NATIONAL UNIVERSITY OF SCIENCE & TECHNOLOGY

SCHOOL OF MECHANICAL & MANUFACTURING ENGINEERING

FALL 2023

ME-15-C

CS-114-Fundamental of Programming

ASSIGNMENT # 1

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

CODE:

```cpp
#include<iostream>

using namespace std;

int main(){

        int x,y;

        cout<<"Enter a number ";

        cin>>x;

        cout<<"The factors are ";

        for(int i=1;i<=x;i++)   //as every factor will give remainder of zero so every time we get 0 remainder it will be printed using if statement

        {

                if(x%i==0){

                        cout<<i<<" , ";

                }

        }

        return 0;

}
```
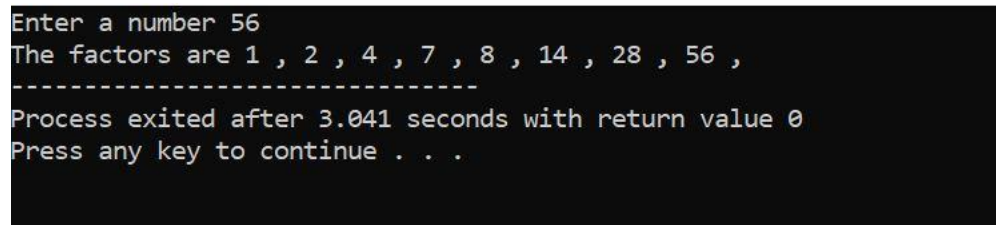
RESULT:

```
Enter a number 56
The factors are 1 , 2 , 4 , 7 , 8 , 14 , 28 , 56 ,
--------------------------------
Process exited after 3.041 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

2. Write output to the following code.

```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; }
```

OUTPUT:

The output will be:

"x is 5 and y is 10"

Cpp file is attached at end page.

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

CODE:

```cpp
#include<iostream>
using namespace std;
int main(){
        int z=1,y=0,x;
        cout<<"Enter a number ";
        cin>>x;
        if(x>10&&x<=20)   //checks if x is greater than 10 and less than or equal to 20
        cout<<z;         //if greater than 10 and less than equal to 20 then 1 will be printed
        else
        cout<<y;         //if less than or equal to 10 and greater than 20 then 0 will be printed
        return 0;

}
```

OUTPUT:

```
Enter a number 12
1
--------------------------------
Process exited after 27.75 seconds with return value 0
Press any key to continue . . .
```

```
Enter a number 5
0
------------------------------
Process exited after 5.142 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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.**

CODE:

```cpp
#include<iostream>
using namespace std;
int main(){
        int x,y=0,d;
        cout<<"Enter a number "; //the number will be provided by user
        cin>>x;
        int i=1,j=1,k;
        while(j<=x){         //while loop runs upto the given number
        while(i<=j){         //the inner loop runs until j
            if(j%i==0){      //it checks if the j is divided by i, eaxh time it is divided by i, 1 will be added to y
            y++;
            }
            i++;

        }

        if(y==2)
        d=j;
        j++;
        y=0;             // y will again equals 0
        i=1;             // i also reassigned by 1
}
cout<<"The number less than or equal to given number is "<<d;

        return 0;
}
```
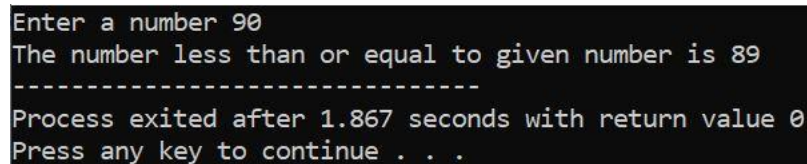
OUTPUT:

```
Enter a number 90
The number less than or equal to given number is 89
--------------------------------
Process exited after 1.867 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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.**

CODE:

```cpp
#include<string>
#include<iostream>
using namespace std;
        int main(){
                string str1 , str2 ;
                cout<<"Enter the string ";
                cin>>str1;
                cout<<"Enter 2nd string ";  //gets input of two string from user
                cin>>str2;
                char Toswap;
                if(str1==str2){  //if two strings are equal
                        cout<<"Strings are equal ";
                        for(int i=0; i<str2.length()/2; i++){   //loop runs upto mid of array
                                Toswap = str2[i];           //in order to swap them first number of string will be assigned to the
variable
                                str2 [i] = str2[str2.length() -1- i];  //then the last number will be assigned to first slot of loop
                                str2[str2.length()-1-i] = Toswap;     //then that last slot will be filled by first slot and then 2nd for
2nd last
                        }
                        cout<<str2;
                }
                else                            //if strings are not equal
                cout<<"Strings are not equal ";
                return 0;
        }
```

OUTPUT:

```
Enter the string NUST
Enter 2nd string NUST
Strings are equal TSUN
--------------------------------
Process exited after 6.088 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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.

CODE:

```
#include<iostream>
using namespace std;
int main(){
                                    int x,y,z=0;
                                    cout<<"Enter the dividend must be greater than divisor ";
                                    cin>>x;
                                    cout<<"Enter the divisor must be greater than dividend ";
                                    cin>>y;
                                    for(int i =1;x>= y;i++){  //as the division is subtracting the divisor from
dividend, for loop will run util the divisor

                                     x=x-y;
                                     z++;          //every time it gets subtracted 1 will be added to z which will be
quotient

                                    }
                                    cout<<z;
                                    return 0;

}
```
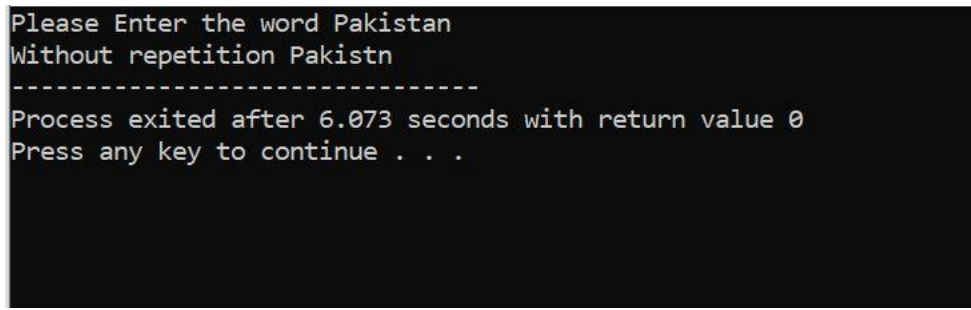
OUTPUT:

```
Enter the dividend must be greater than divisor 10
Enter the divisor must be greater than dividend 2
5
-------------------------------
Process exited after 8.658 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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.**

CODE:

```cpp
#include<iostream>
using namespace std;
int main(){
        string str1,str2;
        cout<<"Please Enter the word ";
        cin>>str1;
        int j=0 , i=0;
        for( i=0; i<str1.length();i++){
                for(j=0;j<str1.length();j++){
                        if(str1[i]==str1[j]){
                                break;

                        }

                }
                if(i==j){
                        str2+=str1[i];
                }
        }
        cout<<"Without repetition ";
        cout<<str2;
        return 0;
}
```

OUTPUT:

```
Please Enter the word Pakistan
Without repetition Pakistn
-------------------------------
Process exited after 6.073 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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

CODE:

```cpp
#include<iostream>
using namespace std;
int main(){
    int size =5;
    int arr[size]={1,2,3,4,5};
    cout<<"How many elements you want to add in array ";
    int x,y;
    cin>>x;
    for(int i=0;i<x;i++){
        cout<<"Enter a the number you want to add ";
        cin>>y;
        arr[size+i]= {y};
    }
    cout<<"After adding numbers the loop is ";
    for(int j=0;j<5+x;j++){

        cout<<arr[j]<<" ";

    return 0;

}
```
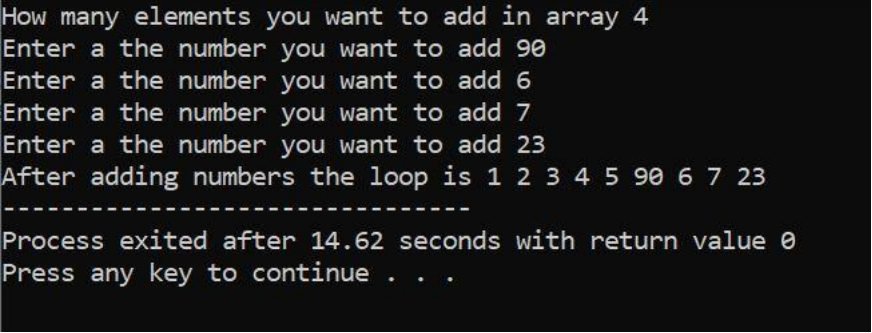
OUTPUT:

```
How many elements you want to add in array 4
Enter a the number you want to add 90
Enter a the number you want to add 6
Enter a the number you want to add 7
Enter a the number you want to add 23
After adding numbers the loop is 1 2 3 4 5 90 6 7 23
------------------------------
Process exited after 14.62 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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.**

CODE:

```cpp
#include<iostream>
using namespace std;
int main(){
    int num,ele, tochk, sum;
    cout<<"Enter the number of elements ";
    cin>>num;
    int arr[num]={};
    for(int i=0;i<num;i++){
        cout<<"Enter a number for the array "; //get the length of array
        cin>>arr[i];
    }
    cout<<"The array is ";
    for(int j=0;j<num;j++){   //to get input from user and store them in te array
        cout<<arr[j]<<" ";
    }
    cout<<endl;
    cout<<" Enter the number to check the sum ";    //get input from user about the number to check about triplet
    cin>>tochk;
    cout<<"The triplets are \n";
    for(int i=0; i<num; i++){              //to get 1 element of array
        for(int j=i+1;j<num; j++){          //to get all element of array except ith element
            sum = arr[i] + arr[j];          //will add the two numbers
            for(int k=j+1;j<num; j++){       //now for third number array will be checked again except for ith and jth element
                sum+=arr[k];              //all the numbers will be added
                if(sum==tochk){             // if they are equal to given number then will cout array
                    cout<<"( "<<arr[i]<<" , "<<arr[j]<<" , "<<arr[k]<<") \n";
                }
            }
        }
    }
    return 0;
}
```

OUTPUT:

```
Enter the number of elements 6
Enter a number for the array 9
Enter a number for the array 7
Enter a number for the array 10
Enter a number for the array 7
Enter a number for the array 3
Enter a number for the array 11
The array is 9 7 10 7 3 11
 Enter the number to check the sum 20
The triplets are
( 10 , 7 , 3)

-------------------------------
Process exited after 48.77 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

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

CODE:

```
int arr[ele]={};
        for (int i = 0; i<ele; i++)
        {
                cout<<"Enter number of array ";   //the array will be entered by user
                cin>>arr[i];
        }
        cout<<"The sorted array in ascending order ";
        for(int j=0;j<ele;j++)           //first for main loop which to get 1 element of array
        {
                for(int k=j+1; k<ele; k++)     //2nd for loop nested in main for to get the next number of arr[j]
                {
                        int toswap;              //variable initialized every time time this loop runs
                        if(arr[j]>arr[k]){       //checks both two numbers and swaps if first is greater than other to make it
in ascending order
                        toswap=arr[j];          //next three is bubble sort
                        arr[j]=arr[k];
                        arr[k]=toswap;
                        }
                }
                cout<<arr[j]<<" ";
        }
        cout<<endl;
        cout<<"The sorted array in descending order ";
        for(int j=0;j<ele;j++)
        {
                for(int k=j+1; k<ele; k++)
                {
                        int toswap;
                        if(arr[j]<arr[k]){ //same logic as applied above just it is to make them in descending order
                        toswap=arr[j];
                        arr[j]=arr[k];
                        arr[k]=toswap;
                        }
                }
                cout<<arr[j]<<" ";
        }
        return 0;

}
```

OUTPUT:

```
Enter number of array 56
Enter number of array 90
Enter number of array 1
Enter number of array 23
Enter number of array 30
Enter number of array 51
The sorted array in ascending order 1 23 30 51 56 90
The sorted array in descending order 90 56 51 30 23 1
--------------------------------
Process exited after 22.53 seconds with return value 0
Press any key to continue . . .
```

Cpp file is attached at end page.

CPP FILES:

QUESTION 1	CPP factors.cpp
QUESTION 2	No cpp file because the question is to write the output
QUESTION 3	CPP less than 10 and equal to 20.cpp
QUESTION 4	CPP prime less than given nmbr.cpp
QUESTION 5	CPP strings.cpp
QUESTION 6	CPP divide without.cpp
QUESTION 7	CPP same out.cpp
QUESTION 8	CPP to add more in array.cpp
QUESTION 9	CPP triplet.cpp
QUESTION 10	CPP sorted array.cpp

Cpp file is attached at end page.