National University of computer and emerging sciences

Lab#07

Summary

Items	Description
Course Title	Programming Fundamentals
Lab Title	Operators in C++
Duration	3 Hours
Operating System/Tool/Language	Ubuntu/ g++/ C++
Objective	To get familiar with use of Conditional Structures

CONDITIONAL STRUCTURES (IF ELSE and Ternary Operator)

SSSS

1. If-else statement

The if keyword is used to execute a statement or block, if, and only if, a condition is fulfilled. Its syntax is:

```
if (boolean_expression)
{
    // Executes this block if
    // condition is true
}
else
{
    // Executes this block if
    // condition is false
}
```

Here, the condition (boolean_expression) is an expression that is being evaluated. If this condition is true, statement is executed. If it is false, the statement in else part is executed.
For example, the following code fragment prints the message (x is 100), only if the value stored in the x variable is indeed 100:

```
1 if (x == 100)
2   cout << "x is 100";
```

If x is not exactly 100, this statement is ignored, and nothing is printed.

If you want to include more than a single statement to be executed when the condition is fulfilled, these statements shall be enclosed in braces {}, forming a block:

```
1 if (x == 100)
2 {
3    cout << "x is ";
4    cout << x;
5 }
```

2- If-else if Statements

In C/C++ **if-else-if ladder** helps user decide from among multiple options. The C/C++ *if* statements are executed from the top down. As soon as one of the conditions controlling the *if* is true, the statement associated with that *if* is executed, and the rest of the *else- if* ladder is bypassed. If none of the conditions is true, then the final *else* statement will be executed. On the other hand if a sequence of *if*s is used instead of *elseif*, the control goes to every *if* part even if some *if*-part has already been executed.

Syntax

```
if (condition)
    statement 1;
else if (condition)
    statement 2;
.
.
else
    statement;
```

Example:
The sample program below displays the group of person based on age:

Program

```
int main(){
        int age;
        cout<< "Enter your age: ";
        cin>> age;

        if(age<13)
            {
            cout<< "You are a child";
            }
        else if(age<20)
            {
```

```
            cout<< “You are a teenager”;
            }
        else if(age<40)
            {
            cout<< “You are still young”;
            }
        else {
            cout<< “You are senior”;
            }
return 0;
}
```

3- Conditional or Ternary Operator (?:) in C/C++

The conditional operator is kind of similar to the if-else statement as it does follow the same algorithm as of if-else statement but the conditional operator takes less space and helps to write the if-else statements in the shortest way possible.

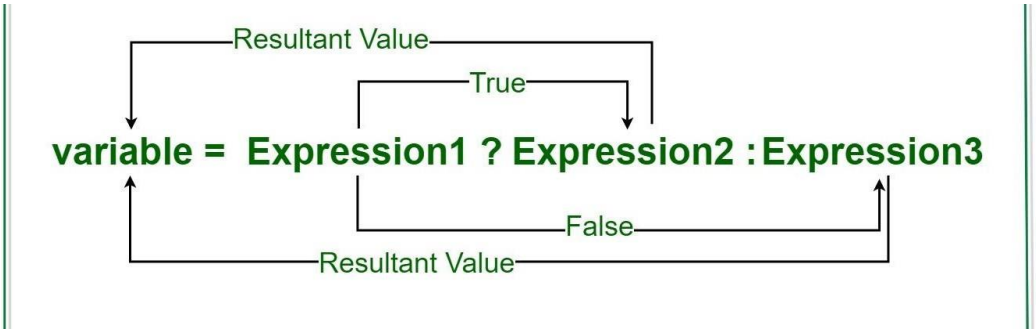

Figure 1-ternary operator in c++ -from geeksforgeeks

Syntax

```
variable = Condition ? Expression2 : Expression3
OR
Condition ? Expression2 : Expression3
```

Visualization into if-else statement

```
if(Expression1)
{
    variable = Expression2;
}
else
{
    variable = Expression3;
}
```

Program 1

```
int n= 20;
char isEven;
isEven= n%2==0 ? 'y' : 'n';
cout<< "isEven= "<<isEven<<endl;
```

output:

```
isEven= y
```

Program 2

```
int x= 20;
n%2==0 ? cout<< "n is an even number": cout<< "n is an odd
number";
```

output:

```
n is an even number
```

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TASKS

Task#01

Write a C++ program to print:
Narrated Abu Sufyan:
That Heraclius sent for him and said, "What did He, i.e. the Prophet (PBUH) order you?" I replied, "He (PBUH) orders us to offer prayers, to give alms, to be chaste and to keep good relations with our relatives."

Task#02

Given four points (x1, y1), (x2, y2) and (x3, y3), (x4,y4) write a program to check if all the three points fall on one straight line. Use ternary operator.

Task#03

Write a program that reads three integers from user and outputs the largest one using **nested if else**.

Sample Output:

Enter first integer x: 5
Enter second integer y: 10
Enter second integer z: 8

Second integer y=10 is largest among three

Task#04

A shop gives discount of 10% of the total purchase to its customers if a customer purchases for more than Rs. 2000. Write a function named **discountedValue**() to calculate and return discounted purchase amount. Ask a customer the total purchase value. Pass the value to function as parameter. The function should display whether the discount is applicable or not. It should return back new purchase value after discount. The main function should display total cost for user after discount.

Sample Output:

Please enter your total purchase value: 10000
Discount is applicable
The total purchase value after discount is: 9000

OR
Please enter your total purchase value: 1500
Discount is not applicable on amount less than 2000
The total purchase value after discount is: 1500

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Task#05

A university does not allow its student to sit in the exam if his/her attendance is less than 85% in any course/lab.
Write a program to ask a student about total number of classes scheduled by instructor during the whole semester and total number of classes he/she attended during the whole semester. Now pass both integers to a function named **calculateAttendance(int classesAttended, int classesTotal**) which should calculate and return floating point number as percentage of his/her attendance. Finally the main function should display the attendance and print the decision if he/she is allowed to sit in the exam or not based on the returned value.

Sample Output:

```
Enter total classes scheduled: 10
Enter total classes attended: 9
Your attendance is: 90%
You are allowed to sit in the exam
```

Task#06

Note:

*Use **if-else if** statements for this program*

Write a program that reads the score of a student in a subject and displays his grades according to the following criteria:

Score	Grade
>= 90	A+
80 – 89	A
70 – 79	B
60 – 69	C
50 – 59	D
< 50	F

Submission Instructions:

1. Save all .cpp files with your roll no and task number e.g. i21XXXX_Problem01.cpp
2. Now create a new folder with name ROLLNO_LAB04 e.g. i21XXXX_LAB06
3. Move all of your .cpp files to this newly created directory and compress it into .zip file.
4. Now you have to submit this zipped file on Google Classroom.