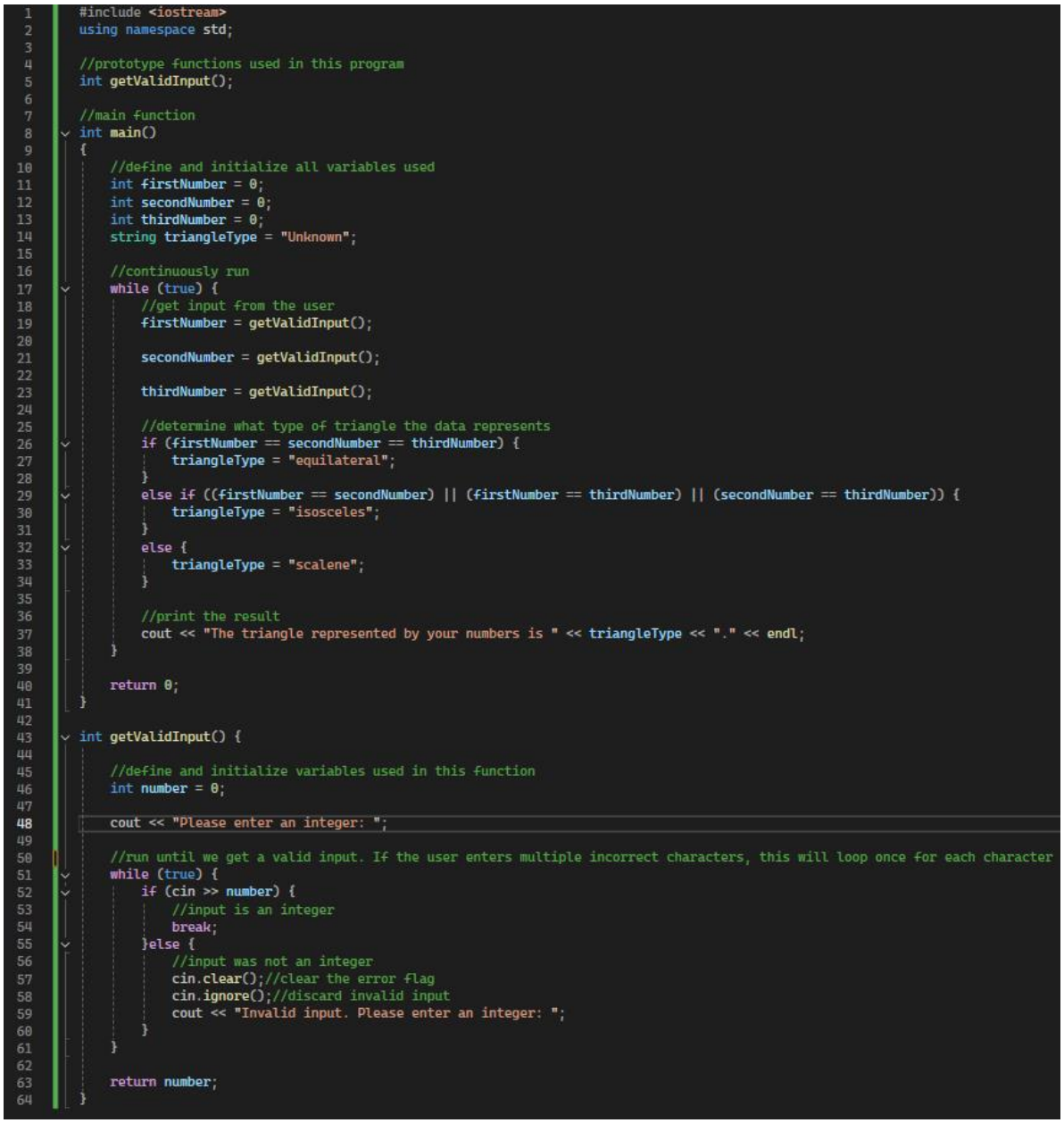
Tim Ferguson | EN.605.604.81.FA24 |Object-Oriented Programming with C++ | 8/31/2024

Design:

The design methodology is to get three valid integer inputs from a user and then use basic logic to determine the type of triangle is represented.

Source code:



```
#include <iostream>
using namespace std;

//prototype functions used in this program
int getValidInput();

//main function
int main()
{
    //define and initialize all variables used
    int firstNumber = 0;
    int secondNumber = 0;
    int thirdNumber = 0;
    string triangleType = "Unknown";

    //continuously run
    while (true) {
        //get input from the user
        firstNumber = getValidInput();

        secondNumber = getValidInput();

        thirdNumber = getValidInput();

        //determine what type of triangle the data represents
        if (firstNumber == secondNumber == thirdNumber) {
            triangleType = "equilateral";
        }
        else if ((firstNumber == secondNumber) || (firstNumber == thirdNumber) || (secondNumber == thirdNumber)) {
            triangleType = "isosceles";
        }
        else {
            triangleType = "scalene";
        }

        //print the result
        cout << "The triangle represented by your numbers is " << triangleType << "." << endl;
    }

    return 0;
}

int getValidInput() {

    //define and initialize variables used in this function
    int number = 0;

    cout << "Please enter an integer: ";

    //run until we get a valid input. If the user enters multiple incorrect characters, this will loop once for each character
    while (true) {
        if (cin >> number) {
            //input is an integer
            break;
        }else {
            //input was not an integer
            cin.clear();//clear the error flag
            cin.ignore();//discard invalid input
            cout << "Invalid input. Please enter an integer: ";
        }
    }

    return number;
}
```

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```
using namespace std;

//prototype functions used in this program
int getValidInput();

//main function
int main()
{
//define and initialize all variables used
int firstNumber = 0;
int secondNumber = 0;
int thirdNumber = 0;
string triangleType = "Unknown";

//continuously run
while (true) {
//get input from the user
firstNumber = getValidInput();

secondNumber = getValidInput();

thirdNumber = getValidInput();

//determine what type of triangle the data represents
if (firstNumber == secondNumber == thirdNumber) {
triangleType = "equilateral";
```

```
}
else if ((firstNumber == secondNumber) || (firstNumber == thirdNumber) || (secondNumber == thirdNumber)) {
triangleType = "isosceles";
}
else {
triangleType = "scalene";
}

//print the result
cout << "The triangle represented by your numbers is " << triangleType << "." << endl;
}

return 0;
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int getValidInput() {

//define and initialize variables used in this function
int number = 0;

cout << "Please enter an integer: ";

//run until we get a valid input. If the user enters multiple incorrect characters, this will loop once for each character
while (true) {
```

```
if (cin >> number) {

//input is an integer

break;

}else {

//input was not an integer

cin.clear();//clear the error flag

cin.ignore();//discard invalid input

cout << "Invalid input. Please enter an integer: ";

}

}


return number;

}
```

Test driver:

The test driver for this code was a series of inputs to determine behavior with any given set of inputs:

- 1, 1, 1
- 1, 2, 1
- 1, 2, 3
- A, 1, b, 2, 2

Results:

The program worked as excpected, validating user input and determining the correct type of triangle.

```
Please enter an integer: 1
Please enter an integer: 1
Please enter an integer: 1
The triangle represented by your numbers is equilateral.
Please enter an integer: 1
Please enter an integer: 2
Please enter an integer: 1
The triangle represented by your numbers is isosceles.
Please enter an integer: 1
Please enter an integer: 2
Please enter an integer: 3
The triangle represented by your numbers is scalene.
Please enter an integer: A
Invalid input. Please enter an integer: 1
Please enter an integer: b
Invalid input. Please enter an integer: 2
Please enter an integer: 2
The triangle represented by your numbers is isosceles.
Please enter an integer:
```