School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamentals of Programming

Lab Report # 03

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Objectives:

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

Home Tasks:

Task 1:

Write a C++ program to print the total number of populations in Punjab, Sindh, KPK, and Balochistan using a switch case.

Code:

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

int main()
{
    char prov;
    cout<<"POPULATION OF PROVINCES"<<endl;
    cout<<"Enter p, s, k, or b for Punjab, Sindh, KPK and Balochistan respectively: ";
    cin>>prov;

    switch(prov)
    {
        case 'p':
            cout<<"The population of Punjab is 73,621,290."<<endl;
            break;
        case 's':
            cout<<"The population of Sindh is 30,439,893."<<endl;
            break;
        case 'k':
            cout<<"The population of KPK is 17,743,645."<<endl;
            break;
        case 'b':
            cout<<"The population of Balochistan is 6,565,855."<<endl;
            break;
        default:
            cout<<"Error! Invalid input."<<endl;
    }
    return 0;
}
```

Output:

```
POPULATION OF PROVINCES
Enter p, s, k, or b for Punjab, Sindh, KPK and Balochistan respectively: k
The population of KPK is 17,743,645.

--------------------------------
Process exited after 2.792 seconds with return value 0
Press any key to continue . . .
```

```
POPULATION OF PROVINCES
Enter p, s, k, or b for Punjab, Sindh, KPK and Balochistan respectively: g
Error! Invalid input.

--------------------------------
Process exited after 4.162 seconds with return value 0
Press any key to continue . . .
```

Task 2:

Write a C++ program to check whether an alphabet is a vowel or consonant using a switch case.

Code:

```cpp
#include <iostream>
using namespace std;
int main()
{
    char alphabet;
    cout<<"Enter an alphabet: ";
    cin>>alphabet;
    alphabet = tolower(alphabet);

    switch(alphabet)
    {
            case 'a': case 'e': case 'i': case 'o': case 'u': cout<<"The alphabet entered is a vowel.";
            break;

            case 'b': case 'c': case 'd': case 'f': case 'g': case 'h': case 'j': case 'k': case 'l': case 'm':
            case 'n': case 'p': case 'q': case 'r': case 's': case 't': case 'v': case 'w': case 'x': case 'y': case'z':
            cout<<"The alphabet entered is a consonant.";
            break;

            default:
            cout<<"Error! Invalid Input";
            break;
    }
    return 0;
}
```

Output:

```
Enter an alphabet: b
The alphabet entered is a consonant.
--------------------------------
Process exited after 2.767 seconds with return value 0
Press any key to continue . . .
```

```
Enter an alphabet: A
The alphabet entered is a vowel.
--------------------------------
Process exited after 5.747 seconds with return value 0
Press any key to continue . . .
```

```
Enter an alphabet: *
Error! Invalid Input
--------------------------------
Process exited after 3.496 seconds with return value 0
Press any key to continue . . .
```

Task 3:

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

Code:

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

int main()
{
    float n;
    cout<<"Enter a number: ";
    cin>>n;

    switch(n>0)
    {
        case 1:
            cout<<"The number is positive."<<endl;
            break;
        case 0:
            switch(n<0)
            {
                case 1:
                    cout<<"The number is negative."<<endl;
                    break;
                case 0:
                    cout<<"The number is equal to zero."<<endl;
                    break;
            }
            break;
    }
    return 0;
}
```

Output:

```
Enter a number: 4
The number is positive.

--------------------------------
Process exited after 2.325 seconds with return value 0
Press any key to continue . . .
```

```
Enter a number: -5
The number is negative.

--------------------------------
Process exited after 2.465 seconds with return value 0
Press any key to continue . . .
```

```
Enter a number: 0
The number is equal to zero.

--------------------------------
Process exited after 2.402 seconds with return value 0
Press any key to continue . . .
```

Task 4:

Write a C++ to find out whether a person is an adult, teenager, or child using nested if-else.

Code:

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

int main()
{
    int age;
    //Age range:
    //Child: 0-12
    //Teenager: 13-19
    //Adult: 20 onwards
    cout<<"Enter the age of a person: ";
    cin>>age;

    if(age>=0)
    {
        if(age<=12)
        {
            cout<<"The person is a child."<<endl;
        }
        else if(age>12 && age<=19)
        {
            cout<<"The person is a teenager."<<endl;
        }
        else
        {
            cout<<"The person is an adult."<<endl;
        }
    }
    else
    {
        cout<<"Error! Invalid input."<<endl;
    }
    return 0;
}
```

Output:

```
Enter the age of a person: 17
The person is a teenager.

--------------------------------
Process exited after 2.221 seconds with return value 0
Press any key to continue . . .
```

```
Enter the age of a person: 22
The person is an adult.

--------------------------------
Process exited after 3.282 seconds with return value 0
Press any key to continue . . .
```

```
Enter the age of a person: 12
The person is a child.

--------------------------------
Process exited after 4.255 seconds with return value 0
Press any key to continue . . .
```

```
Enter the age of a person: -5
Error! Invalid input.

--------------------------------
Process exited after 7.441 seconds with return value 0
Press any key to continue . . .
```

Task 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.

Code:

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

int main()
{
    float x, y, z;
    cout<<"Enter the first number: ";
    cin>>x;
    cout<<"Enter the second number: ";
    cin>>y;
    cout<<"Enter the third number: ";
    cin>>z;

    if(x>=y)
    {
        if(x>=z)
        {
            cout<<"Greatest number is: "<<x<<endl;
        }
        else
        {
            cout<<"Greatest number is: "<<z<<endl;
        }
    }

    else
    {
        if(y>=z)
        {
            cout<<"Greatest number is: "<<y<<endl;
        }
        else
        {
            cout<<"Greatest number is: "<<z<<endl;
        }
    }
    return 0;
}
```

Output:

```
Enter the first number: 7
Enter the second number: 9
Enter the third number: 10
Greatest number is: 10

--------------------------------
Process exited after 6.005 seconds with return value 0
Press any key to continue . . .
```

```
Enter the first number: 4
Enter the second number: 22
Enter the third number: 4
Greatest number is: 22

--------------------------------
Process exited after 10.75 seconds with return value 0
Press any key to continue . . .
```

```
Enter the first number: 78
Enter the second number: 34
Enter the third number: 3
Greatest number is: 78

--------------------------------
Process exited after 12.84 seconds with return value 0
Press any key to continue . . .
```

Task 6:

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

Code:

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

int main()
{
    char alphabet;
    cout<<"Enter an alphabet: ";
    cin>>alphabet;

    alphabet = tolower(alphabet);

    if(alphabet>= 'a' && alphabet<='z')
    {
        if(alphabet == 'a')
        {
            cout<<"The alphabet entered is a vowel."<<endl;
        }
        else
        {
            if(alphabet == 'e')
            {
                cout<<"The alphabet entered is a vowel."<<endl;
            }

            else
            {
                if(alphabet == 'i')
                {
                    cout<<"The alphabet entered is a vowel."<<endl;
                }
                else
                {
                    if(alphabet == 'o')
                    {
                        cout<<"The alphabet entered is a vowel."<<endl;
                    }
                    else
                    {
                        if(alphabet == 'u')
                        {
                            cout<<"The alphabet entered is a vowel."<<endl;
                        }
                        else
                        {
                            cout<<"The alphabet entered is a consonant."<<endl;
                        }
                    }
                }
            }
        }
    }
    else
    {
        cout<<"Error! Invalid input."<<endl;
    }
    return 0;
}
```

Output:

```
Enter an alphabet: f
The alphabet entered is a consonant.

--------------------------------
Process exited after 9.567 seconds with return value 0
Press any key to continue . . .
```

```
Enter an alphabet: G
The alphabet entered is a consonant.

--------------------------------
Process exited after 19.43 seconds with return value 0
Press any key to continue . . .
```

```
Enter an alphabet: e
The alphabet entered is a vowel.

--------------------------------
Process exited after 18.43 seconds with return value 0
Press any key to continue . . .
```

Conclusion:

In this lab, we learnt how to use the switch statement to write programs we had previously written with if-else. We also learnt how to use nested if-else for different purposes.