# C++ Game - Dream House

Yifan Zhang 16522086

## 1 Game Introduction

### 1.1 Background

The game is played through console. By controlling a snake moving in a house, the player need to find a way out. The house has five levels, and each level may contain NPCs and keys. The player need to collect keys and talk to the NPCs to find clues. Finally, the player will find whether this house is a dream, or a nightmare.

### 1.2 Core Elements

The images below shows the core characters of the game and their functionalities, including NPC, key and items.

🕵️

**Role**: NPC

**Usage**: offer suggestions, given problems or set barriers

**Where**: in every level, when user finishes talking with the previous one, the next one would show up.

**Role**: key

**Usage**: open the doors

**Where**: in every level, or by answering NPCs questions.

**Notes**: The number of keys is less than the number of doors, therefore, players need to choose carefully about which door to open.

🔑

💎

**Role**: treasure

**Usage**: trade with NPCs to get keys

**Where**: in some levels

**Notes**: The treasure is quite rare in the game and usually locked in doors. It is risky to waste a key to get it since it may not help players to get out of the house, sometimes.

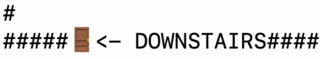
**Role**: billboard, stairs

**Usage**: show the current level, let user to go to the next level

**Where**: at the upper right corner in every level

**Notes**: the top level does not have the stairs.

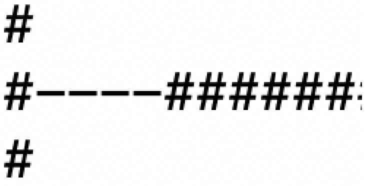
```
#///UPSTAIRS///##
#////LEVEL 1///##
#####[.|.]#######
```



```
#
#####🚪<- DOWNSTAIRS####
```

**Role**: stairs
**Usage**: let the player to go to the lower level
**Where**: at the lower left corner in every level
**Notes**: the bottom level does not have the stairs.

**Role**: door
**Usage**: need to open by keys
**Where**: in every level
**Notes**: If there are multiple doors in one level, then using one key can open all the doors; similarly, they can be locked at the same time.



```
#
#----######
#
```

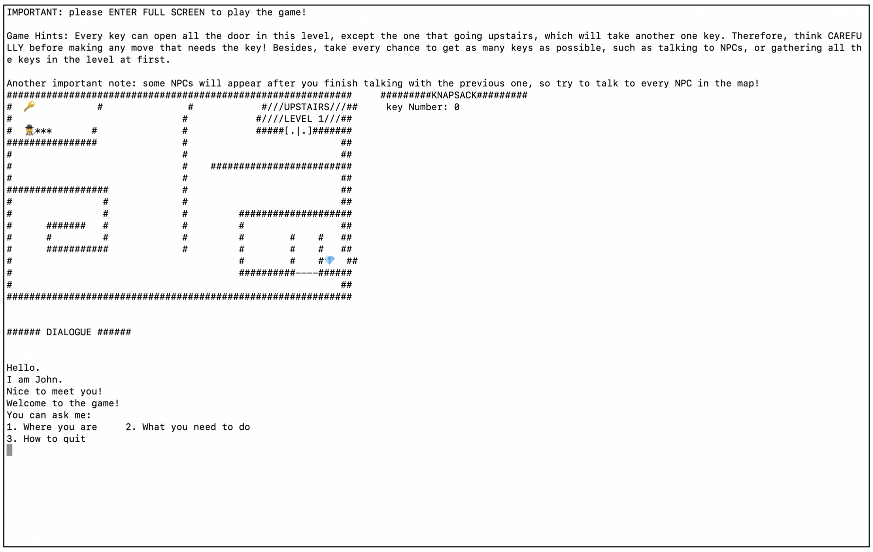
```
***
```

**Role**: snake (player)
**Move**: use w, a, s, d to move up, left, right and down.
**Notes**: the snake can turn 180 degrees.

**Role**: Exit
**Usage**: leave this house!
**Where**: in level 5

## 1.3 Level preview

Here is the preview of the first level, which could represent the layout of elements in other levels.



```
IMPORTANT: please ENTER FULL SCREEN to play the game!

Game Hints: Every key can open all the door in this level, except the one that going upstairs, which will take another one key. Therefore, think CAREFU
LLY before making any move that needs the key! Besides, take every chance to get as many keys as possible, such as talking to NPCs, or gathering all th
e keys in the level at first.

Another important note: some NPCs will appear after you finish talking with the previous one, so try to talk to every NPC in the map!
#############################################################     #########KNAPSACK#########
#   🔑          #               #            #///UPSTAIRS///##     key Number: 0
#                              #            #////LEVEL 1///##
#   🕵***       #               #            #####[.|.]#######
################               #                           ##
#                              #                           ##
#                              #    #########################
#                              #                           ##
##################             #                           ##
#                #             #                           ##
#                #             #         ####################
#      #######   #             #         #                 ##
#      #         #             #         #        #    #   ##
#      ###########             #         #        #    #   ##
#                                        #        #    #💎  ##
#                                        ##########----######
#                                                          ##
#############################################################


###### DIALOGUE ######


Hello.
I am John.
Nice to meet you!
Welcome to the game!
You can ask me:
1. Where you are     2. What you need to do
3. How to quit
```

Figure 1: Level 1 Preview

## 1.4 Game Features

### 1.4.1 Intelligent NPC

The communication between players and NPC is highly free. That is to say, there is no fixed answer offering to user for choosing. Each NPC is a class, mainly containing the position, the dialogue database and function to search for answer using fuzzy search. The sample conversation can be found in Figure 1 above.

### 1.4.2 Built-in Games Included

There are other built-in games included in this game, which are guessing riddles and Rock-paper-scissors game. They are triggered by conversation between players and NPCs. Specifically, Rock-paper-scissors game includes AI part that the system will behave differently dependent on the users' input. For example, if players like to put scissors, then the system chance of choosing rock increases.

### 1.4.3 Item Collection System

The game includes its item collection system so that players could see exactly how many items he (or she) has collected so far to make further decisions.

# 2 Game Rules

The player controls a snake to escape from the house. When the snake passes a key or treasure, it will collect automatically. when confronted with the door, if the snake has more than one keys, it will use one of them to open the door.

The aim of the game is to find the exit of the house, which is in the final level. Therefore, the player should take every chance to gather as many keys as possible. Some keys can be directly collected in the map, and others are got by answering NPCs questions or playing games. Unfortunately, not all NPCs are helpful. Some of them may offer suggestions, while some could shut the doors the player just opened. The player does not know which NPC is good or bad, therefore, it adds a lot of uncertainty and excitement to the game.

# 3 Game Structure

The figure below presents the class diagram of the game, which contains five classes: Level, MainBody, Npc, LevinsteinDistance and Search. The Level class contains the information of each level, including the layout of the room and its items, i.e. keys and treasure. The Npc class contains the dialogue database of each NPC, and corresponding functions that make it available. The Mainbody class contains the basic structure of the game, including the movement of the character. The other two classes are used to do the fuzzy search in the conversation.

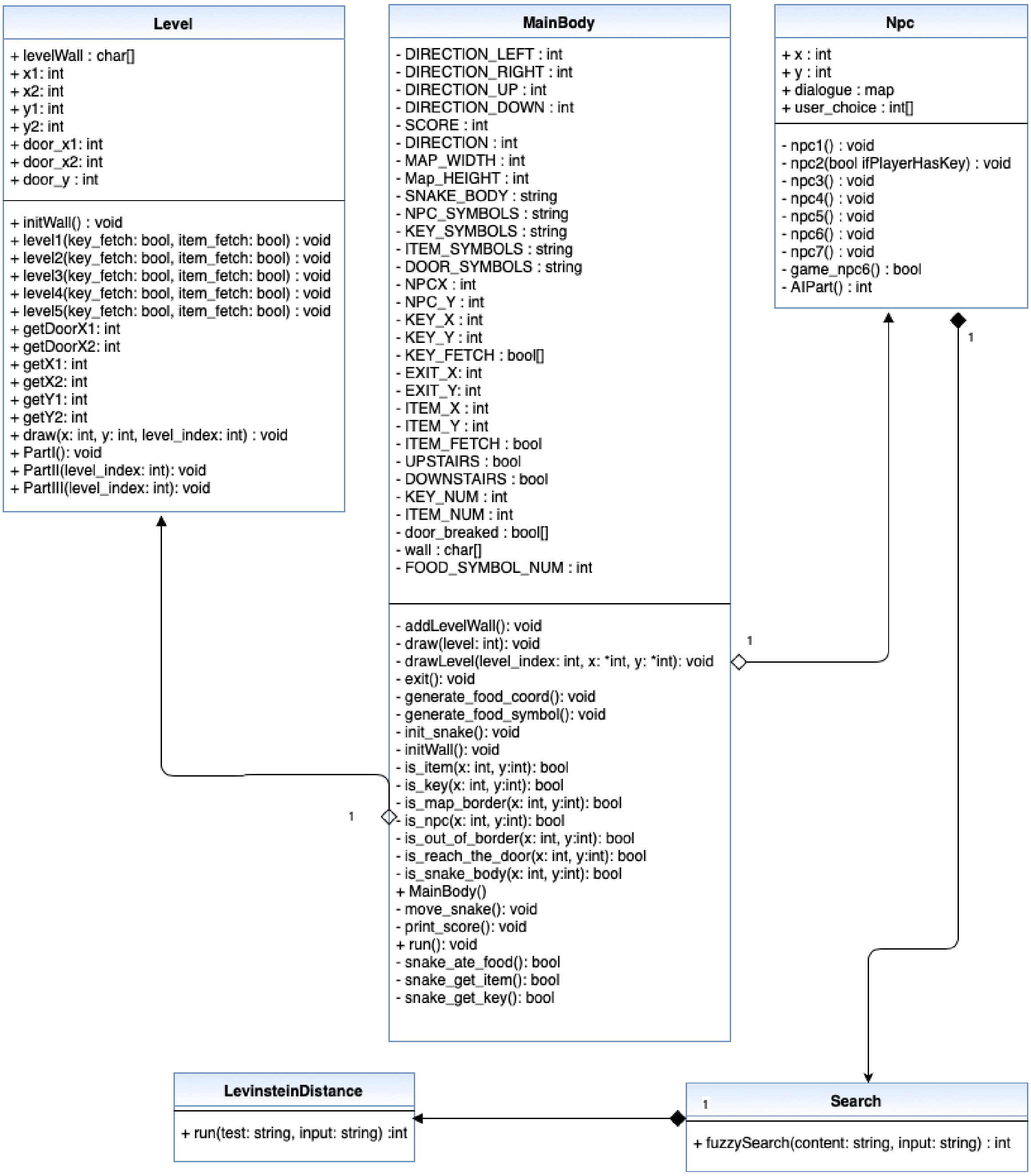


Figure 2: UML Diagram of the Game

# 4 Fulfilled Requirements

## 4.1 Hard Requirements

The program can compile on the X2Go in the CSlinux.

For compile, please use: **g++ main.cpp -o run**

Then run the game by using command: **./run**

****Note: please enter full screen to play the game, or there may be display issue happens.***

## 4.2 Soft Requirements

### 4.2.1 Correctly Used C++ Object Oriented Techniques

The program contains five classes, and the relationship between each class is either composition or aggregation.

### 4.2.2 Readable Program and Appropriate Comments

The program has been well organized and every important variable and function has corresponding comments.

### 4.2.3 Clear Results Presents

If the player choose to quit the game, it will show the warning message that if the player continues that operation, he (or she) will lose the game. If the player has finally control the snake escaping from the house, the screen will show the win message.

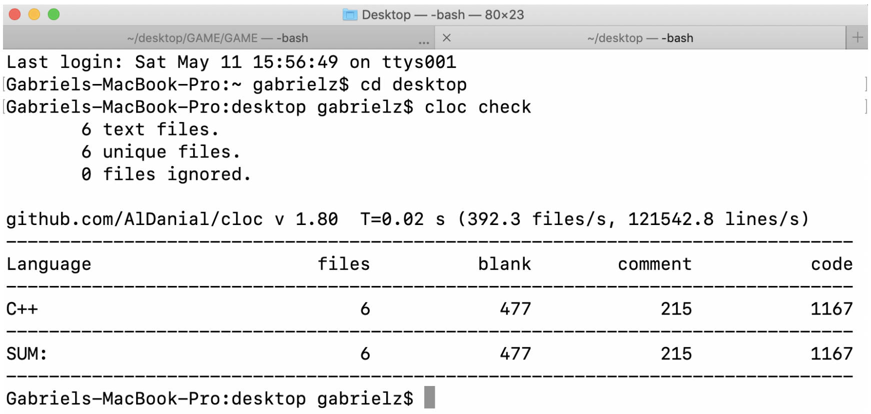
### 4.2.4 Fuzzy Search Implemented

The fuzzy search method is used in the communication between the player and NPCs. The dialogue database of NPCs is a map, and the system will do the fuzzy search in the keys of the map to find the answer that closest to the player's questions.

### 4.2.5 Sufficient Complexity Contained

The game is not only about moving the character, it also contains the item-collection system, free conversation system and multiple NPCs and levels.

The figure below shows the size of the game code:



```
Last login: Sat May 11 15:56:49 on ttys001
Gabriels-MacBook-Pro:~ gabrielz$ cd desktop
Gabriels-MacBook-Pro:desktop gabrielz$ cloc check
       6 text files.
       6 unique files.
       0 files ignored.

github.com/AlDanial/cloc v 1.80  T=0.02 s (392.3 files/s, 121542.8 lines/s)
-------------------------------------------------------------------------------
Language                     files          blank        comment           code
-------------------------------------------------------------------------------
C++                              6            477            215           1167
-------------------------------------------------------------------------------
SUM:                             6            477            215           1167
-------------------------------------------------------------------------------
Gabriels-MacBook-Pro:desktop gabrielz$ 
```

Figure 3: Code Amout of the Game

### 4.2.6 AI Contained

The built-in game Rock-paper-scissors contains simple AI implementation that the system will give corresponding response based on the player's preferred choice (rock, scissor or paper).

### 4.2.7 High Level Playability

One of the feature in the game is that the player can communicate with NPCs freely, i.e., there are no fixed question and answer routine. The player can type whatever they want to say.

Another feature is that the game will never terminate itself unless the player successfully control the snake getting out of the house. Since the player needs to collect keys to open one after another doors, but the number of keys is limited, he (or she) should make clever choice and try not to stuck in a room or a level. If so, then the game needs to be restarted.

Meanwhile, the property of each NPC is different, The player will never know the next NPC he (or she) talks to is good or bad. A good NPC will offer some tips to the player, or have reward if the player wins the game. In contrast, a bad NPC will shut the door the player has just opened and vanish immediately without giving the player chance to talk. Therefore, this kind of uncertainty is also one of the playability points that the game contains.