Programming Home Task 3

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Task 1

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

```cpp
//Task 1

//The following code prints the population number for a selected province of Pakistan.
int province;
//this is the only variable used.
//simple prompt asking for an input, the key is used to assign each province its own number which will allow switch funtion to be used.
cout<<"Enter 1 for Punjab, 2 for Sindh, 3 for KPK and 4 for Balochistan."<<endl;
cin>>province;
//the integer is placed in the switch and now the conditions can be set for each province.
switch (province)
{
    case 1: //code to be executed if province = 1.
        cout<<"The population of Punjab is"<<endl<<"127,474,000"<<endl; //if integer falls under case 1 then a simple prompt will be printed.
        break;

    case 2: //code to be exicuted if province = 2.
        cout<<"The population of Sindh is"<<endl<<"54,858,515"<<endl; // if integer is 2 then this prompt will be displayed.
        break;

    case 3: //code to be executed if province = 3.
        cout<<"The population of KPK is"<<endl<<"40,850,000"<<endl; // idf integer is 3 then this will be displayed.
        break;

    case 4: //code to be exicuted if province = 4.
        cout<<"The population of Balochistan."<<endl<<"21,700,000"<<endl;
        break;

    default: //this code will display if the input value is not 1,2,3 or 4.
        cout<<"Your input was invalid."<<endl<<"Try again"<<endl;
}
```

For this task I first made a key that represents each province as a number, then I used the switch function to make cases for each province number. I then set the default to be an error prompt that shows up if none of the cases match.

Task 2

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

```
char letter, res; //for this code i used char since the input can only be character.
    cout<<"Enter your alphabet."<<endl; //simple prompt asking for an alphabet.
    cin>>letter;
switch (letter)
{   case 'a': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'e': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'i': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'o': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'u': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'A': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'E': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'I': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'O': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    case 'U': // using '' i can define the alphabet that this code will detect and run.
        cout<<"Your alphabet is a vowel."<<endl;
        break;
    default: //this using default any other alphabet is a consonant.
        cout<<"Your alphabet is a consonant."<<endl; }
```

For this code I first used char to define any letter, then using a long list of cases I set the switch for every lowercase alphabet and for all uppercase alphabets. The default was set to out put “Your alphabet is a consonant” because if any letter does not pass any of the cases then it must be a consonant.

Task 3

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

```cpp
//Task 3

//The following code will check if a number is positive, negative or equal to 0 using switch.
int x; // the integer used is x

cout<<"Enter an integer value."<<endl; // simple prompt that asks for user input.
cin>>x;
// since you cant use expressions like case x > 0: within a switch statement i had to first use if statement to convert positive,
// negative and zero into integers so that i could place the respective integers in their cases.
// this question could have been so much more straight forword if we were told to only use if statement.
if (x>0) {
    x = 1;
}
else if (x<0) {
    x = 2;
}
else {
    x = 3;
}

switch (x)
{
    case 1:
        cout<<"The integer is positive"<<endl; // this code is displayed if x was greater then 0.
        break;

    case 2:
        cout<<"The integer is negative"<<endl; // this code is displayed if x was less then 0.
        break;

    case 3:
        cout<<"The integer is equal to 0"<<endl; // this code is displayed if x was equal to 0.
        break;
}
```

For this code I used int as switch mainly works on whole numbers, I first used if-else statements to convert my inputs into 3 categories i-e x>0, x<0 and x=0. This allows me to use cases to determine the output. This code is complicated since you cant put equations in cases.

Task 4

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

```
//Task 4

//The following code is used to find out if a person is a child, teenager or an adult.

int age; //This code uses only 1 variable, age.

cout<<"Enter your age"<<endl; //simple code that asks for the users age.
cin>>age;

if (age < 13) { //condition 1 age is less the 13 aka the a age of a child.
    cout<<"Acording to your input you are a child"<<endl;
}
else if (age >=13) // the start of a nested if-else statmentx.
{
    if (age < 18) {cout<<"Acording to your input you are a teenager"<<endl; // condtion 2 age is less then 18 which is the age of a teenager.
    }
    else if (age < 20 && age > 17) {cout<<"Acording to your input you are an adult teenager"<<endl; // conditon for an adult teen.
    }
    else if (age > 19) {cout<<"Acording to your input you are an adult"<<endl; // conditon for an adult.
    }
}
```

For this task I set my first if as greater less then 13, then using nested if-else I coded the rest of the possibilities. I also added an output for an adult teenager as when someone is both 18+ but less then 20 they can be considered an adult teenager.

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.

```
//Task 5

//The following code uses nested if-else statments to decide the largest number amoung 3 input numbers.

//Used float so that my code is compatible with decimal inputs.
float X, Y, Z;
//This code is a simple prompt that asks for 3 individual numbers.
cout<<"Enter 3 numbers"<<endl;
cin>>X>>Y>>Z;

//The first if statment sees if x is greater then y if it is then it checks if x is also greater then z thus becomeing the largest number
//if it is greater then y but less then z then z automaticly becomes the largest
//if first condition fails then safe to essume that y is greater then x so then the code checks if y is also greater then z if so
//then y is the largest, if not then z is the largest.
if ( X > Y ) {
    if ( X > Z ) {
        cout<<"The largest number amoung your inputs is "<<X<<endl; // X is the largest if this path of ifs is followed
    }
    else {cout<<"The largest number amoung your inputs is "<<Z<<endl; // z is the largest if this path of ifs is followed
    }
}
else {
    if ( Y > Z ) {
        cout<<"The largest number amoung your inputs is "<<Y<<endl; // y is the largest if this path of ifs is followed
    }
    else {
        cout<<"The largest number amoung your inputs is "<<Z<<endl; // z is the largest if this path of the code is followed
    }
}
```

For this task I used float in order to be able to use decimal values, then I set the first if as X>Y and if this is true then the a nested if X>Z which if true would mean X is the largest, if not then automatically Z is the greatest. If the first condition fails then that mean Y>X so then the next nested if is Y>Z which if true mean Y is the largest and if false then automatically Z is the largest.

Task 6

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

```cpp
    //Task 6

    // the following code checks if a entered alphabet is a vowel or a consonant using nested if-else.

    char alpha;
    // a simple code that asks for an input
    cout<<"Enter an alphabet"<<endl;
    cin>>alpha;

    if ( ( alpha >= 'a' && alpha <= 'z' ) || ( alpha >= 'A' && alpha <= 'Z' ) ) { // first if is used to check if the input is even an alphabet
        if ((alpha == 'a') || (alpha == 'e') || (alpha == 'i') || (alpha == 'o') || (alpha == 'u')) { //this code checks vowels in lowercase letters
            cout<<"This letter is a vowel"<<endl; //if a vowel is detected the out put is displayed
    }
        else if ((alpha == 'A') || (alpha == 'E') || (alpha == 'I') || (alpha == 'O') || (alpha == 'U')) { // code checks for uppercase vowels
        // the repeteation of code for lower and upper case vowels could have been avoided using tolower() funtion that would convert any input into its
        // Lower case form.
            cout<<"This letter is a vowel"<<endl; //if a vowel is detected the out put is displayed
    }
        else {
            cout<<"Your alphabet is a consonant"<<endl; //output if non of the above conditions are true
        }
    }
    else {
        cout<<"Invalid Input"<<endl; //output if the first condition failed

    }
```

For this task I used char to define the input, then I used the first if to check weather the input is even an alphabet. Then I used a nested if-else statement to check if the alphabet is a vowel of not. If the first if fails then the input mast have not been an alphabet so an error prompt appears.

Task 1-6 Outputs:

```
C:\Users\Personal\Desktop\NUST work documents & assignments\Programming\Faizan Ahmad-476602 home work 3\Home Asignment...
TASK 1
Enter 1 for Punjab, 2 for Sindh, 3 for KPK and 4 for Balochistan.
1
The population of Punjab is
127,474,000
TASK 2
Enter your alphabet.
T
Your alphabet is a consonant.
TASK 3
Enter an integer value.
-3
The integer is negative
TASK 4
Enter your age
19
Acording to your input you are an adult teenager
TASK 5
Enter 3 numbers
3
3
9
The largest number amoung your inputs is 9
TASK 6
Enter an alphabet
E
This letter is a vowel

--------------------------------
Process exited after 48.9 seconds with return value 0
```