CSS 342

Homework 05

Hunt the Wumpus

**Overview:**

For this homework you will be implanting a version of the game Wumpus.

Wumpus is a text based adventure game. You are in a pitch black cave with 20 rooms.

The rooms are arranged in a dodecahedron. IE each room has three exits to other rooms.

Some of the rooms have a bottomless pit.

Some of the rooms have a colony of super bats.

Somewhere in the maze there is a sleeping Wumpus .

Your job is to kill the Wumpus before it kills you, or you fall into a pit.

( Details below)

You should provide a separate .h and .cpp files for each class you design, as well as a .cpp file with main() for running the program

You will submit a single zip file containing all your files.

I will compile your program by downloading your files and executing “g++ \*.cpp”

For testing – run your program and test with various parameters to assure your program is following the parameters as set out.

Additionally, we will look at your code for commenting / style provisions and as necessary for logic.

One test we will run is to have a file of rooms to move to and redirect it to your application. For this to work you need to name your rooms as specified below.

**Game Details:**

Your will have 20 rooms, numbered 0 thru 19. They will be arranged as follows ( label room 20 as room 0)

Shape

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When you start the game, you will take three parameters on the command line.

* NumBats
* NumPits
* WumpusTiredness

If you do not provide three values, the program will remind you to enter values and exit. Something like

*Incorrect number of parameters. Provide “ NumBats, NumPits, WumpusHealth”*

You will randomly populate the maze with the number of Bats specified. Bats are very territorial. Only one bat per room

You will randomly populate the maze with the number of pits specified. No more than one pit per room. Note that a room with a pit may have a Bat.

You will randomly populate the maze with a single Wumpus.

The player will start in room 0. This implies that you cannot put a pit, bat, or Wumpus in room 0;

If you enter a room with a bat, you will be picked up by the bat and carried to a new room.

If you enter a room with a pit, you will fall into the pit and die ( unless a bat picks you up and moves you to a new room)

If you enter a room with a bat and a wumpus – the bat will take you away before the Wumpus eats you.

If you enter a room with a Wumpus – the wumpus will either move to a new room or eat you. The probability of eating or leaving is based on the Wumpus Tiredness.

Whenever you enter a room ( either by moving there, or being carried by a bat) the program will give you some information about what you hear, feel, or smell.

* If there is a Wumpus in an adjacent room you will be told “You smell a Wumpus nearby”
* If there is a bat in an adjacent room you will be told “You hear the wings of a bat fluttering”
* If there is a pit in an adjacent room you will be told “You feel a cold draft”

You have two arrows. You can fire the arrow into an adjacent room. If the Wumpus is in the room you kill it and win the game.

If you try and fire your arrow into a non-adjacent room the arrow will break agains the wall.

If you use up all of your arrows, you die and lose the game.

If the Wumpus eats you , you die and lose the game.

If you fall into a pit, you die and lose the game.

To shoot an arrow you enter room #20 as the room you want to move to. The program will prompt you for the room number to fire into

Bats:

The giant bat hangs on the ceiling of the room Each bat starts off with one unit of health;

Every turn – the Bat gets another unit of health

If you wander into a room with a bat, the bat will fly you to another room and drop you.

The number of rooms the bat will travel is based on it’s health. IE if ‘BatHealth’ is the health value – you will be flown “(BatHealth % 3)+1” rooms.

The room selection is at random . at each room you will randomly pick one of the three passageways out of the room

When the bat drops you in the room, it’s health will be reset to ‘1’ and it will return to the original location.

If you are dropped in a room with a bat, you will be picked up by that bat and flown to some other room.

If you are dropped in a room with a pit, and no bat , you will die

If you are dropped in a room with a Wumpus it will be as if you entered the room

Pits:

Enter a room with a pit and you die – unless there is a bat to grab you and take you to another room

Wumpus:

The Wumpus is sleeping. When disturbed it will either eat you, or wander off to some other room , selected at random , and go back to sleep.

The Wumpus can happily go to any room in the cave ( suction feet and too heavy for a bat to move)

The Wumpus has a tiredness factor that you set when you invoke the program.

With each turn the tiredness factor is decremented by one.

To determine if the Wumpus eats you – you generate a random number from 0 to the tirednessFactor. If the generated number is ‘0’ the Wumpus eats you. If the tirednessFactor is 0 – the Wumpus always eats you.

In order to test the program – whenever the Wumpus moves to a new room ( and at the start of the game) print which room the wumpus is in.

Sample Output:

You are in room 11

You may go to room 10, Room 12, Room 19

Enter Choice :10

You are in room 10

You may go to room 2, Room 9, Room 11

Enter Choice :2

You are in room 2

You feel a draft

You may go to room 1, Room 3, Room 10

Enter Choice :1

You are in room 1

You have fallen into a pit. You are dead

You are in room 11

You may go to room 10, Room 12, Room 19

Enter Choice :10

You are in room 10

You may go to room 2, Room 9, Room 11

Enter Choice :2

You are in room 2

You hear the wings of a bat fluttering

You smell a Wumpus nearby

You may go to room 2, Room 9, Room 11

Enter Choice :9

You are in room 9

A giant bat picks you up and drops you in Room 13

You are in room 13

You have fallen into a pit. You are dead

You are in room 2

You hear the wings of a bat fluttering

You smell a Wumpus nearby

You may go to room 1, Room 3, Room 10

Enter Choice :20

What direction do you want to shoot your arrow?

Enter Room number :3

You have killed the Wumpus. You win.

C++ Hints:

There are a few tricky bits re C++ and this program Specifically

* Getting input from the command line and converting it into numbers
* Random number generation
* How to handle map of rooms. IE what are the adjacent rooms.

Getting input:

The main () function really has two additional arguments. The signature is:



To get the command line args. Do something like this

Text

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Description automatically generated with medium confidence

Shows how to get the string and convert to an integer.

Random Numbers.

To generate a psudo-random number you have to:

Seed the number generator.

Get the random number. Number is between 0 and RAND\_MAX ( a really big number)

To get a useful random number – you typically do a mod on it. IE

Text

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How to handle room relations.

IE what rooms can I got to from some room?

Several possible approaches:

You could put three pointers to the ‘next’ room in a Room class

You would Create the 20 room objects, then write code to init the three exits to each room

Somewhat fiddley

You could write a big if / then / else block of code IE

If in room ‘3’ and door number ‘1’ Return ‘2’

Also fiddley

You could set up some kind of const data structure in the map that holds the room number relations.

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A problem I encountered last night:

Compiling

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bat.cpp is including bat.h

bat.h is including map.h

map.h is including room.h

room.h needs to know about the Bat class – but bat.h has not finished being read yet.

One solution

Don’t have circular dependencies in your classes.

Diagram

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If you have to – you can forward declare the class if all you need is a reference to it.

Text

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