   .rw-r--r--   958 ex10si0n 23 Oct 14:23   npc.py
11
12   .rw-r--r--@  374 ex10si0n 30 Oct 14:54   README.md
13   .rw-r--r--@ 5.6k ex10si0n 30 Oct 15:50   Report.md
14   .rw-r--r--  1.8k ex10si0n 30 Oct 14:55   Guideline.md
15   .rw-r--r--    15 ex10si0n 23 Oct 15:36   requirement.txt
```

Tonal Contrast Test

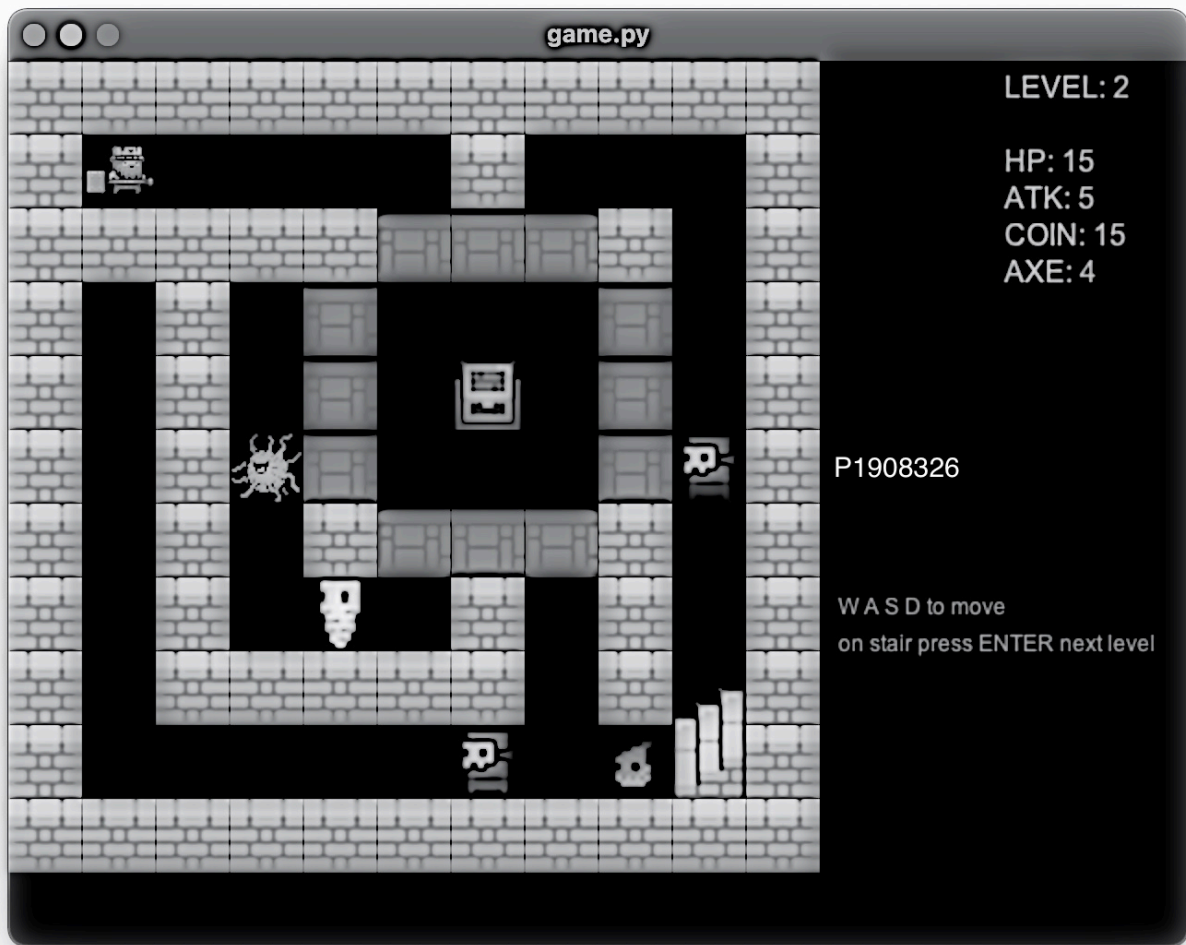Here are the effects during the test.

For R, G, B channels viewing. The effect is OK.

LEVEL: 2

HP: 15
ATK: 5
COIN: 15
AXE: 4

P1908326

W A S D to move
on stair press ENTER next level

For grayscale testing, here it is.

We can see that the image is also recognizable while in grayscale format. Hence, the game is availabe for providing accessibility experience.

Improvements

After recognizing two design issues. This project should be improved in several aspects.

Code refactor

I should make the source code more structured. In addition, the `assets/` folder should be managed when assets read and write.

Change a programming language

Change to C++ with OpenGL is a better choice for improve user experience by distributing a smaller distribution. Besides, I can also implement the Client-Server structure which is famous these years to deploy the game online with the technique of Front-ended programming using JavaScript and Vue solution.

Conculsion

The game project is difficultly determined when student choice a specific technology stack of development. In this project, I adopted Python to develop the prototype. And use `pyglet` package to develop the user interface. In all, the difficulty of development is not quite hard. However, there are some problems in developing process, they are mainly in `pyglet` API and variable's scope. In the further evolution of this project, a code refactor is needed. Indeed, the code is not mature enough. I need to imporve the coding structure as well.

Note: Besides the free assets from https://itch.io/game-assets/free. All of this project is done by Steve (P1908326) individually including Algorithm implementation, game developemnt and game concept design. Any similarity is purely coincidental.