NUST SCHOOL OF MECHANICAL &MANUFACTURING ENGINEERING

ASSIGNMENT NO:1

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Course: FOP

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SMME ♡

1. Write a C++ program to display factors of a number using for loops.

FOP ASSIGNMENT 1 code 1.cpp

```cpp
#include<iostream>
using namespace std;
int main()
{
    int num;
    cout<<"please enter the positive integer for finding its factors: ";
    cin>>num;
    for(int i = 1; i<=num; i++){
        if(num%i==0){
            cout<<i<<" ";
        }

    }return 0;
}
```

```
C:\Users\HP\Desktop\FOP ASSIGNMENT 1 code 1.exe
please enter the positive integer for finding its factors: 10
1 2 5 10
--------------------------------
Process exited after 5.543 seconds with return value 0
Press any key to continue . . .
```

2. Write output to the following code.

FOP ASSIGNMENT 1 code 2.cpp

```cpp
    #include <iostream>
int main() {
 int x = 5;
 int y = 10;
 if (x == 5)
 if (y == 10)
 std::cout << "x is 5 and y is 10" << std::endl;
 else
 std::cout << "x is not 5" << std::endl;
 return 0;
}
```

```
C:\Users\HP\Desktop\FOP ASSIGNMENT 1 code 2.exe
x is 5 and y is 10

--------------------------------
Process exited after 0.6715 seconds with return value 0
Press any key to continue . . .
```

3. Write a C++ program, take an integer value from user and check if it's greater than 10 and less thanequal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

```cpp
#include<iostream>
using namespace std;
int main(){
    int num;
    cout<<"please enter the number: ";
    cin>>num;
    if(num >10 && num <=20){cout<<"output = 1";
    }
    else{cout<<" output = 0 ";
    }return 0;
}
```

```
C:\Users\HP\Desktop\FOP ASSIGNMENT 1 cod...
please enter the number: 20
output = 1
--------------------------------
Process exited after 1.872 seconds with return value 0
Press any key to continue . . .
```

4. Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing functions to check for prime numbers.

```cpp
#include <iostream>
using namespace std;
int main() {
    int num;
    cout << "Enter a positive integer : ";
    cin >> num;
    while (num > 1) {

//      main body of code:

        int i;
        for (i = 2; i * i <= num; ++i) {
            if (num % i == 0) {
                break;
            }
        }
        if (i * i > num) {
            cout << "The largest prime number is: " << num << endl;
            break;
        }
//          main body of code end.



        --num;
    }



    if (num <= 1) {
        cout << "No prime number is found less than or equal to 1." << endl;
    }
    return 0;
}
```

```
C:\Users\HP\Desktop\
Enter a positive integer : 56
The largest prime number is: 53

--------------------------------
Process exited after 2.148 seconds with retu
rn value 0
Press any key to continue . . .
```

5. Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

```cpp
#include <iostream>
using namespace std;
int main() {
  string str1, str2;

  cout << "Enter the first string: ";
  getline(cin, str1);

  cout << "Enter the second string: ";
  getline(cin, str2);

  if (str1 == str2) {
    cout << "The strings are equal." << endl;

    // Rotate str1 by one position to the left
    char temp = str1[0];
    for (int i = 1; i < str1.length(); i++) {
      str1[i - 1] = str1[i];
    }


    str1 += temp;

    cout << "Rotated string: " << str1 << endl;
  } else {
    cout << "The strings are not equal." << endl;
  }

  return 0;
}
```

```
C:\Users\HP\Desktop\FOP AS
Enter the first string: mr ahmad
Enter the second string: mr ahmad
The strings are equal.
Rotated string: r ahmaddm

--------------------------------
Process exited after 13.04 seconds with return value 0
Press any key to continue . . .
```

6. Perform division in C++ without / using for loops. You can use / only to display the final results. Your dividend must be greater than divisor. #include int main() { int x = 5; int y = 10; if (x == 5) if (y == 10) std::cout << "x is 5 and y is 10" << std::endl; else std::cout << "x is not 5" << std::endl; return 0; }

```cpp
#include<iostream>
using namespace std;
int main(){
    int divisor, dividend;

    cout<<"enter the dividend for the code: ";

    cin>> dividend;

    cout<<"enter the divisor for the code: ";

    cin>> divisor;

    if( dividend<divisor){cout<<"invalid input";
    return 1;}


    int quotient = 0;
    for (; dividend>=divisor; ++quotient){
        dividend= dividend - divisor;

    }
    cout<<"the quotient is: "<<quotient<<endl;
    cout<<"the remainder is: "<< dividend<<endl;
    return 0;

}
```

```
C:\Users\HP\Desktop\fop assi
enter the dividend for the code: 80
enter the divisor for the code: 37
the quotient is: 2
the remainder is: 6

--------------------------------
Process exited after 3.012 seconds with return value
0
```

7. Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.

```cpp
#include<iostream>
#include<string>
using namespace std;
int main() {
    string p;
    cout<<"please enter any word: ";
    cin>> p;

    for (int i = 0; i < p.length(); i++) {
        for (int j = i + 1; j < p.length();;) {
            if (p[i] == p[j]) {
                // Eliminate duplicate letters from the code:
                p.erase(j, 1);
            } else {
                j++;
            }
        }
    }

    cout << "Word after eliminating duplicate characters in a word or in a scentence: " << p << endl;

    return 0;
}
```

```
C:\Users\HP\Desktop\FOP AS
please enter any word: Ramzan
Word after eliminating duplicate characters in a word or in a scentence: Ramzn

--------------------------------
Process exited after 3.167 seconds with return value 0
Press any key to continue . . .
```

8. Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and display them in C++.

```cpp
#include <iostream>
using namespace std;
int main() {
    int a[] = {1, 2, 3, 4, 5};
    // Add more elements
    cout<<"please enter the 5 th element of the array: ";
    cin>> a[5];

    cout<<"please enter the 6 th element of the array: ";
cin>> a[6];
    // Display all elements
    cout << "Array elements: ";
    for (int i = 0; i < 7; ++i) {
        cout << a[i] << " ";
    }

    return 0;
}
```

```
C:\Users\HP\Desktop\Fop ass
please enter the 5 th element of the array: 8
please enter the 6 th element of the array: 9
Array elements: 1 2 3 4 5 8 9
--------------------------------
Process exited after 3.178 seconds with return value 0
Press any key to continue . . .
```

9. Given an integer array and an integer X. Find if there's a triplet in the array which sums up to the given integer X.

```cpp
#include <iostream>
using namespace std;
int main() {
    int arr[3], target_number, tripletFound;


    cout << "Enter three numbers: ";
    for (int i = 0; i < 3; ++i) {
        cin >> arr[i];
    }


    cout << "Enter the target integer: ";
    cin >> target_number;


    if (tripletFound = arr[0] + arr[1] + arr[2] == target_number){ cout<<" the Sum of triplet is equal to target no.";
    }


  else if (tripletFound = arr[0] + arr[1] + arr[2] != target_number){cout<<" the sum of triplet maybe smaller or bigger than target number.";
  }
  else { cout<<" invalid";
  }

    return 0;


}
```

```
C:\Users\HP\Desktop\Fop ass
Enter three numbers: 7
8
9
Enter the target integer: 24
 the Sum of triplet is equal to target no.
--------------------------------
Process exited after 17.59 seconds with return value 0
Press any key to continue . . .
```

10. Implement Bubble Sort on an array of 6 integers.

```cpp
#include <iostream>
using namespace std;
int main() {
    int arr[] = {9, 2, 8, 7, 5, 6};
    int n = 6;

    cout << "Original Array: ";
    for (int i = 0; i < n; ++i) {
        cout << arr[i] << " ";
    }
    cout << endl;

    //  code for the Bubble Sort program:
    for (int i = 0; i < n - 1; ++i) {
        for (int j = 0; j < n - i - 1; ++j) {
            if (arr[j] > arr[j + 1]) {
                swap(arr[j], arr[j + 1]);
            }
        }
    }

    cout << "Bubble sorted array: ";
    for (int i = 0; i < n; ++i) {
        cout << arr[i] << " ";
    }
    cout << endl;

    return 0;
}
```

```
C:\Users\HP\Desktop\Fop ass
Original Array: 9 2 8 7 5 6
Bubble sorted array: 2 5 6 7 8 9

--------------------------------
Process exited after 0.1603 seconds with return value 0
Press any key to continue . . .
```