

# Final Design Document of CC3K

## Peigeng Han & Bin Sun

### Part One: Relationships between classes

#### 1. Main Class

- 1.1 Printfile
- 1.2 Grid
- 1.3 Board
- 1.4 Cell
- 1.5 Room

#### 2. Subclass

- 2.1 Player
- 2.2 Enemy

##### 1.1 Printfile class

This class is mainly to print the .txt file to the screen. Because of the different use of printfile, there are three methods in this class.:

`printfile(string) : void`

this method will print all 30 x 79 chars to the screen

`printfilefrom(string, int) : void`

this method will print the file from line 0 to line n, n is the parameter that this function consumed.

`printfile_easy(string) : void`

this will only be used when we use `<ncurses.h>`, since that in `<ncurses.h>` we cannot use the standard input and output of C++, so the code for printing will be different.

##### 1.2 Grid

This class is our main class of this game. It is a Singleton Pattern, marked as game, which will be used while the program running. It contains a series of Cells(Cells can be floor, wall, doors as default, players, items, and enemies), a pointer to the Board(which is the visible textDisplay to let users observe the Grid), an array of Room(each level has five rooms), etc.

##### 1.3 Board

This is very similar to the textDisplay class in A4. It helped Grid to be visible. The relationship is "Grid has a Board".

##### 1.4 Cell

Each Cell is a element on the Grid. 25 x 79 Cells make the whole game and they can be floor, wall, poition, etc by using different char and value.

##### 1.5 Room

This is a new class in the final version, this class is main for generate. Because we have to generate things according to room not to the space. Therefore this class is very important and useful.

We only have to random a number between 0-4(there are 5 room, marked as 0, 1, 2, 3, 4) once we get the number, we select a room, then use giveCoords method of selected Room, it will change the parameters into random proper position (x, y) (or r, c), then return the integer to tell us which Cell in the Room will be replaced by potions(or treasures and enemies), then let this Cell becomes determined potion(or treasure, enemy) by using changePos method.

## 2.1 2.2 Player & Enemy

Using virtual method and visitor pattern we can achieve a lot of fun feature in the game. Like Health for Troll, Steal money for Goblin, Health Steal for Vampire, etc.

Moving Option:

### 1. command play.

Player can use command to play cc3k.

No,so,ea,we,nw,ne,se,sw to move

a to attack.

U to use

### 2. easy play. (ncurses.h)

W,S,A,D,1,3,Z,C to move. (normally we use q,e,z,c to move but q is the command to quit :( )

j to attack

k to use

(why j,k? Because super Mario used these button !)

## Part Two : Answers of Questions

Difference between final version and original version

We only considered how to move, how to attack, etc when we were doing our original version, but we did not consider how to randomly generate stuffs in every room. In the final version, we added a new class named Room to accomplish that.

In the first version we also divide the item into Potion and Gold. However, it is not really necessary, because no matter the item is potion or gold, the only thing it does is changing one of the player's field. Therefore one useOn function will solve all problem for us.

Also in the first version we haven't write the code yet, so we miss a lot of important functions in some classes.

Question in plan

Q2.1, Q2.2a, Q2.2b have not changed in final version

## Question 2.1

Similar to the question 'Floor it' we will write a Grid class, with contains cells and the display board. Everytime we want to make a change on the board we only need to call methods in the Grid class. It is not hard to add addition classes once we figure out the relationship between these classes clearly.

## Question 2.2.1

Enemy is a abstract class, we will use random number to use the probabilities that are given to create enemies. We will also use random number to determine where the enemies should be put. First random a room for this enemy. Then random the coords for this enemy, as long as the prev char in this place is '.' we can replace it with the enemy.

It is different from generate a player. Player is generate by using command but Enemy is

generate by random numbers. However, the way that we random the coord for the Player and enemy is almost the same.

### Question 2.2.2

We can use virtual method. For example, overload the attack method for goblins to enable them to steal money, overload the attack method for vampires to enable health stealing, overload move method for troll to enable health regeneration.

### Question 2.3.1

We are using Type passing to solve this problem. It is very similar to the example of turtle and rock which use useOn and attack function that have taught in class.

### Question 2.3.2

we have put Treasure and Potion in the same class Item. And solve the take item problem with one function useOn(player) by adding condition that check weather the item is a 'P' or a 'G'.

## Final Two Questions

### 1. What lessons did this project teach you about developing software in teams?

At first, we thought it is easier to work in teams. When we are thinking ideas, with cooperation we finish the idea very fast. However, when it comes to the coding part. It is difficult to combine two piece of code. It is also very difficult to combine two different classes. For example, I wrote the enemy class and all the subclass within one day. And Bin Sun finished his palyer part that day too. However, it takes us two days more to combine these classes that make them work with all the features like Gold steal, Heal steal, etc.

The best thing to work in a team is that the partner can help you with your weekness when you are coding. For me, i'm good at design pattern but checking(debuging) long code make me feel horrible. But Bin Sun seems very enjoy to debug. He like to try a lot of things and find out the similarity to debug. For example, Our programme have a memory leak before. However, i can't find where is the leak. Bin worked on it for a very long time a testing it with all different charactor. Finally he found out it is the Dargon horde which is leaking memory.

The most important lesson that we have learned is that we have to think together, work

together and learn together!

2. What would you have done differently if you had the chance to start over?

Because of the time limit and the bad luck ( bug everywhere! Never compile the first time!) we haven't try a lot of thing in cc3k. In the original play we are planed to add some arms and weapons. We can buy potions and sell arms and weapons to the mechrant. It seems we can't finish it in time. We will still try to improve our programm after the exams. It is fun to play the programm you Wrote!