

Final Project

For our final project, our class was tasked with creating a computer game that would allow a player to traverse a series of rooms all while interacting with the spaces and collecting objects along the way. One or more of the objects would enable the player to solve the game. The concept of my game is structured around Winnie-the-Pooh, who is about to embark on a trip with friends, and must go through various rooms to capture the blow torch that will ultimately be used to obtain his precious and vital insulin.

Pooh enters his home and can interact inside all the spaces in his room. In the living room, he can feed the cat; in Piglet's guest room, he can close the curtain; in the library, he can turn the lights on as well as discover the blow torch and cayenne pepper; in the honey room, he can eat honey; in the bedroom, he can make his bed. In the thinking room, he can use the blow torch to capture the insulin and spray the bees with cayenne pepper. When Pooh uses the blow torch on the glass case which houses the insulin and has not exceeded the time limit imposed at the start of the game, he successfully captures the coveted item, and the game is over.

My game was designed by creating an abstract Space base class with six derived classes: the thinking room, Piglet's room, living room, library, honey room, and bedroom. The space class contained all the Boolean variables, getter, and setter functions that would be used to change the status of the rooms. The space class also contained the four direction pointers- up, down, right, and left. There were also three pure virtual functions - menu(), roomMenu() and specialAction(). These three functions existed in all the derived classes and enabled the player to interact with the room and visiting adjoining rooms. Lastly, the space class also contained a spaceMap() function, which was used to create the spatial infrastructure of the game. A backpack was used as a

container Pooh would use to collect items. The backpack was an array of strings, where the array size was set to three. In the game, Pooh could find and store the cayenne pepper and blow torch in his backpack. The blow torch was necessary to solve the game. The final class was the game class which allowed the game to be played until Pooh ran out of time or accomplished the goal of the game by obtaining the sacred insulin.

I had to solve a variety of problems before successfully completing my game. The first problem I had to resolve involved finding a way to have the items found in my library class be evident to my thinking room class. Initially, my container was in my library class as a private member variable. This prevented the thinking room from knowing what items were in the backpack. To resolve this, I put the backpack in my game class, and my thinking room and library room constructors now received a pointer to the backpack as its argument. This allowed me to reference the contents of the backpack from the thinking room and library room.

Another issue I had to solve involved figuring out a way to navigate the rooms using pointers. It took some time to conceptualize this, but I finally understood how to accomplish what I wanted when I envisioned my rooms as a linked list held together by pointers. In addition, I also was cognizant of the walls that separated the rooms and thus allowed Pooh to only visit adjoining rooms to mimic a real-life physical scenario. As such, I connected the spaces using these pointers and assembled the spatial layout of the game.

The third issue I had to solve involved keeping track of the player's status. I now created the spatial infrastructure of my game, but had to devise a way to move my player from room to room. At first, I struggled with trying to implement this concept because I had to account for where the player currently was and where the player could feasibly go. The player could only go to adjoining rooms and could not hop over walls. After much thought, I was able to solve this

problem by creature a virtual roomMenu() function that would return a pointer to space. The roomMenu() function allowed the player to move to any adjoining room by updating the currentRoom pointer to point to the room the player wanted to go to next.

Creating this computer game allowed me to strengthen my understanding of pointers, data structures, polymorphism, and inheritance. I had to conceptualize a base class that would extend its properties to my derived room classes. In addition, I had to utilize pointers to link the rooms together and allow the player to move to the adjoining rooms. Although this project presented some challenges, I worked through these problems successfully and created an interactive game.

Test Case	Expected Outcome	Driver Functions	Observed Outcome
Try to spray bees with cayenne pepper without the cayenne spray item in backpack	Unable to spray bees. Get message that states cayenne spray is not in backpack.	menu()	Unable to spray bees. Get message that states cayenne spray is not in backpack.
Try to obtain insulin without blowtorch	Unable to obtain insulin. Get message that states blowtorch is not in backpack.	menu()	Unable to obtain insulin. Get message that states blowtorch is not in backpack.
Spray bees with cayenne pepper with cayenne pepper in backpack	Can spray bees	menu()	Can spray bees
Feed the cat in the living room	Cat gets fed	specialAction()	Cat gets fed
Feed the cat in the living room a second time	Get message: you already fed the cat!	specialAction()	Get message: you already fed the cat!
Eat honey in the honey room	Eats honey	specialAction()	Eats honey
Try to eat honey a second time	Gets message: you already had honey!	specialAction()	Gets message: you already had honey!
Close the curtains in Piglet's room	Get message: You have closed the curtains.	specialAction()	Get message: You have closed the curtains.
Try to close the curtain's in piglet's room a second time	Get message: The curtains are already closed.	specialAction()	Get message: The curtains are already closed.
Make the bed in the bedroom	Makes the bed	specialAction()	Makes the bed
Try to make the bed in the bedroom a second time	Get message: You already made the bed	specialAction()	Get message: You already made the bed
Turn on the light	Lights turn on	specialAction()	Lights turn on

Try to turn on the light a second time	Gets message: you already turned on the lights!	specialAction()	Gets message: you already turned on the lights!
Check behind the Winnie Pooh Life-Sized Grand Almanac	Obtain the blow torch	menu()	Blow torch is obtained
Open the drawer in the library	Obtain the cayenne pepper	menu()	Cayenne pepper is obtained
Player solves game by using blowtorch to obtain insulin	Game ends	playGame()	Game ends
Attempt to exceed time limit by playing for playing until the ticket hits 50	Game ends	playGame()	Game ends
From living room, visit thinking room	Goes to thinking room	roomMenu()	Goes to thinking room
From thinking room, go to Piglet's guest room	Goes to Piglet's guest room	roomMenu()	Goes to Piglet's guest room