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Introduction to C++

To be reported on canvas. Create a PDF. Include screenshots of code and execution. Include copy-pasteable text of code. Be careful with variable names and indentation. You must use the templates.

Problem 1. Hotel, Floors and Rooms

Write a program that calculates the occupancy rate for a hotel. The program should ask the user how many floors the hotel has. A loop should then iterate once for each floor. In each iteration, the loop should ask the user for the number of rooms on the floor and how many of them are occupied. After all the iterations, the program should display how many rooms the hotel has, how many of them are occupied, how many are unoccupied, and the percentage of rooms that are occupied. The percentage may be calculated by dividing the number of rooms occupied by the number of rooms.

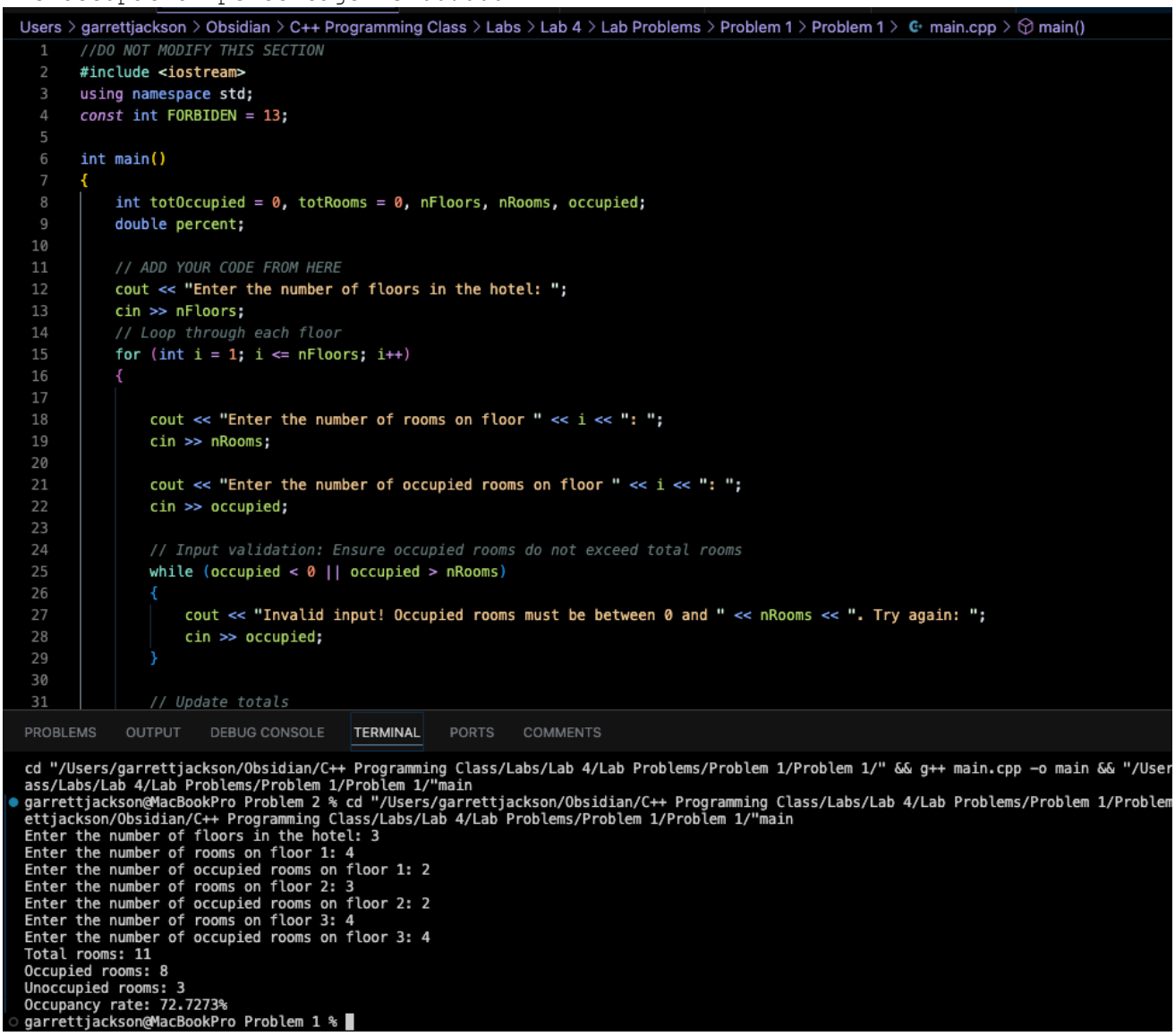
USE THE NEXT TEMPLATE (MANDATORY):

```
//DO NOT MODIFY THIS SECTION
#include <iostream>
using namespace std;

const int FORBIDEN=13;
int main()
{
    int totOccupied=0, totRooms=0, nFloors, nRooms, occupied;
    double percent;

//ADD YOUR CODE FROM HERE




}
```

Example:

```
How many floors? 6
 How many rooms in floor 1? 3
 How many occupied rooms in floor 1? 2
 How many rooms in floor 2? 3
 How many occupied rooms in floor 2? 2
 How many rooms in floor 3? 3
 How many occupied rooms in floor 3? 2
 How many rooms in floor 4? 3
 How many occupied rooms in floor 4? 2
 How many rooms in floor 5? 3
 How many occupied rooms in floor 5? 2
```

```
 How many rooms in floor 6? 3
 How many occupied rooms in floor 6? 2
 The hotel has 18 rooms.
12 are occupied.
6 are unoccupied.
The occupation percentage is 66.6667
```




```
//DO NOT MODIFY THIS SECTION
#include <iostream>
using namespace std;
const int FORBIDEN = 13;

int main()
{
    int totOccupied = 0, totRooms = 0, nFloors, nRooms, occupied;
    double percent;

    // ADD YOUR CODE FROM HERE
    cout << "Enter the number of floors in the hotel: ";
    cin >> nFloors;
    // Loop through each floor
```

```
    for (int i = 1; i <= nFloors; i++)
    {

        cout << "Enter the number of rooms on floor " << i << ": ";
        cin >> nRooms;

        cout << "Enter the number of occupied rooms on floor " << i << ": ";
        cin >> occupied;

        // Input validation: Ensure occupied rooms do not exceed total rooms
        while (occupied < 0 || occupied > nRooms)
        {
            cout << "Invalid input! Occupied rooms must be between 0 and " <<
nRooms << ". Try again: ";
            cin >> occupied;
        }

        // Update totals
        totRooms += nRooms;
        totOccupied += occupied;
    }

    // Calculate occupancy rate
    percent = (static_cast<double>(totOccupied) / totRooms) * 100;

    // Display results
    cout << "Total rooms: " << totRooms << endl;
    cout << "Occupied rooms: " << totOccupied << endl;
    cout << "Unoccupied rooms: " << (totRooms - totOccupied) << endl;
    cout << "Occupancy rate: " << percent << "%" << endl;

    return 0;
}
```

Problem 3. File with Names and Ages

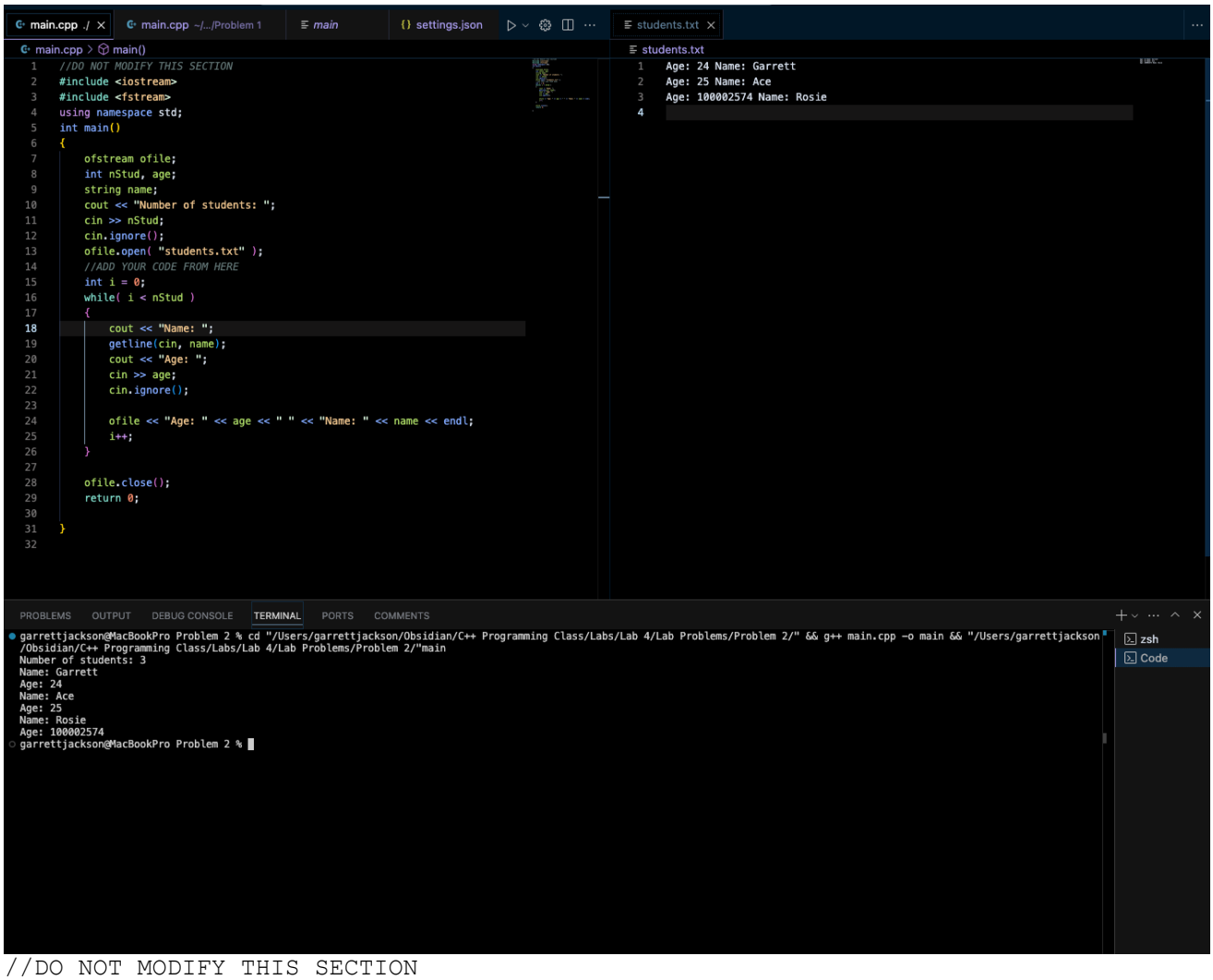
Write a program that will open (create) a new file named "students.txt", and will do this:

a) Ask the user how many students will be registered.
b) Make a loop for all students in which the program will:
   - Ask for the names of the students (can have spaces).
   - Ask for the student's age.
   - Write a line with the age, space, and full name in the file.

TEMPLATE:

```
//DO NOT MODIFY THIS SECTION
#include <iostream>
#include <fstream>
using namespace std;

int main()
{
    ofstream ofile;
    int nStud, age;
    string name;
```

```
    cout << "Number of students: ";
    cin >> nStud;
    cin.ignore();
    ofile.open( "students.txt" );
//ADD YOUR CODE FROM HERE
}
```




```
//DO NOT MODIFY THIS SECTION
#include <iostream>
#include <fstream>
using namespace std;
int main()
{
    ofstream ofile;
    int nStud, age;
    string name;
    cout << "Number of students: ";
    cin >> nStud;
    cin.ignore();
    ofile.open( "students.txt" );
    //ADD YOUR CODE FROM HERE
    int i = 0;
    while( i < nStud )
    {
```

```
        cout << "Name: ";
        getline(cin, name);
        cout << "Age: ";
        cin >> age;
        cin.ignore();

        ofile << "Age: " << age << " " << "Name: " << name << endl;
        i++;
    }

    ofile.close();
    return 0;

}
```