NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY

School of Mechanical and Manufacturing Engineering

COURSE NAME

Fundamentals of Programming

ASSIGNMENT NO:

1

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

Code

```
#include <iostream>
using namespace std;
int main()
{
    int x, i;

    cout << "Enter a positive integer: ";
    cin >> x;
  cout << "Factors of " << x << " are: ";
    for(i = 1; i <= x; i++) {
        if(x % i == 0)
            cout << i << " "<< endl;
    }


    return 0;
}
```

Output

```
Enter a positive integer: 12
Factors of 12 are: 1
2
3
4
6
12

--------------------------------
Process exited after 12.29 seconds wit
Press any key to continue . . .
```

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;
```

Output

x is 5 and y is 10

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

```
{
    float x;
    cout<<"enter an integer "<<endl;
    cin>>x;
    if (x>10&&x<=20) {
        cout<<"1";
    }
    else {
            cout<<"0";
    }
    return 0;
}
```

Output

```
enter an integer
12
1
------------------------
Process exited after 7.3
Press any key to continu
```

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.

Code

```
{
    int N, i;

    cout << "Enter a positive integer: ";
    cin >> N;

    if (N <= 1) {
        cout << "No prime number less than or equal to " << N << endl;
        return 0;
    }

    i = N;

    while (i >= 2) {
        bool isPrime = true;

        for (int y = 2; y <= sqrt(i); y++) {
            if (i % y == 0) {
                isPrime = false;
                break;
            }
        }

        if (isPrime) {
            cout << "The largest prime number less than or equal to " << N << " is " << i << endl;
            break;
        }

        i--;
    }

    return 0;
}
```

Output

```
Enter a positive integer: 6
The largest prime number less than or equal to 6 is 5

--------------------------------
Process exited after 6.413 seconds with return 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

Code

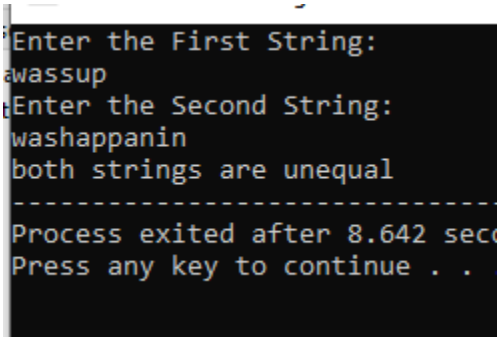
```
{
    string str1,str2;
    string newstring="";
   cout<<"Enter the First String: "<<endl;
   cin>>str1;
   cout<<"Enter the Second String: "<<endl;
   cin>>str2;
   if (str1==str2)
   {
       cout<<" strings are equal "<<endl;
    for ( int i= str1.length(); i>=0; i-- ) {
       newstring=newstring+str1[i];


       }


   }
   else {
   cout<<"both strings are unequal";

}
```

Output



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

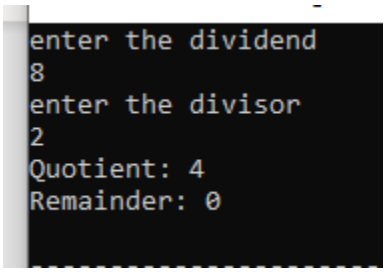
```
{
int dividend , divisor , quotient = 0;
cout<<"enter the dividend"<<endl;
cin>>dividend;
cout<<"enter the divisor"<<endl;
cin>>divisor;
if (dividend>=divisor) {

  while (dividend >= divisor) {
      dividend = dividend-divisor;
      quotient++;
  }
   }
   else {
       cout<<"try again"<<endl;
   }


   cout << "Quotient: " << quotient <<endl;
  cout << "Remainder: " << dividend <<endl;

   return 0;
}
```

Output



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.

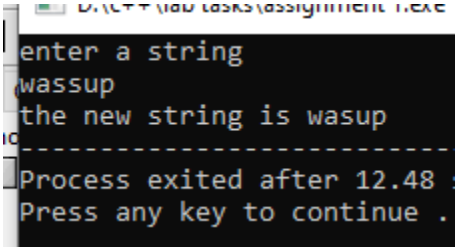
Code

```
{
    string str1,strnew;

    cout<<"enter a string"<<endl;
    cin>>str1;
    for(int i=0;i<str1.length();i++) {
        for(int j=0;j<str1.length();j++) {
            if(i!=j){ if (str1[i]==str1[j]) {
            str1[j]=str1[j+1];
            str1[j+1]=' ';
            }
            }
        }

    }
    cout<<"the new string is ";
    for(int i=0;i<str1.length();i++) {
        if(str1[i]==' '){
            str1[i]=str1[i+1];
            str1[i+1]=' ';
            cout<<str1[i];
        }
        else { cout<<str1[i];
        }
    }}
```

Output



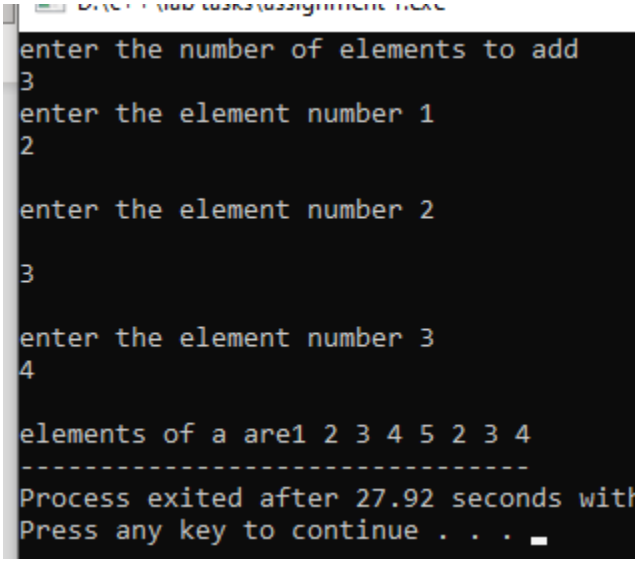
8. Suppose an integer array a[5] = {1,2,3,4,5}. Add more elements to it and display them in C++.

Code

```
{
    int x, a[5]={1,2,3,4,5} , b[5+x] ;
    cout<<"enter the number of elements to add "<<endl;
    cin>>x;
    for(int i=0;i<5;i++) {
        b[i]=a[i];
    }
    for(int i=5;i<5+x;i++) {
        cout<<"enter the element number "<<i-4<<endl;
        cin>>b[i];
        cout<<endl;
    }
    cout<<"elements of a are";
    for(int i=0;i<5+x;i++) {
        cout<<b[i]<<" ";
    }

}
```

Output



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.

```
{
    int sum=9;
    int a[6]={0,1,2,3,4,5};
    cout<<"combinations: "<<endl;
    for (int i=0; i<6; i++) {
            for (int j=0; j<6; j++) {
                for (int k=0; k<6; k++) {
                    if( ((i!=j) && (j!=k) && ( k!= i) && a[i]+a[j]+a[k] ==sum ))
                    {
                        cout<<a[i]<<" "<<a[j]<<" "<<a[k]<<" "<<endl;
                    }
                }

            }
    }
}
```

Output

```
combinations:
0 4 5
0 5 4
1 3 5
1 5 3
2 3 4
2 4 3
3 1 5
3 2 4
3 4 2
3 5 1
4 0 5
4 2 3
4 3 2
4 5 0
5 0 4
5 1 3
5 3 1
5 4 0
```

10. Implement Bubble Sort on an array of 6 integers

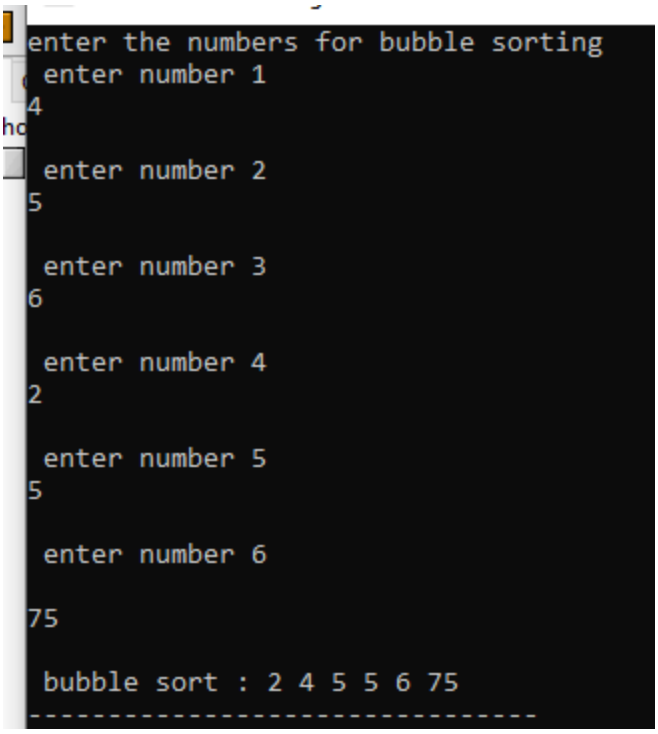
Code

```
{
    int x, a[6] ;
    cout<<"enter the numbers for bubble sorting"<<endl;
    for(int i =0; i<6;i++) {
        cout <<" enter number " <<i+1<<endl;
        cin>>a[i];
        cout<<endl;

    }
    for (int i =0; i<6; i++) {
        for ( int j=0; j<6;j++) {
            if (a[j+1]<a[j]) {
                x=a[j];
                a[j]=a[j+1];
                a[j+1] =x;
            }
        }
    }
    cout<<" bubble sort : ";
    for ( int i=0;i<6;i++)
    cout<<a[i]<<" ";

}
```

Output


enter the numbers for bubble sorting
enter number 1
4
enter number 2
5
enter number 3
6
enter number 4
2
enter number 5
5
enter number 6
75
bubble sort : 2 4 5 5 6 75
