Writing C++ Program using Conditional Statements to solve real world problems

Working Example

We have an integer (the number of points). Bonus score are charged on it, according to the rules described below. Write a program that calculates bonus score for the number entered and total points with bonuses.

- If the number is up to 100 including, bonus score is 5.
- If the number is larger than 100, bonus score is 20% of the number.
- If the number is larger than 1000, bonus score is 10% of the number.
- Additional bonus score (accrued separately from the previous ones):
    - for even number give + 1 point.
    - for number, that ends with 5 give + 2 points.

Working Example: Test Cases

Input	Output
20	Bonus: 6 Updated Number: 26
175	Bonus: 37 Updated Number: 212
2703	Bonus: 270.3 Updated Number: 2973.3
15875	Bonus: 1589.5 Updated Number: 17464.5

Solution

Step 1:

Take integer input from the user

Let's make a variable num for taking the input.

```
1  #include <iostream>
2  using namespace std;
3  main()
4  {
5      int num;
6      cout << "Enter an integer Value: ";
7      cin >> num;
```

Solution

Step 2:

Include the condition:

- If the number is up to 100 including, make bonus score equal to 5

```
1  #include <iostream>
2  using namespace std;
3  main()
4  {
5      int num;
6      cout << "Enter an integer Value: ";
7      cin >> num;
8      float bonus;
```

Let's make a variable bonus for calculating the bonus according to the condition.

Food for Thought:
Can someone tell why we have declared bonus as float type?

Solution

Step 2:

Include the condition:

- If the number is up to 100 including, make bonus score equal to 5

Let's write the condition now.

```
1   #include <iostream>
2   using namespace std;
3   main()
4   {
5       int num;
6       cout << "Enter an integer Value: ";
7       cin >> num;
8       float bonus;
9       if (num <= 100){
10          bonus = 5;
11      }
```

Solution

Step 3:

Include the condition:

- If the number is larger than 100, bonus score is 20% of the number.

```
1   #include <iostream>
2   using namespace std;
3   main()
4   {
5       int num;
6       cout << "Enter an integer Value: ";
7       cin >> num;
8       float bonus;
9       if (num <= 100){
10          bonus = 5;
11      }
12      if (num > 100){
13          bonus = num * (20.0/100);
14      }
```

Bonus will be 20% of the number entered by the user

Food for Thought:

Can someone tell why we have wrote 20.0 ?

Solution

Step 4:

Include the condition:

- If the number is larger than 1000, bonus score is 10% of the number.

Bonus will be 10% of the number entered by the user

```
1   #include <iostream>
2   using namespace std;
3   main()
4   {
5       int num;
6       cout << "Enter an integer Value: ";
7       cin >> num;
8       float bonus;
9       if (num <= 100){
10          bonus = 5;
11      }
12      if (num > 100){
13          bonus = num * (20.0/100);
14      }
15      if (num > 1000){
16          bonus = num * (10.0/100);
17      }
```

Solution

Step 5:

Include the condition:

- for even number give + 1 point

+1 will be added in the bonus if the number is even.

```
#include <iostream>
using namespace std;
main()
{
    int num;
    cout << "Enter an integer Value: ";
    cin >> num;
    float bonus;
    if (num <= 100){
        bonus = 5;
    }
    if (num > 100){
        bonus = num * (20.0/100);
    }
    if (num > 1000){
        bonus = num * (10.0/100);
    }
```

Food for Thought:

How to check if the number is Even ?

Solution

Step 5:

Include the condition:

- for even number give + 1 point

+1 will be added in the bonus if the number is even.

```
1   #include <iostream>
2   using namespace std;
3   main()
4   {
5       int num;
6       cout << "Enter an integer Value: ";
7       cin >> num;
8       float bonus;
9       if (num <= 100){
10          bonus = 5;
11      }
12      if (num > 100){
13          bonus = num * (20.0/100);
14      }
15      if (num > 1000){
16          bonus = num * (10.0/100);
17      }
18      if (num % 2 == 0){
19          bonus = bonus + 1;
20      }
```

Solution

Step 6:

Include the condition:

- for number, that ends with 5 give + 2 points

+2 will be added in the bonus if the number ends with 5.

```
1   #include <iostream>
2   using namespace std;
3   main()
4   {
5       int num;
6       cout << "Enter an integer Value: ";
7       cin >> num;
8       float bonus;
9       if (num <= 100){
10          bonus = 5;
11      }
12      if (num > 100){
13          bonus = num * (20.0/100);
14      }
15      if (num > 1000){
16          bonus = num * (10.0/100);
17      }
18      if (num % 2 == 0){
19          bonus = bonus + 1;
20      }
21      if (num % 10 == 5){
22          bonus = bonus + 2;
23      }
```

Solution

Step 7:

Display the output on the console

```
#include <iostream>
using namespace std;
main()
{
    int num;
    cout << "Enter an integer Value: ";
    cin >> num;
    float bonus;
    if (num <= 100){
        bonus = 5;
    }
    if (num > 100){
        bonus = num * (20.0/100);
    }
    if (num > 1000){
        bonus = num * (10.0/100);
    }
    if (num % 2 == 0){
        bonus = bonus + 1;
    }
    if (num % 10 == 5){
        bonus = bonus + 2;
    }
    cout << "Bonus: " << bonus << endl;
    cout << "Updated Number: " << num + bonus;
}
```

Learning Objective

In this lecture, we learnt how to write a C++ program that takes input from the user, apply conditions on it and gives output on Console.

Self Assessment

Write a Program that takes a number and a character and gives the perimeter of either a circle or a square. The input will be in the form of letter and number where the letter will be either 's' for square, or 'c' for circle, and the number will be the side of the square or the radius of the circle.

Use the following formulas:

Perimeter of a square: 4 * side.
Perimeter of a circle: 6.28 * radius.