School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamentals of Programing

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LAB REPORT # 3

Home Tasks:

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.

Objective:

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

HOME TASK 1

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

CODE

```cpp
//Code to print the population of the provinces of Pakistan
/* Juveriah Waqqas - 460510 */
/* Variables used : province (variable which is input and depending upon the character used , the population of the province is displayed) */
/* 11-10-2023*/
/* Lab Report # 3 */

#include<iostream>
using namespace std;
int main()
{
    char province;
    cout<<"Enter = "<<endl<<"p for Punjab"<<endl<<"s for Sindh"<<endl<<"k for KPK"<<endl<<"b for Balochistan"<<endl;
    cin>>province;

    switch(province)
    {
            case 'p': cout<<"The population of Punjab is = 73,621,290";
            break;

            case 's': cout<<"The population of Sindh is = 30,439,893";
            break;

            case 'k': cout<<"The population of KPK is = 17,743,645";
            break;

            case 'b': cout<<"The population of Balochistan is = 6,565,855";
            break;

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

EXECUTION (example)

```
Enter =
p for Punjab
s for Sindh
k for KPK
b for Balochistan
p
The population of Punjab is = 73,621,290
--------------------------------
Process exited after 2.128 seconds with return value 0
Press any key to continue . . .
```

```
Enter =
p for Punjab
s for Sindh
k for KPK
b for Balochistan
k
The population of KPK is = 17,743,645
--------------------------------
Process exited after 1.017 seconds with return value 0
Press any key to continue . . .
```

```
Enter =
p for Punjab
s for Sindh
k for KPK
b for Balochistan
b
The population of Balochistan is = 6,565,855
--------------------------------
Process exited after 3.148 seconds with return value 0
Press any key to continue . . .
```

```
Enter =
p for Punjab
s for Sindh
k for KPK
b for Balochistan
s
The population of Sindh is = 30,439,893
--------------------------------
Process exited after 0.4764 seconds with return value 0
Press any key to continue . . .
```

```
Enter =
p for Punjab
s for Sindh
k for KPK
b for Balochistan
z
Invalid Input
--------------------------------
Process exited after 0.9105 seconds with return value 0
Press any key to continue . . .
```

HOME TASK 2

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

CODE

```cpp
//Code to determine if an alphabet is a vovwel or a consonant
/* Juveriah Waqqas - 460510 */
/* Variables used : alp (variable in which the alphabet is input which is later categorised as vowel or consosnant */
/* 11-10-2023*/
/* Lab Report # 3 */

#include<iostream>
using namespace std;
int main()
{
    char alp;
    cout<<"Enter your alphabet = ";
    cin>>alp;

    switch(alp)
    {
        case 'a': case 'e': case 'i': case 'o': case 'u':
        case 'A': case 'E': case 'I': case 'O': case 'U': cout<<"The alphabet 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':
        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 is a consonant";
        break;

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

EXECUTION (example)

```
Enter your alphabet = F
The alphabet is a consonant
--------------------------------
Process exited after 0.5063 seconds with return value 0
Press any key to continue . . .
```

```
Enter your alphabet = c
The alphabet is a consonant
--------------------------------
Process exited after 0.5438 seconds with return value 0
Press any key to continue . . .
```

```
Enter your alphabet = A
The alphabet is a vowel
--------------------------------
Process exited after 2.925 seconds with return value 0
Press any key to continue . . .
```

```
Enter your alphabet = i
The alphabet is a vowel
--------------------------------
Process exited after 3.963 seconds with return value 0
Press any key to continue . . .
```

```
Enter your alphabet = 1
Invalid Input
--------------------------------
Process exited after 2.165 seconds with return value 0
Press any key to continue . . .
```

HOME TASK 3

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

CODE

```cpp
//Code to determine if a number is poitive, negative or zero
/* Juveriah Waqqas - 460510 */
/* Variables used : num (variable which is input by user and then it is determined if it is positive negative or zero ) */
/* 11-10-2023*/
/* Lab Report # 3 */

#include<iostream>
using namespace std;
int main()
{
    int num;
    cout<<"Input the number = ";
    cin>>num;

    switch(num>0)
    {
    case 1: cout<<"The number is Positive";
    break;

    case 0:
    switch(num<0)
    {
        case 1: cout<<"The number is negative";
        break;

        case 0:
        cout<<"The number is zero";
        break;
    } break;

    }

    return 0;
}
```

EXECUTION (example)

```
Input the number = 1
The number is Positive
--------------------------------
Process exited after 0.5167 seconds with return value 0
Press any key to continue . . .
```

```
Input the number = 0
The number is zero
--------------------------------
Process exited after 0.7588 seconds with return value 0
Press any key to continue . . .
```

```
Input the number = -25
The number is negative
--------------------------------
Process exited after 1.462 seconds with return value 0
Press any key to continue . . .
```

```
Input the number = 222
The number is Positive
--------------------------------
Process exited after 0.9912 seconds with return value 0
Press any key to continue . . .
```

HOME TASK 4

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

CODE

```
//Code to determine if a person is a child, adult or teenager
/* Juveriah Waqqas - 460510 */
/* Variables used : age (variable in which age is input to be later classifed) */
/* 11-10-2023*/
/* Lab Report # 3 */

#include<iostream>
using namespace std;
int main()
{
    int age;
    cout<<"Enter the Age of the Person = ";
    cin>>age;
    if (age>=0)
    {
//The range of a child is 0-12,a teenager is 13 -19 and an adult is 20 forwards.
        if(age<=12){ cout<<"The person is a Child";}
        else if(age>12 && age<=19){ cout<<"The person is a Teenager";}
        else{ cout<<"The person is an Adult";
        }
    }
    else{ cout<<"Invalid Input";
    }

    return 0;
}
```

EXECUTION (example)

```
Enter the Age of the Person = 25
The person is an Adult
--------------------------------
Process exited after 2.542 seconds with return value 0
Press any key to continue . . .
```

```
Enter the Age of the Person = 18
The person is a Teenager
--------------------------------
Process exited after 2.836 seconds with return value 0
Press any key to continue . . .
```

```
Enter the Age of the Person = 5
The person is a Child
--------------------------------
Process exited after 0.5243 seconds with return value 0
Press any key to continue . . .
```

```
Enter the Age of the Person = -5
Invalid Input
--------------------------------
Process exited after 1.412 seconds with return value 0
Press any key to continue . . .
```

HOME TASK 5

Write a C++ program that takes three number from the user and finds the greatest number out of the three numbers using nested if-else statements.

CODE

```
//Code to determine the greatest of three numbers
/* Juveriah Waqqas - 460510 */
/* Variables used : a, b and c (variables which are input to determine whcih of the three is the greatest) */
/* 11-10-2023*/
/* Lab Report # 3 */

#include<iostream>
using namespace std;
int main()
{
    float a,b,c;
    cout<<"Input the First Number ";
    cin>>a;
    cout<<"Input the Second Number ";
    cin>>b;
    cout<<"Input the Third Number ";
    cin>>c;

    if(a>b)
    {
        if(a>c)
        {cout<<"The frist number "<<a<<" is the greatest";}
        else
        {cout<<"The third number "<<c<<" is the greatest";}
    }

    else
    {
        if(b>c)
        {cout<<"The second number "<<b<<" is the greatest";}
        else
        {cout<<"The third number "<<c<<" is the greatest";}
    }
    return 0;
}
```

EXECUTION (example)

```
Input the First Number 7
Input the Second Number -3
Input the Third Number 4
The frist number 7 is the greatest
--------------------------------
Process exited after 2.353 seconds with return value 0
Press any key to continue . . .
```

```
Input the First Number 3
Input the Second Number 22
Input the Third Number 0
The second number 22 is the greatest
--------------------------------
Process exited after 3.397 seconds with return value 0
Press any key to continue . . .
```

```
Input the First Number -33
Input the Second Number -8
Input the Third Number -1
The third number -1 is the greatest
--------------------------------
Process exited after 8.074 seconds with return value 0
Press any key to continue . . .
```

HOME TASK 6

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

CODE

```
//Code to determine if an alphabet is a vowel or a consonant
/* Juveriah Waqqas - 460510 */
/* Variables used : alp (variable in which alphabet is input to classify as vowel or consonant) */
/* 11-10-2023*/
/* Lab Report # 3 */

#include<iostream>
using namespace std;
int main()
{
    char alp;
    cout<<"Enter Alphabet = ";
    cin>>alp;
    alp = tolower(alp);

    if(alp>='a' && alp<='z')
    {if(alp == 'a')
        {cout<<"The Alphabet is a Vowel";}
    else{
        if(alp == 'e')
        {cout<<"The Alphabet is a Vowel";}
        else{
            if(alp == 'i')
            {cout<<"The Alphabet is a Vowel";}
            else{
                if(alp == 'o')
                {cout<<"The Alphabet is a Vowel";}
                else{
                    if(alp == 'u')
                    {cout<<"The Alphabet is a Vowel";}
                        else{cout<<"The alphabet is a consonant";}

                    }
                }
            }
        }
    }
    else{cout<<"Error! Invalid Input";}
    return 0;
}
```

EXECUTION (example)

```
Enter Alphabet = a
The Alphabet is a Vowel
--------------------------------
Process exited after 1.918 seconds with return value 0
Press any key to continue . . .
```

```
Enter Alphabet = I
The Alphabet is a Vowel
--------------------------------
Process exited after 3.756 seconds with return value 0
Press any key to continue . . .
```

```
Enter Alphabet = v
The alphabet is a consonant
--------------------------------
Process exited after 0.4739 seconds with return value 0
Press any key to continue . . .
```

```
Enter Alphabet = M
The alphabet is a consonant
--------------------------------
Process exited after 5.049 seconds with return value 0
Press any key to continue . . .
```

Summary:

Through these tasks I learnt how to use selection structure, particularly nested if-else and switch.

Nested if else statements are used when you want to make decisions based on multiple conditions, they allow you to test for multiple conditions and execute different blocks of code based on the outcome of those conditions, whereas switch statements are used as a substitute for long if statements. One of the drawbacks of switch statements against if-else statements is that the switch statements are limited to testing a single expression against constant values whereas if-else statements offer more flexibility.