Department of Mechanical Engineering

CS-114 - Fundamental of Programming

Lab Manual # 03

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Objective:

This lab is about the selection structure and understanding the types of selection structures.

Description:

Selection: decisions, branching, when there are 2 or more alternatives. There are three types of selection structures:

- if
- if...else
- switch

Nested if else:

In C++ we can use an if statement in another else block or we can also include an if block in another if block.

Syntax : C++ Nested If

```cpp
if( boolean_expression 1)
{
    // Executes when the boolean expression 1 is true
    if(boolean_expression 2)
    {
        // Executes when the boolean expression 2 is true
    }
}
```

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Example: Nested If

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

int main()
{
    int age = 87;

    if(age>60){

        if(age>100){
            cout << "why are you stil alive?"
        }

    }else{
        cout << "you are young, get a job" << endl;
    }

    return 0;
```

We can nest else if…else in a similar way as you have nested the if statement.

Example: Nested If-else

```cpp
#include <iostream> using

namespace std;


int main ()

{

    int marks = 55;

    if( marks >= 80) {

        cout << "U are 1st class !!";

    } else

    {

        if( marks >= 60) {

            cout << "U are 2nd class !!";

        } else
        {
```

```
        if( marks >= 40) {

            cout << "U are 3rd class !!";

        } else

        {

            cout << "U are fail !!";

        }

    }

} return

0;

}
```

Switch Statement:

Switch case statements are a substitute for long if statements. A switch statement allows a variable to be tested for equality against a list of values. Each value is called a case, and the variable being switched on is checked for each switch case.

```
switch (n)
{
    case 1: // code to be executed if n = 1;
        break;
    case 2: // code to be executed if n = 2;
        break;
    default: // code to be executed if n doesn't match any cases
}
```

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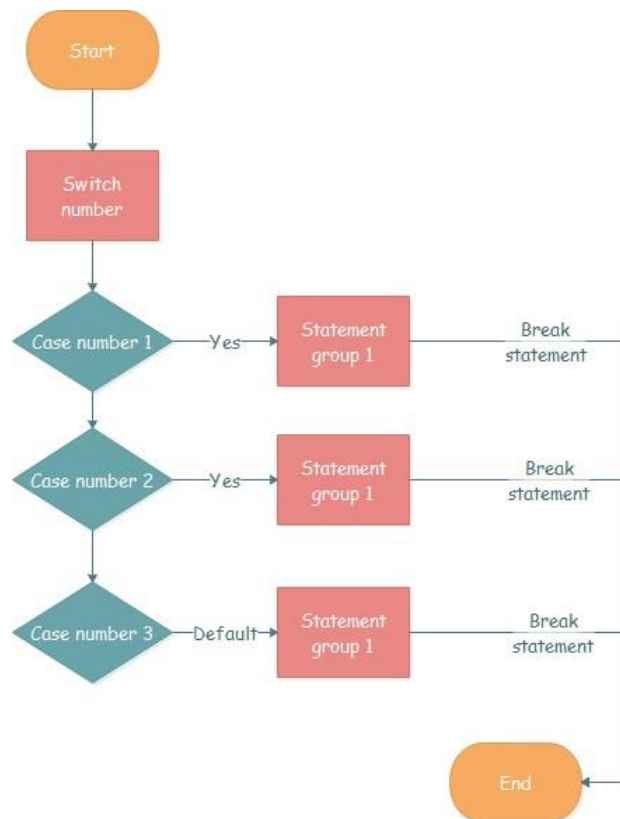
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Lab Task:

1. Write a C++ code for a basic calculator application, using switch...case, to carry out operations such as addition, subtraction, multiplication, or division.
2. Write a C++ program that prints the total number of days in a month, using a switch case.
3. Write a C++ program to take two integer values from the user. Check whether the values are equal. If they are not equal, determine and display the greater value using nested if-else statements.
4. Write a C++ program to read the value of an integer m and display the value of n is 1 when m is larger than 0, 0 when m is 0, and -1 when m is less than 0 using nested if-else.

Home Task:

1. Write a C++ program to print the total number of populations in Punjab, Sindh, KPK, and Balochistan using a switch case.
2. Write a C++ program to check whether an alphabet is a vowel or consonant using a switch case.

3. Write a C++ program to check whether a number is positive, negative, or zero using a switch case.
4. Write a C++ to find out whether a person is an adult, teenager, or child using nested if-else.
5. Write a C++ program that takes three number from the user and find the greatest number out of the three numbers using nested if-else statements.

6. Write a C++ program to check whether the alphabet entered by the user is Vowel or Consonant using nested if-else.

TASK01

```cpp
// Write a C++ program to print the total number of populations in Punjab, Sindh, KPK, and
//balochistan using a switch a case

#include <iostream>
using namespace std;
int main()
{
        char province;
        cout<<"enter s for population of sindh\n";
        cout<<"enter p for population of punjab\n";
        cout<<"enter b for population of balochistan\n";
        cout<<"enter k for popuation of kpk\n";
        cin>>province;
        switch (province){
                case 's':
                        cout<<"the population of sindh is 54,858,515";
                        break;
                case 'p':
                        cout<<"the population of punjab is 127,474,000";
                        break;
                case 'b':
                        cout<<"the population of balochistan is 20,094,659";
                        break;
                case 'k':
                        cout<<"the population of kpk is 39,372,462 ";
                        break;
                default :
                        cout<<"invalid response";


        }
}
```

```
enter s for population of sindh
enter p for population of punjab
enter b for population of balochistan
enter k for popuation of kpk
s
the population of sindh is 54,858,515
--------------------------------
Process exited after 2.733 seconds with return value 0
Press any key to continue . . .
```

TASK02

// whether a alphabet is vowel or consonent

```
#include <iostream>
using namespace std;
int main()
{
 char alpha;
 cout<<"enter an alphabet ";
 cin>>alpha;
 switch (alpha){

        case 'a':case 'A':case 'e':case 'E':case 'i':case 'I':case 'o':case 'O':case 'u':case 'U':
            cout<<"alphabet is a vowel ";
            break;
        default:
            cout<<"alphabet is a consonent ";
    }
}
```

```
enter an alphabet x
alphabet is a consonent
--------------------------------
Process exited after 9.54 seconds with return value 0
Press any key to continue . . .
```

TASK 03

//Write a C++ program to check whether a number is positive, negative, or zero using a switch
//case.

#include <iostream>
using namespace std;
int main()
{
int num;
cout<<"enter a number ";
cin>>num;
switch (num>0){

    case 1:// 1 represents if the given statement is true
     cout<<"number is positive ";
     break;
   case 0:// 0 represents if the statement is false
     switch(num<0){// nested switch
      case 1:
      cout<<"the number is negative ";
      break;
    case 0:// as the number is not positive so it has to be zero
     cout<<"the number is zero ";
     }

```
}
}
```

```
C:\Users\TALHA SANGRASI\D    ×    +    ∨

enter a number -69
the number is negative
-------------------------------
Process exited after 7.141 seconds with return value 0
Press any key to continue . . .
```

TASK 04

// whether a person is a child teenager or adult

```
#include <iostream>
using namespace std;
int main()
{
int age;
cout<<"enter your age ";
cin>>age;
if (age>=0&&age<=12){// setting limits
        cout<<"you are a child ";}
        else{
                if(age>12&&age<=19){// nested if else
                        cout<<"you are a teenager ";

                }
                else{
                        cout<<"you are an adult ";// otherwise
                }
        }
}
```

```
enter your age 69
you are an adult
--------------------------------
Process exited after 5.233 seconds with return value 0
Press any key to continue . . .
```

TASK 05

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

int main() {
    double num1, num2, num3;

    // user enters three numbers
    cout << "Enter three number: ";
    cin >> num1>>num2>>num3;

    if (num1 >= num2) {
        if (num1 >= num3) {
            cout << " the greatest number is" <<num1;
        } else {
            cout << " the greatest number is" <<num3;
        }
    } else {
        if (num2 >= num3) {
            cout << " the greatest number is" <<num2;
        } else {
            cout << " the greatest number is " <<num3;
        }
    }

    return 0;
}
```

```
Enter three number: 34
56
69
 the greatest number is 69
--------------------------------
Process exited after 8.909 seconds with return value 0
Press any key to continue . . .
```

TASK 06

```cpp
#include <iostream>
using namespace std;
int main()
{
char alpha;
cout<<"enter an alphabet ";
cin>>alpha;
if ((alpha>='a'&&alpha<='z')||(alpha>='A'&&alpha<='Z')){

if
(alpha=='a'||alpha=='e'||alpha=='i'||alpha=='o'||alpha=='u'||alpha=='A'||alpha=='E'||alpha
=='I'||alpha=='O'||alpha=='U'){
      cout<<"entered alphabet is a vowel ";}
      else{
            cout<<"entered alphabet is consonent";
      }
}
else {
      cout<<"invalid response ";

}
}
```

```
enter an alphabet x
entered alphabet is consonent
----------------------------------
Process exited after 4.049 seconds with return value 0
Press any key to continue . . .
```