Algorithm and Programming Final Project Report

“Text-Based Video Game”

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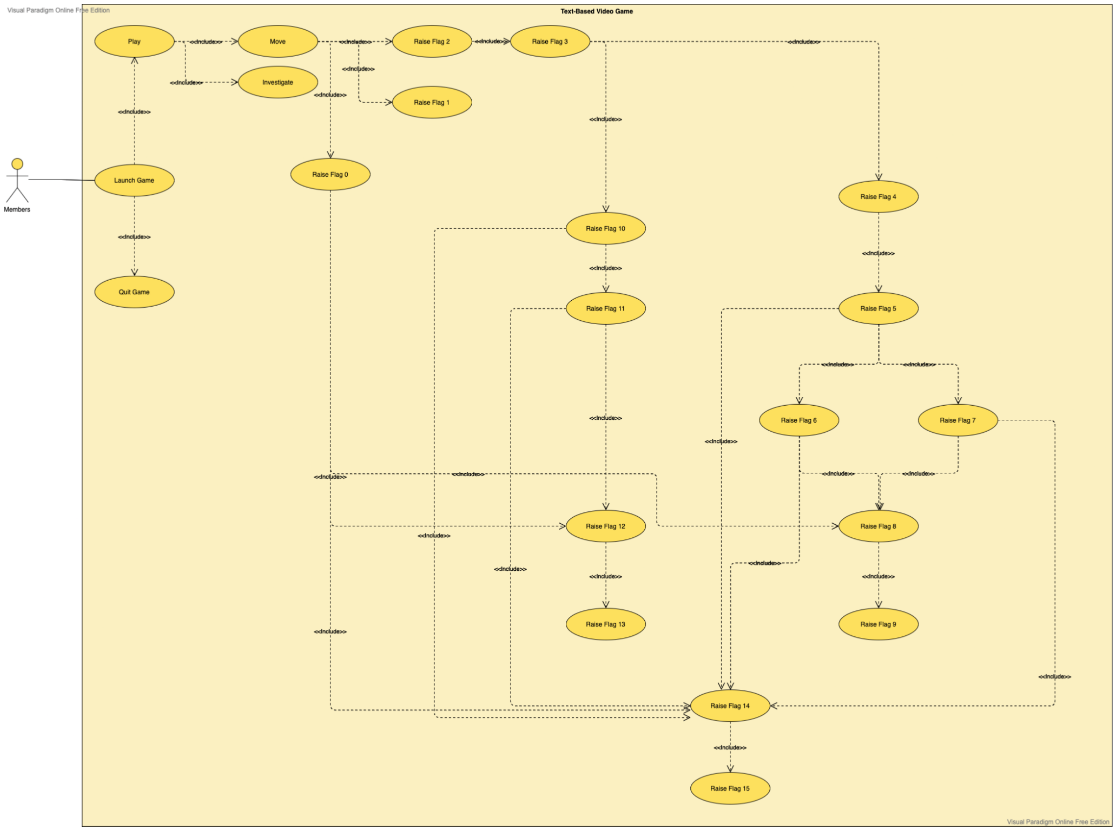
I. Brief Description

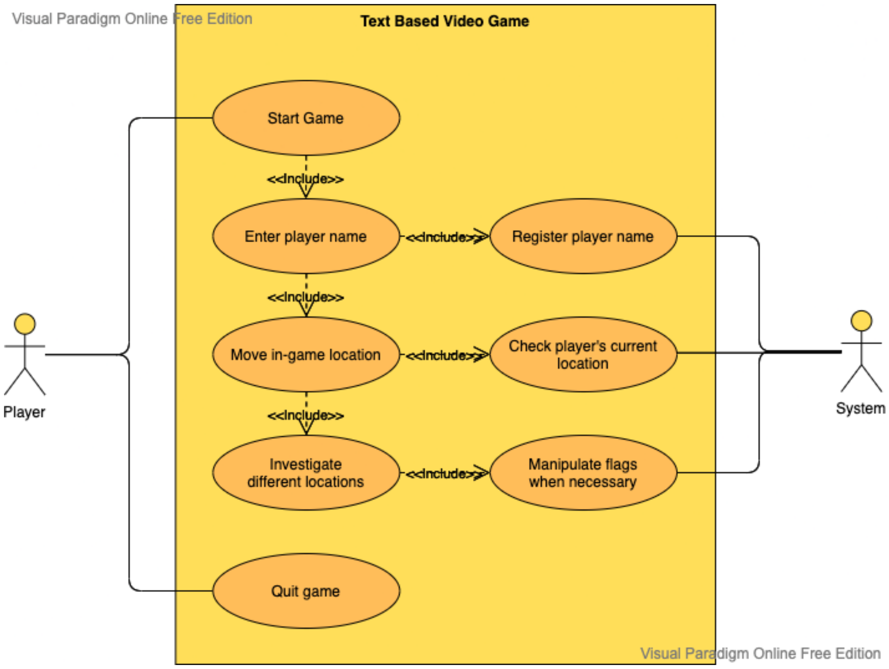
A text-based video game is a game that uses written text as its main communication method. As such, the game will relay information through text, to which the player will choose their next action also through text, often using a command prompt. Due to the simple nature of the game, developers can make the game as simple or as complex as they want. One example of a text-based video game is “The Oregon Trail”, an educational strategy game about the struggles of being a pioneer in the 19th century. In it, you guide a family in their expedition to reach Oregon, from buying supplies to surviving the harsh environment. Another thing to note is that these types of games are often possible to complete purely via text. Despite this, more modern examples of text-based games generally accompany the gameplay with matching visuals.

For my final project, I decided to create a simple story-driven text-based video game. By implementing the lessons I learned in the Algorithm and Programming course over the course of the semester. One reason I decided to start this project is that I would like to implement my hobby of writing stories into my university projects somehow, and I believe that making a text-based video game would be a good place to start.

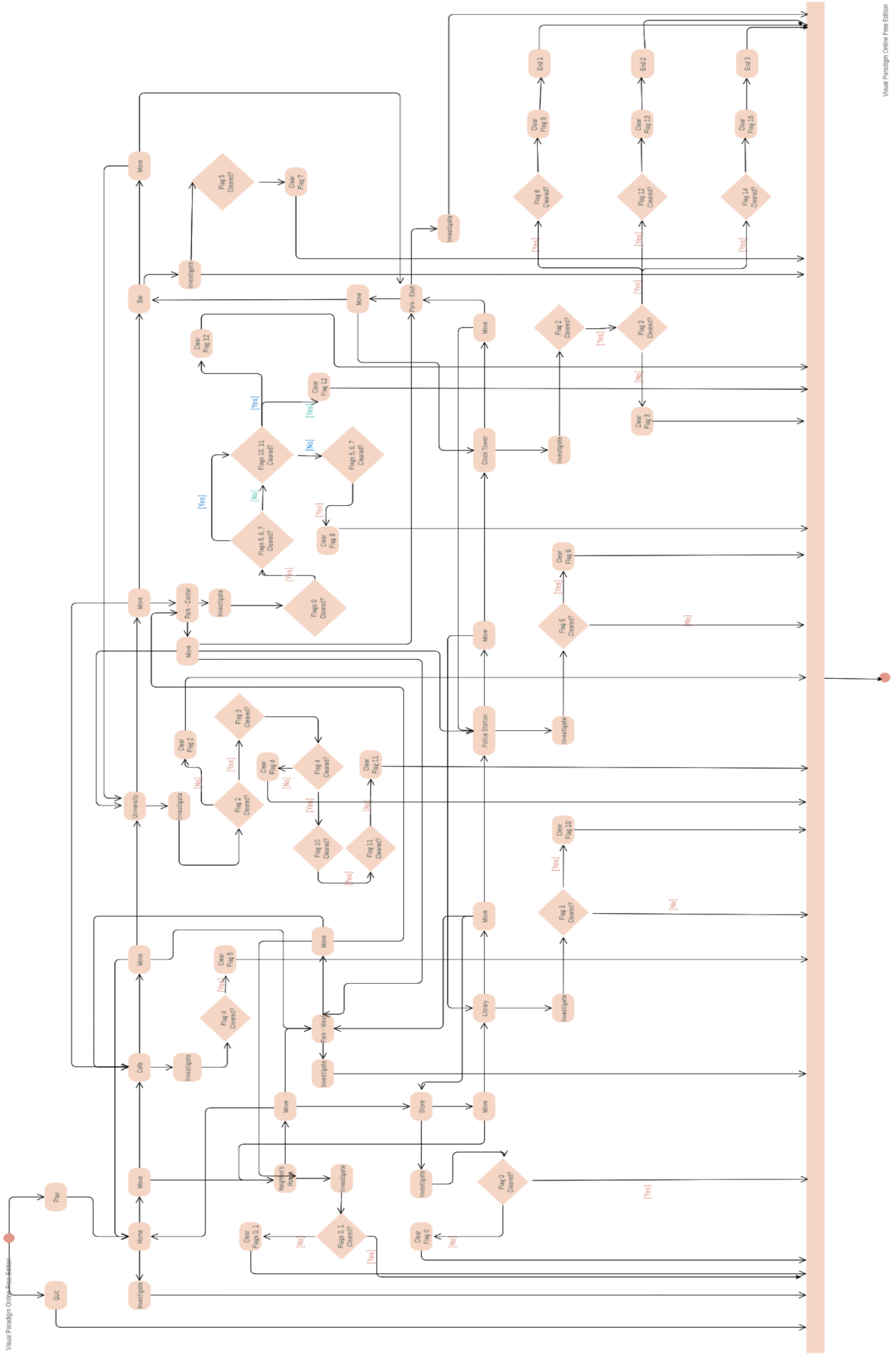
II. User Case Diagram

Attached is the UML User Case Diagram:



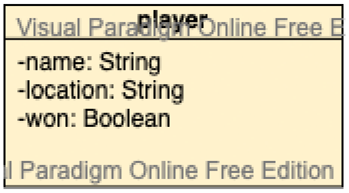


III. Activity Diagram



IV. Class Diagram

Attached is the class diagram for all the classes used in this program:



V. Modules

Modules used in my program:

No.	Module Name	Function
1	sys (system)	This module implements system functions which contain elements like functions and variables that can affect various parts of the code. Essentially it allows us to operate on the interpreter itself. In this program, this module imports the **sys.stdout.write()** and **sys.stdout.flush()** functions. The function **sys.stdout.write()** is similar to the **print** function in Python, while **sys.stdout.flush()** delays the output for the **sys.stdout.write()** function. In short, it prints the output one by one rather than simultaneously.
2	os (Operating System)	This module implements system functions that correspond with the user's operating system. From this module, I imported the **os.system('clear')** in my system. This function clears the screen when the function is called.
3	time	This module implements time related functions. In this program, this module is used to import **time.sleep()** function, which can be used to delay the output of certain lines of code.

VI. Essential Algorithms

My program has four essential systems that is used regularly when running the code:

1. Moving the Player

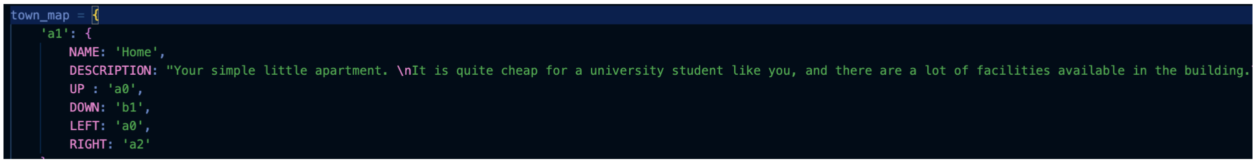
The first essential algorithm I used in this program is the move function. The move function is also one of the two available actions to the player every time the prompt function is called. When the player chooses to move, they are given four possible directions of movement: north, south, east, and west. Whichever direction they pick, they will be transported to the tile of the corresponding direction.

To execute this function, I first visualized a 4x3 grid that will represent the town, as shown below:

A1 = Home	A2 = Cafe	A3 = University	A4 = Bar
B1 = Neighbor’s House	B2 = Park - West	B3 = Park - Center	B4 = Park - East
C1 = Store	C2 = Library	C3 = Police Station	C4 = Clock Tower

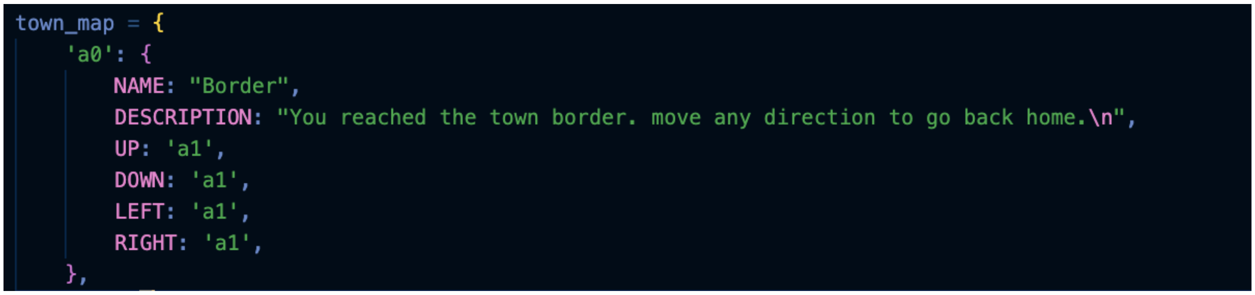
As shown, each tile represents a place that the player can go to. The player will be starting in their home and can move to the cafe or the neighbor’s house by moving east or south respectively. In each location, certain flags can be raised in order to progress the story, which will be further in the second and third section.

To make the movement system, I created a dictionary containing all the location tiles as its keys. For the values, I implemented another dictionary containing the name of the location, description about the location, as well as the next tile for when the player wants to move up, down, left, or right from the current tile. The picture below shows the dictionary entry for A1 - Home:



```
town_map = {
    'a1': {
        NAME: 'Home',
        DESCRIPTION: "Your simple little apartment. \nIt is quite cheap for a university student like you, and there are a lot of facilities available in the building.
        UP : 'a0',
        DOWN: 'b1',
        LEFT: 'a0',
        RIGHT: 'a2'
```

However, there is a possibility for the player to move out of the playable area. For instance, if the player’s current location is home, should the player move north, there wouldn’t be a location for the player to go to, thus creating an error. To combat this, I added a pseudo location called A0 labeled “Border”. If the player manages to enter this location, anywhere the player moves will always transport him back to A1 - Home. After that, the player can resume the game normally.



```
town_map = {
    'a0': {
        NAME: "Border",
        DESCRIPTION: "You reached the town border. move any direction to go back home.\n",
        UP: 'a1',
        DOWN: 'a1',
        LEFT: 'a1',
        RIGHT: 'a1',
    },
```

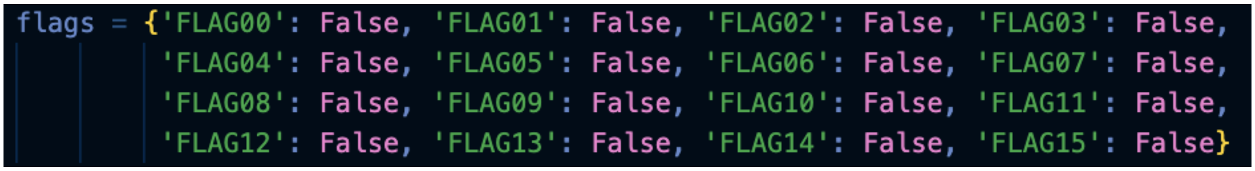
2. Investigating the Location

The second option a player can choose is investigate. When the player types in ‘investigate’ into the prompt, the investigate function will execute and it will check for two things: the location of the player and the state of certain flags. Certain locations will have certain flags, and investigating said locations will activate those flags, thus progressing the story. In some locations, there are some flags that must be previously cleared in order for certain flags to be activated. After the program runs the check, it will print the dialogue based on the player’s current progression.

3. Flag System

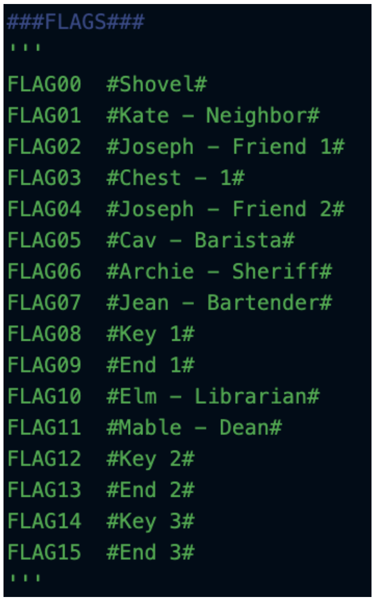
I implemented a flag system into my game to be used as an event checker system so that each dialogue will be correct according to the progress of the story, and as such will be working in tandem alongside the investigation system. In total, I initialized 16 different flags to be used in the code.

I started by making a dictionary containing all flags numbered 00-15 and setting all of their values as false, as seen in the image attached:



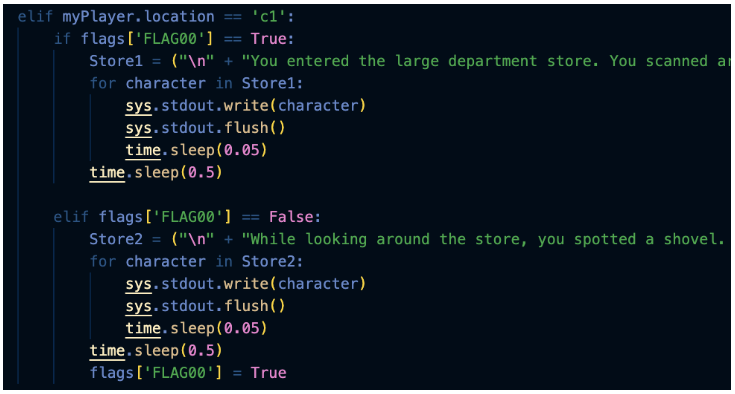
```
flags = {'FLAG00': False, 'FLAG01': False, 'FLAG02': False, 'FLAG03': False,
         'FLAG04': False, 'FLAG05': False, 'FLAG06': False, 'FLAG07': False,
         'FLAG08': False, 'FLAG09': False, 'FLAG10': False, 'FLAG11': False,
         'FLAG12': False, 'FLAG13': False, 'FLAG14': False, 'FLAG15': False}
```

Attached is the flag identifier:



```
###FLAGS###
'''
FLAG00  #Shovel#
FLAG01  #Kate - Neighbor#
FLAG02  #Joseph - Friend 1#
FLAG03  #Chest - 1#
FLAG04  #Joseph - Friend 2#
FLAG05  #Cav - Barista#
FLAG06  #Archie - Sheriff#
FLAG07  #Jean - Bartender#
FLAG08  #Key 1#
FLAG09  #End 1#
FLAG10  #Elm - Librarian#
FLAG11  #Mable - Dean#
FLAG12  #Key 2#
FLAG13  #End 2#
FLAG14  #Key 3#
FLAG15  #End 3#
'''
```

As seen on the image, each flag signifies a different part of the story as well as a point of reference for the player’s progression in the story. To illustrate how the flag system works, let's take a look at the flags for the location ‘store’:



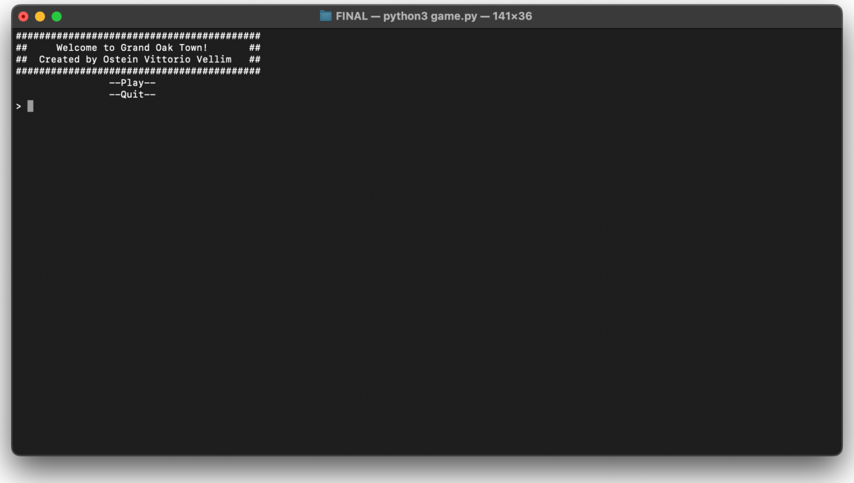
```
elif myPlayer.location == 'c1':
    if flags['FLAG00'] == True:
        Store1 = ("\n" + "You entered the large department store. You scanned ar
        for character in Store1:
            sys.stdout.write(character)
            sys.stdout.flush()
            time.sleep(0.05)
        time.sleep(0.5)

    elif flags['FLAG00'] == False:
        Store2 = ("\n" + "While looking around the store, you spotted a shovel.
        for character in Store2:
            sys.stdout.write(character)
            sys.stdout.flush()
            time.sleep(0.05)
        time.sleep(0.5)
        flags['FLAG00'] = True
```

When the player enters the location 'store' and chooses to investigate, the game will check whether FLAG00 is cleared or not. If it is not cleared (FLAG00 = False), then the game will go through the second dialogue option. After the player clears the dialogue, the flag will be cleared (FLAG00 = True). Otherwise, if the player chooses to investigate the location with FLAG00 already cleared, then the game will go through the first dialogue, but no change will be applied. This is only a single example, and other locations with variance in the flags.

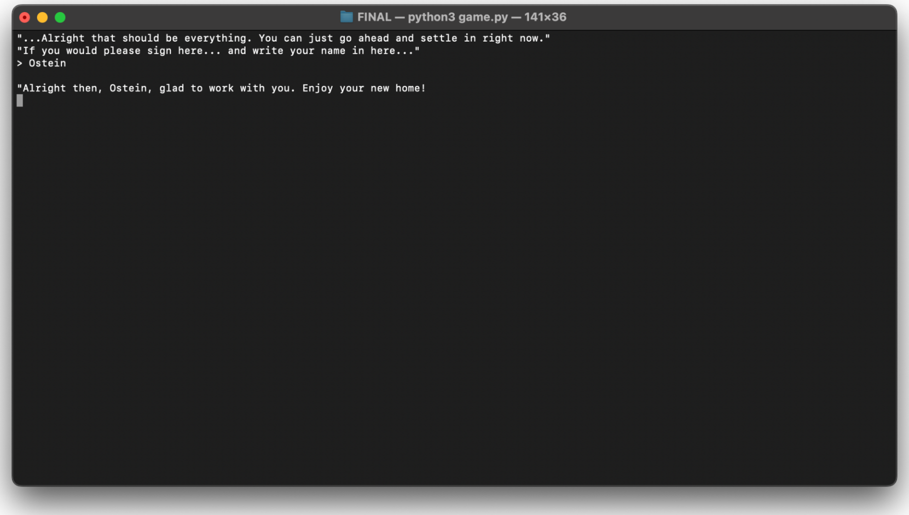
4. Prompt

The prompt is the player's main interface for the game. Throughout the duration of the game, the player will either type in 'move' to change locations or 'investigate' to investigate the current location.

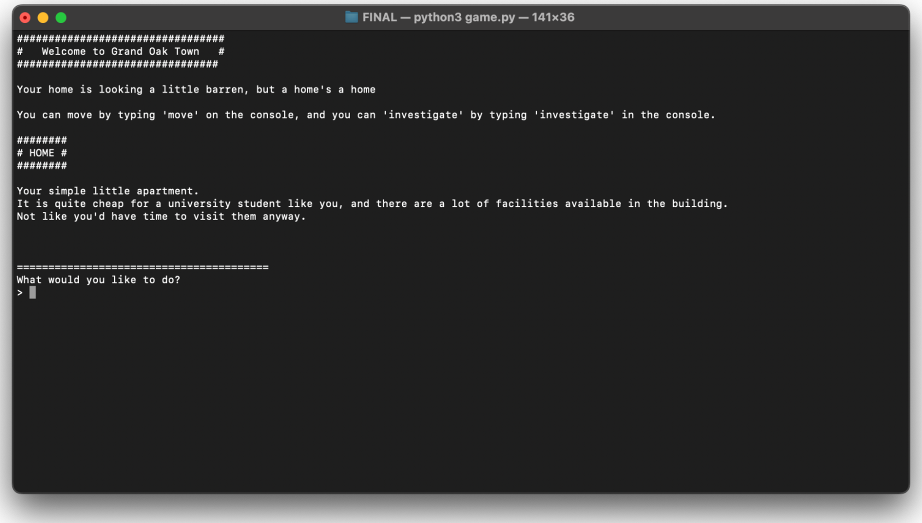
VII. Screenshots



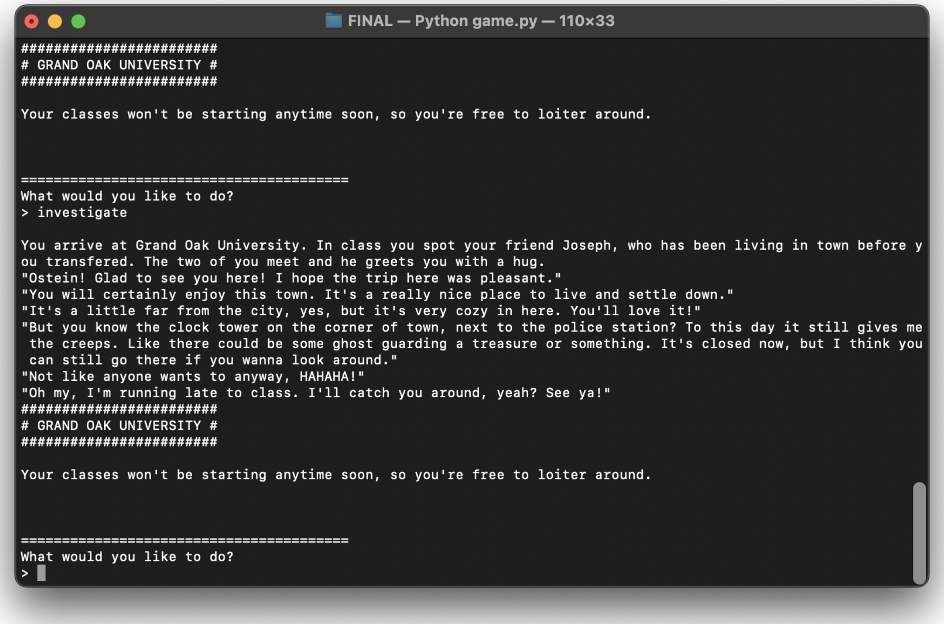
```
##########################################
##     Welcome to Grand Oak Town!       ##
##  Created by Ostein Vittorio Vellim   ##
##########################################
                --Play--
                --Quit--
> 
```



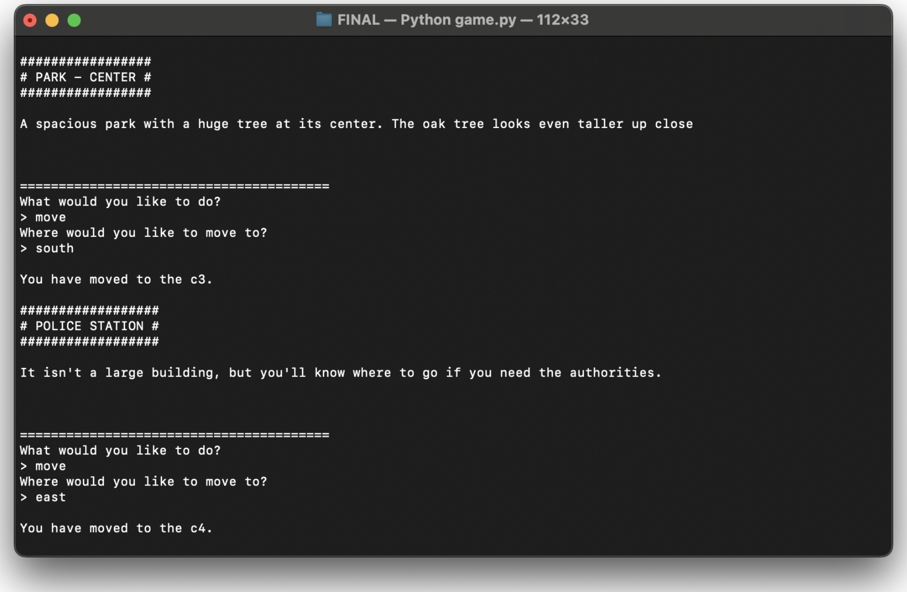
```
"...Alright that should be everything. You can just go ahead and settle in right now."
"If you would please sign here... and write your name in here..."
> Ostein

"Alright then, Ostein, glad to work with you. Enjoy your new home!
```



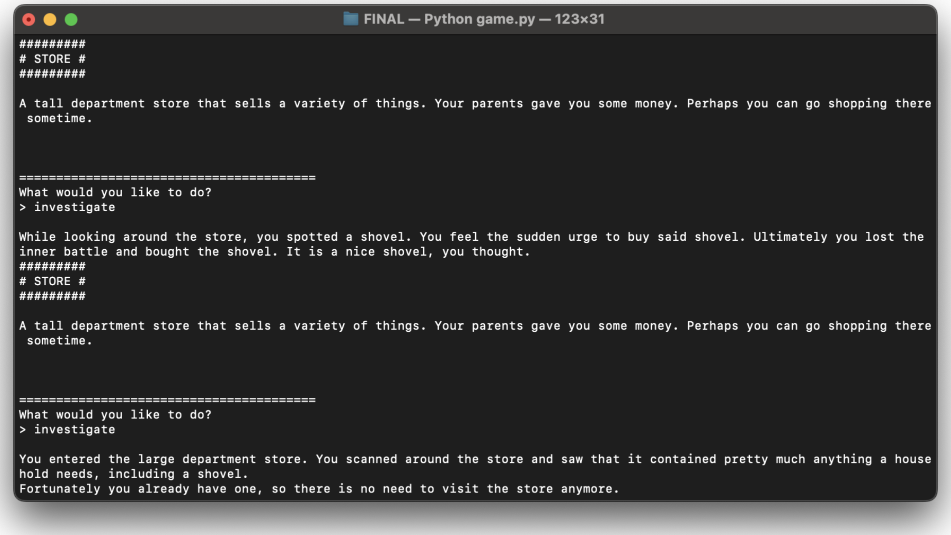
```
#################################
#   Welcome to Grand Oak Town   #
################################

Your home is looking a little barren, but a home's a home

You can move by typing 'move' on the console, and you can 'investigate' by typing 'investigate' in the console.

########
# HOME #
########

Your simple little apartment.
It is quite cheap for a university student like you, and there are a lot of facilities available in the building.
Not like you'd have time to visit them anyway.



========================================
What would you like to do?
> 
```



```
########################
# GRAND OAK UNIVERSITY #
########################

Your classes won't be starting anytime soon, so you're free to loiter around.



========================================
What would you like to do?
> investigate

You arrive at Grand Oak University. In class you spot your friend Joseph, who has been living in town before y
ou transfered. The two of you meet and he greets you with a hug.
"Ostein! Glad to see you here! I hope the trip here was pleasant."
"You will certainly enjoy this town. It's a really nice place to live and settle down."
"It's a little far from the city, yes, but it's very cozy in here. You'll love it!"
"But you know the clock tower on the corner of town, next to the police station? To this day it still gives me
 the creeps. Like there could be some ghost guarding a treasure or something. It's closed now, but I think you
 can still go there if you wanna look around."
"Not like anyone wants to anyway, HAHAHA!"
"Oh my, I'm running late to class. I'll catch you around, yeah? See ya!"
########################
# GRAND OAK UNIVERSITY #
########################

Your classes won't be starting anytime soon, so you're free to loiter around.



========================================
What would you like to do?
> 
```



```
#################
# PARK - CENTER #
#################

A spacious park with a huge tree at its center. The oak tree looks even taller up close



========================================
What would you like to do?
> move
Where would you like to move to?
> south

You have moved to the c3.

##################
# POLICE STATION #
##################

It isn't a large building, but you'll know where to go if you need the authorities.



========================================
What would you like to do?
> move
Where would you like to move to?
> east

You have moved to the c4.
```



```
#########
# STORE #
#########

A tall department store that sells a variety of things. Your parents gave you some money. Perhaps you can go shopping there
 sometime.



========================================
What would you like to do?
> investigate

While looking around the store, you spotted a shovel. You feel the sudden urge to buy said shovel. Ultimately you lost the
inner battle and bought the shovel. It is a nice shovel, you thought.
#########
# STORE #
#########

A tall department store that sells a variety of things. Your parents gave you some money. Perhaps you can go shopping there
 sometime.



========================================
What would you like to do?
> investigate

You entered the large department store. You scanned around the store and saw that it contained pretty much anything a house
hold needs, including a shovel.
Fortunately you already have one, so there is no need to visit the store anymore.
```

VIII. Reflection

This project was simple in nature, but in order to keep its simplicity, it takes a lot of work. I saw a lot of my peers using more intricate modules like pygame, but I decided to make myself work with some very basic modules. Despite that, I realized that you could do a lot with the main functions itself. For instance, the map system. It is quite intuitive to use dictionaries as a navigation system, and I believe that it worked incredibly well for a simple project like mine. And I like to think of my project as that: simple.

I used to think that programmers and developers were skilled because they could work with more complex systems, more complex languages, more complex modules. But through this project, I realized that it is not entirely correct. Sure, more powerful systems can create bigger things, faster things, more effective things. But a truly skilled programmer should be able to create something out of anything; even the simpler things.

Am I a skilled programmer? No. Far from it. I could barely print out a line of code just about a year ago. But going through this program and starting and completing this project, despite facing numerous roadblocks, I realized that I could be much better and that I have grown from where I was. And in the end, I could say that this is a project I am proud of. Even so, I know that I am capable of accomplishing more in my career, and from now I will continue to learn and grow to better myself into someone I would look up to.

IX. Resources and Links

1. Python - Text RPG Tutorial on Youtube by Bryan Tong
   https://www.youtube.com/playlist?list=PL1-slM0ZOosXf2oQYZpTRAoeuo0TPiGpm

2. Video Demo
   https://youtu.be/Rp-q4L_TgzM