

## 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:

```
1  #include <iostream>
2  using namespace std;
3
4  //prototype functions used in this program
5  int getValidInput();
6
7  //main function
8  int main()
9  {
10     //define and initialize all variables used
11     int firstNumber = 0;
12     int secondNumber = 0;
13     int thirdNumber = 0;
14     string triangleType = "Unknown";
15
16     //continuously run
17     while (true) {
18         //get input from the user
19         firstNumber = getValidInput();
20
21         secondNumber = getValidInput();
22
23         thirdNumber = getValidInput();
24
25         //determine what type of triangle the data represents
26         if (firstNumber == secondNumber == thirdNumber) {
27             triangleType = "equilateral";
28         }
29         else if ((firstNumber == secondNumber) || (firstNumber == thirdNumber) || (secondNumber == thirdNumber)) {
30             triangleType = "isosceles";
31         }
32         else {
33             triangleType = "scalene";
34         }
35
36         //print the result
37         cout << "The triangle represented by your numbers is " << triangleType << "." << endl;
38     }
39
40     return 0;
41 }
42
43 int getValidInput() {
44     //define and initialize variables used in this function
45     int number = 0;
46
47     cout << "Please enter an integer: ";
48
49     //run until we get a valid input. If the user enters multiple incorrect characters, this will loop once for each character
50     while (true) {
51         if (cin >> number) {
52             //input is an integer
53             break;
54         }
55         else {
56             //input was not an integer
57             cin.clear(); //clear the error flag
58             cin.ignore(); //discard invalid input
59             cout << "Invalid input. Please enter an integer: ";
60         }
61     }
62
63     return number;
64 }
```

#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;  
}
```

## 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 expected, 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:
```