# NATIONAL UNIVERSITY OF SCIENCE & TECNOLOGY

## SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERING

# [FUNDAMENTALS OF PROGRAMMING –(LAB)]

## ASSIGNMENT # 1

*SEMESTER # 01*

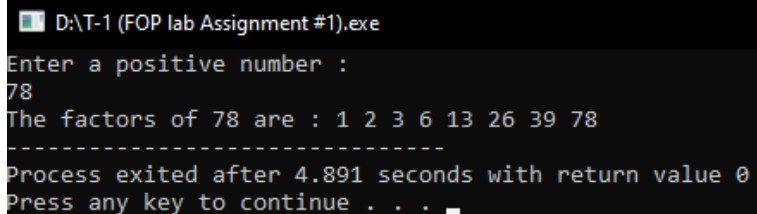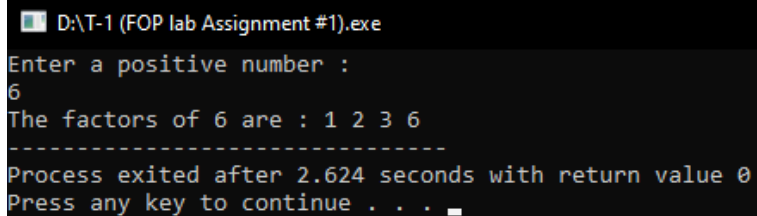### CLASS: - ME-15 [SEC A]

**NAME: TALHA MATEEN**

**ROLL NO.: 454713**

**SUBMITTED TO: M. AFFAN TARIQ**

# QUESTION NO.1

```cpp
// __C++ program to display factors of a number using for loops __
#include <iostream>
using namespace std;
int main()
{
int n;    // __declaring input number __
// __Getting input from user __
cout<<"Enter a positive number :"<<endl;
cin>>n;
// as code is written for positive numbers only so, to ignore negative numbers using if statement__
if(n<0){
cout<<"Please enter a positive number :"<<endl;
cin>>n;
}
cout<<"The factors of "<<n<<" are : ";

 for (int i=1;i<=n;i++) // declaring loop variable
   {
   if(n%i==0)   // if n is divisible to any number
   cout<<i<<" ";
   }
return 0;
}
```

```
D:\T-1 (FOP lab Assignment #1).exe

Enter a positive number :
6
The factors of 6 are : 1 2 3 6
-------------------------------
Process exited after 2.624 seconds with return value 0
Press any key to continue . . . _
```

```
D:\T-1 (FOP lab Assignment #1).exe

Enter a positive number :
78
The factors of 78 are : 1 2 3 6 13 26 39 78
-------------------------------
Process exited after 4.891 seconds with return value 0
Press any key to continue . . . _
```
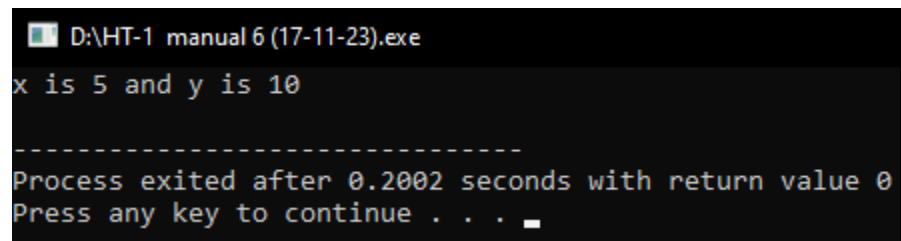
## QUESTION NO.2

Write output to the following code

```
#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;
}
```

## ANSWER:

x is 5 and y is 10

/*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*/
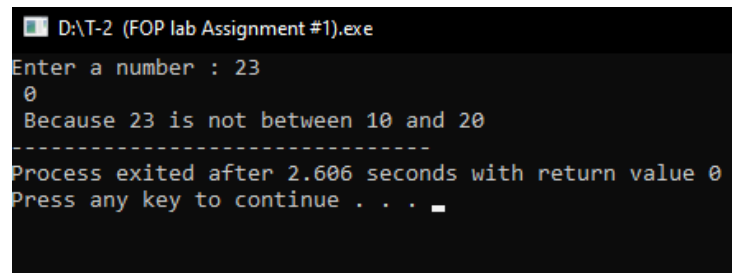
```cpp
#include <iostream>
using namespace std;
int main()
{
int num;   // __declaring input from user__
cout<<"Enter a number : ";
cin>>num;  // __read the input__

// __checking if number is less than equal to 20 and greater than 10__
if(num>10&&num<=20)

{
cout<<" 1 "<<endl; // __print 1 if yes__
cout<<num<<" is less than equal to 20 and greater than 10";}

else {
cout<<" 0 "<<endl;  // __print 0 if no__
cout<<" Because "<<num<<" is not between 10 and 20 ";
}

return 0;   // __end program__
}
```
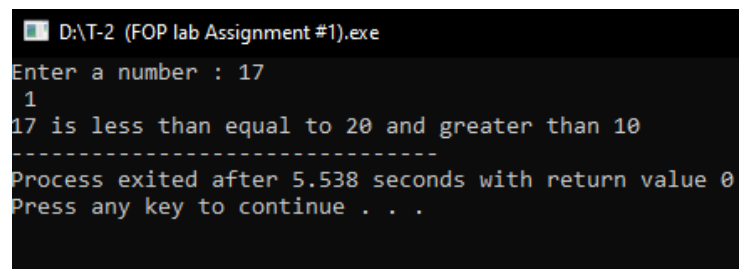
```
D:\T-2 (FOP lab Assignment #1).exe

Enter a number : 23
0
 Because 23 is not between 10 and 20
-------------------------------
Process exited after 2.606 seconds with return value 0
Press any key to continue . . . _
```
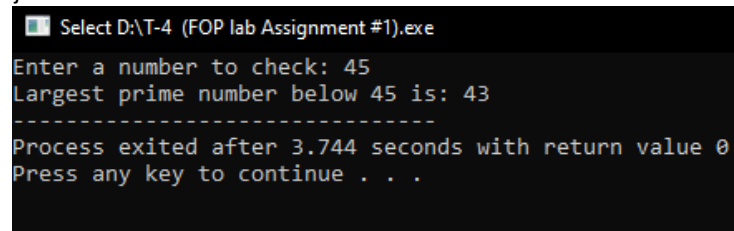
```
D:\T-2 (FOP lab Assignment #1).exe

Enter a number : 17
 1
17 is less than equal to 20 and greater than 10
-------------------------------
Process exited after 5.538 seconds with return value 0
Press any key to continue . . .
```
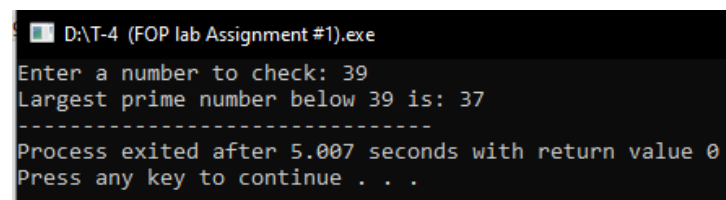
```cpp
/*program to find the largest prime number less than a given positive integer*/
#include <iostream>
using namespace std;

int main(){
int n, i, j;
bool numb=false;
cout<<"Enter a number : "; //asking user to enter the number
cin>>n;
i=n;
while(i>1){
 j=i-1;
 numb=false;
 while(j>1){
        if(i%j==0){
//cout<<i<<"  "<<j<<endl;
  numb=false;
  break;
}
else if(i%j==1){
numb=true;
}
j--;
}
if(numb==true){
cout<<"Largest prime number below "<<n<<" is: "<<i;
break;
}
i--;
}
return 0; //end program
}
```

```
■ Select D:\T-4 (FOP lab Assignment #1).exe

Enter a number to check: 45
Largest prime number below 45 is: 43
--------------------------------
Process exited after 3.744 seconds with return value 0
Press any key to continue . . .
```

```
■ D:\T-4 (FOP lab Assignment #1).exe

Enter a number to check: 39
Largest prime number below 39 is: 37
--------------------------------
Process exited after 5.007 seconds with return value 0
Press any key to continue . . .
```

```cpp
/*program that take two string as input from user and check if both strings are equal or not */
#include <iostream>
#include <string>
using namespace std;
int main(){
int i, length1, j, length2;
string letter1, letter2;

char temp;
bool num=false;

cout<<"Enter String 1: ";
cin>>letter1;
cout<<"Enter String 2: ";
cin>>letter2;

length1=letter1.length();
length2=letter2.length();

 if(length1==length2){
 for(i=0; i<letter2.length(); i++){

  if(letter1[i]==letter2[i]){
        num=true;
        continue;
}
  else{
        num=false;
        cout<<"Both Strings are Not the Same!"<<endl;
        break;
}
}
  if(num==true){
        cout<<"Strings are Same, Updating String!"<<endl;
        length1=length1-1;

  for(i=0; i<=length1/2; i++){
        temp=letter1[i];
        letter1[i]=letter1[length1-i];
        letter1[length1-i]=temp;
}

        cout<<"Updated String 1: "<<letter1;

}
```

```
}
else{
        cout<<"Both Strings are not Equal!";
}
return 0;
}
```

```
D:\T-5 (FOP lab Assignment #1).exe

Enter String 1: Going
Enter String 2: Going
Strings are Same, Updating String!
Updated String 1: gnioG
------------------------------
Process exited after 20.64 seconds with return value 0
Press any key to continue . . . _
```

```
D:\T-5 (FOP lab Assignment #1).exe

Enter String 1: school
Enter String 2: College
Both Strings are not Equal!
------------------------------
Process exited after 29.52 seconds with return value 0
Press any key to continue . . .
```

```
D:\T-5 (FOP lab Assignment #1).exe

Enter String 1: School
Enter String 2: SCHOOL
Both Strings are Not the Same!

------------------------------
Process exited after 15.26 seconds with return value 0
Press any key to continue . . .
```

## QUESTION NO.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.*/

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

int main(){
int dividend=0, divisor=1, remainder, qoutient, result, count;

while(divisor>dividend){

cout<<"REMEMBER : Dividend Must be Greater than the Divisor!"<<endl;
cout<<"Enter the Dividend: ";
cin>>dividend;
cout<<"Enter the Divisor: ";
cin>>divisor;
}

for(count=1; count<=dividend; count++){
        remainder=dividend%divisor;
        result=(divisor*count)+remainder;

        if(result==dividend){
         qoutient=count;
         break;
}
}
        cout<<"qoutient is :" ;
        cout<<dividend<<" / "<<divisor<<" = "<<qoutient<<endl;
   if(remainder>0)
{
        cout<<"The Remainder is: "<<remainder;
}
return 0;
}
```
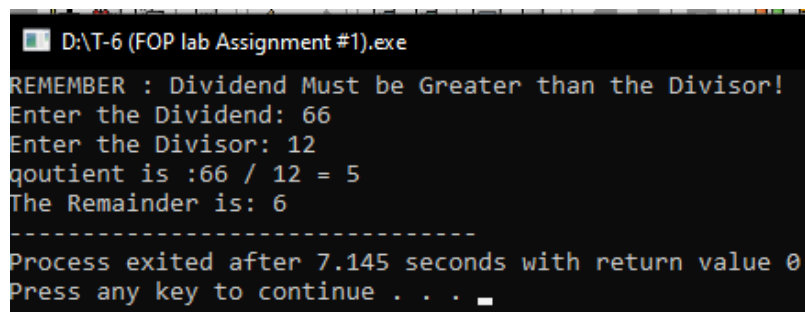
/*Write a C++program for a string which may contain lowercase
and uppercase characters. The task is to remove all duplicate
characters from the string and find the resultant string*/

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

int main(){
string letter, uletter;
int len, count, count2;

cout<<"Please Enter a Word to detect and remove duplicate characters : ";
cin>>letter;
uletter=letter;

for(count=0; count<letter.length(); count++){
  tolower(letter[count]);

 for(count2=count+1; count2<=letter.length(); count2++ ){
    if(letter[count]==letter[count2]){
      letter[count]=' ';
      letter[count2]=' ';
}
}
}
   uletter="";
for(count=0; count<letter.length(); count++){
    if(isspace(letter[count])){

continue;}
else{
uletter += letter[count];
}
}
cout<<"New Word is: "<<uletter<<endl;
}
```
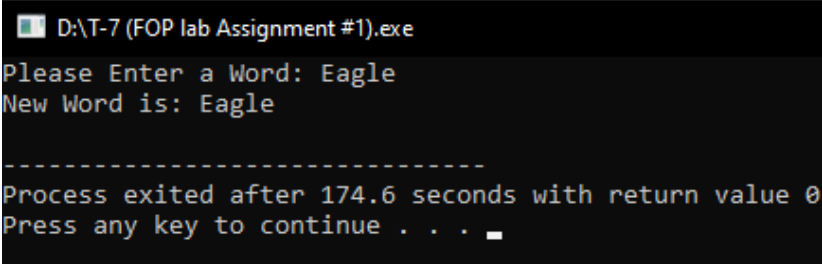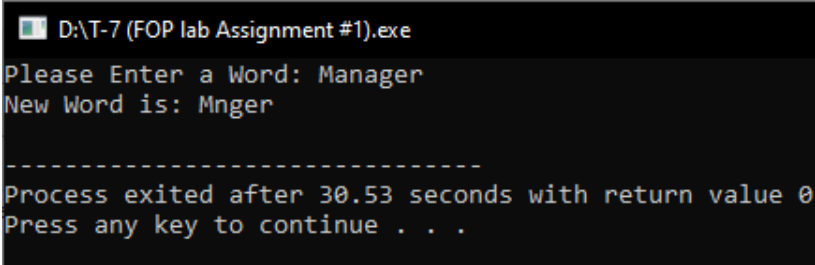
```
D:\T-7 (FOP lab Assignment #1).exe

Please Enter a Word: Eagle
New Word is: Eagle

--------------------------------
Process exited after 174.6 seconds with return value 0
Press any key to continue . . . _
```

```
D:\T-7 (FOP lab Assignment #1).exe

Please Enter a Word: Manager
New Word is: Mnger

--------------------------------
Process exited after 30.53 seconds with return value 0
Press any key to continue . . .
```

```
/* Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and
display them in C++. */
#include<iostream>
using namespace std;
int main ()
{
   int arr[7]={2,8,3,4,9,6,7};

   for(int i=0;i<7;i++){

   cout<<"The value of array at "<<i<<" is : "<<arr[i]<<endl;

}

return 0;
}
```
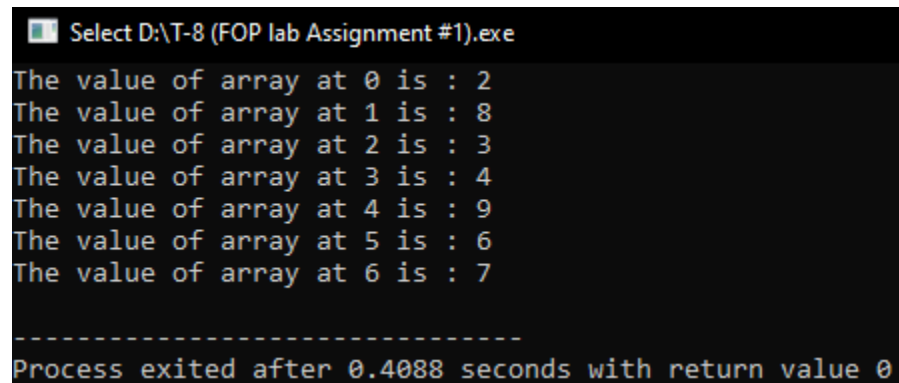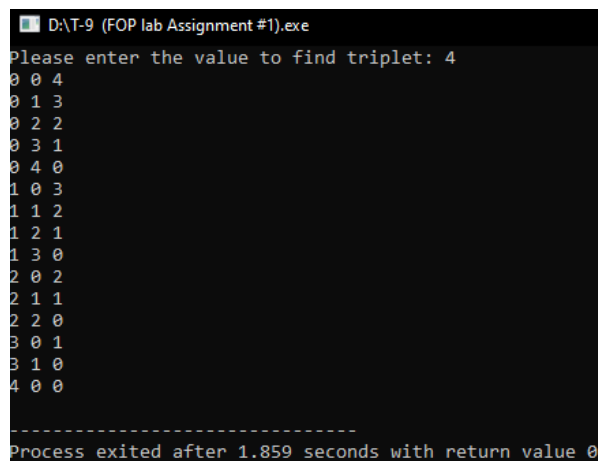
```
Select D:\T-8 (FOP lab Assignment #1).exe

The value of array at 0 is : 2
The value of array at 1 is : 8
The value of array at 2 is : 3
The value of array at 3 is : 4
The value of array at 4 is : 9
The value of array at 5 is : 6
The value of array at 6 is : 7

-------------------------------
Process exited after 0.4088 seconds with return value 0
```
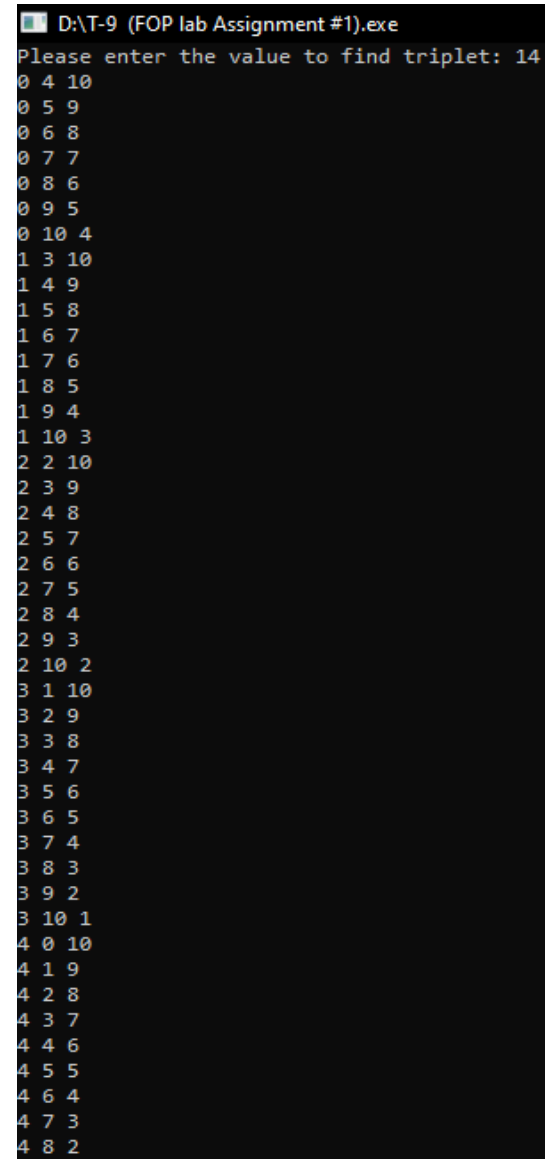
## QUESTION NO.9

/*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 ar[11] = {0,1,2,3,4,5,6,7,8,9,10};  //declaring array of 11 elements.
   int X;     //declaring number to find triplet.
   cout<<"Please enter the value to find triplet: ";
   cin>>X;   //input from user.
   for ( int i=0;i<=10;i++){      //declaring i with a limit of 10.

     for(int j=0;j<=10;j++){      //declaring j with a limit of 10.
     for(int k=0;k<=10;k++){      //declaring k with a limit of 10.
      if(ar[i]+ar[j]+ar[k]==X){
        cout<<ar[i]<<" "<<ar[j]<<" "<<ar[k]<<<endl;   //print triplets.
}
}
}
}
return 0;
}
```

## QUESTION NO.10

/*Implement Bubble Sort on an array of 6 integers*/
#include<iostream>
using namespace std;

```cpp
int main(){
int arr[6];
bool sort=false;
int i,temp;

for(i=0; i<6; i++){
 cout<<"Enter Value for Array: ";
 cin>>arr[i];
}
while(sort==false){
 for(i=0; i<6; i++){

  if(arr[i]>arr[i+1]){
      temp=arr[i];
      arr[i]=arr[i+1];
      arr[i+1]=temp;
}
}
      for(i=0; i<6; i++){

       if(arr[i]>arr[i+1]){
          sort=false;
break;
}
      else{
        sort=true;
}
}
}
   cout<<"Sorted Array: { ";

    for(i=0; i<5; i++){
        cout<<arr[i]<<", ";
}
cout<<arr[5]<<"}";
return 0;
}
```

```
D:\T-10 (FOP lab Assignment #1).exe
Enter Value for Array at 0: 3
Enter Value for Array at 1: 5
Enter Value for Array at 2: 1
Enter Value for Array at 3: 9
Enter Value for Array at 4: 6
Enter Value for Array at 5: 4
Sorted Array: { 1, 3, 4, 5, 6, 9}
---------------------------------
Process exited after 14.22 seconds with return value 0
```

```
D:\T-10 (FOP lab Assignment #1).exe
Enter Value for Array at 0: 2
Enter Value for Array at 1: 7
Enter Value for Array at 2:
5
Enter Value for Array at 3: 5
Enter Value for Array at 4: 3
Enter Value for Array at 5: 8
Sorted Array: { 2, 3, 5, 5, 7, 8}
---------------------------------
Process exited after 12.53 seconds with return value 0
```