

Assignment 1

Submitted to: M. Affan

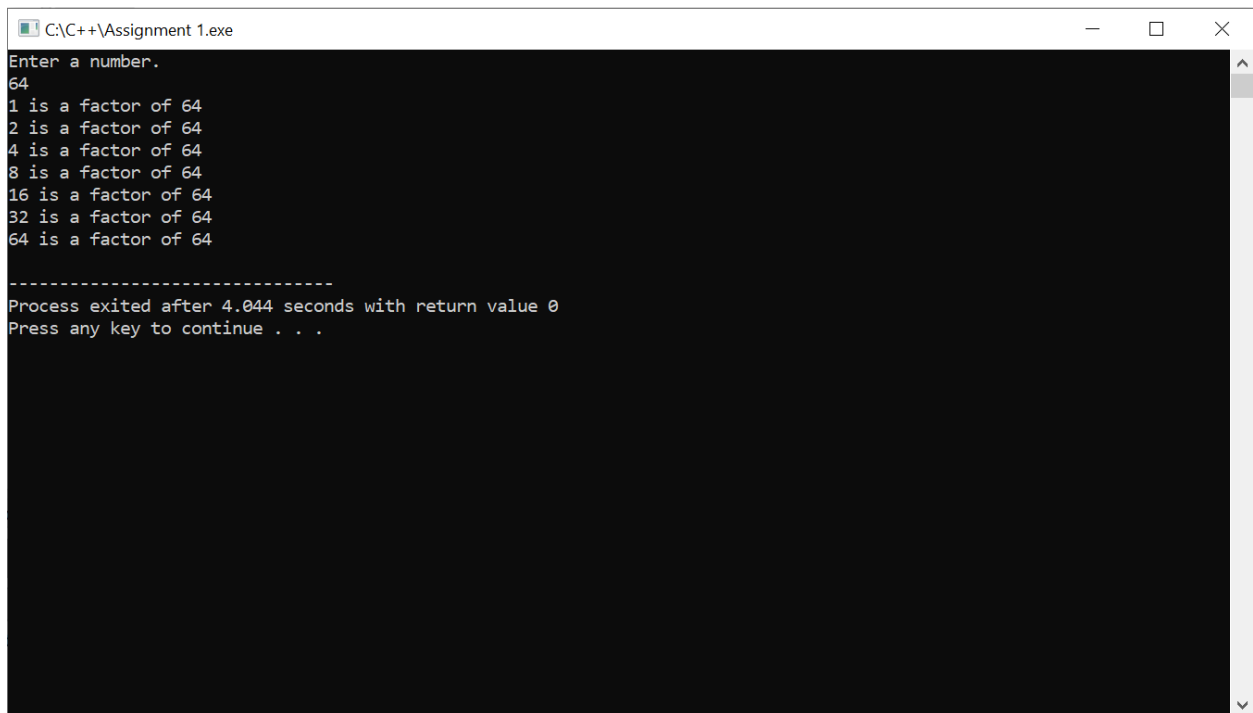
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1. Write a C++ program to display factors of a number using for loops.

```
int num;  
  
cout<<"Enter a number."<<endl;  
  
cin>>num;  
  
for (int i=1;i<=num;i++) {  
    if (num%i==0) {  
        cout<<i<<" is a factor of "<<num<<endl;  
    }  
}
```



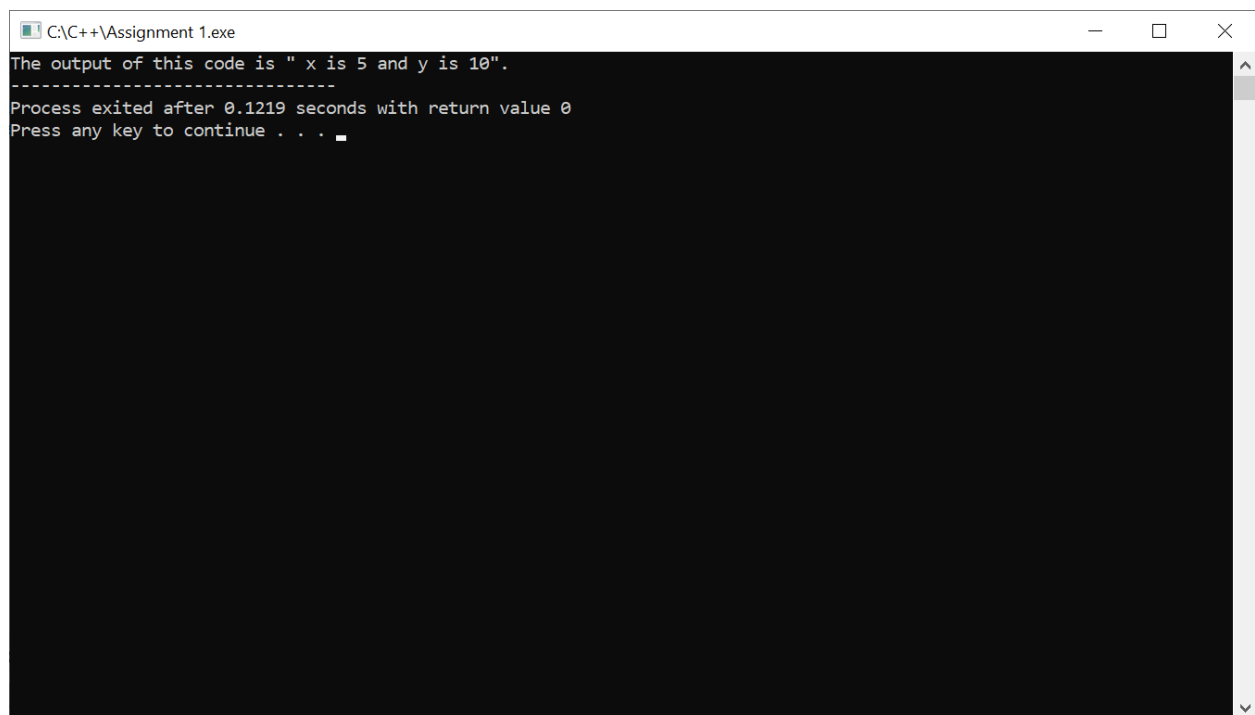
The screenshot shows a Windows command prompt window titled "C:\C++\Assignment 1.exe". The program prompts the user to "Enter a number." and the user has entered "64". The program then displays the factors of 64: "1 is a factor of 64", "2 is a factor of 64", "4 is a factor of 64", "8 is a factor of 64", "16 is a factor of 64", "32 is a factor of 64", and "64 is a factor of 64". Below the output, a separator line of dashes is shown, followed by the message "Process exited after 4.044 seconds with return value 0" and "Press any key to continue . . .".

```
C:\C++\Assignment 1.exe  
Enter a number.  
64  
1 is a factor of 64  
2 is a factor of 64  
4 is a factor of 64  
8 is a factor of 64  
16 is a factor of 64  
32 is a factor of 64  
64 is a factor of 64  
-----  
Process exited after 4.044 seconds with return value 0  
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; }
```

The output of this code will be "x is 5 and y is 10".



```
C:\C++\Assignment 1.exe  
The output of this code is " x is 5 and y is 10".  
-----  
Process exited after 0.1219 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 than equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

```
int num;

bool within_range;

cout<<"Enter a number."<<endl;

cin>>num;

if (num>10 && num<=20)    {

    within_range= true;

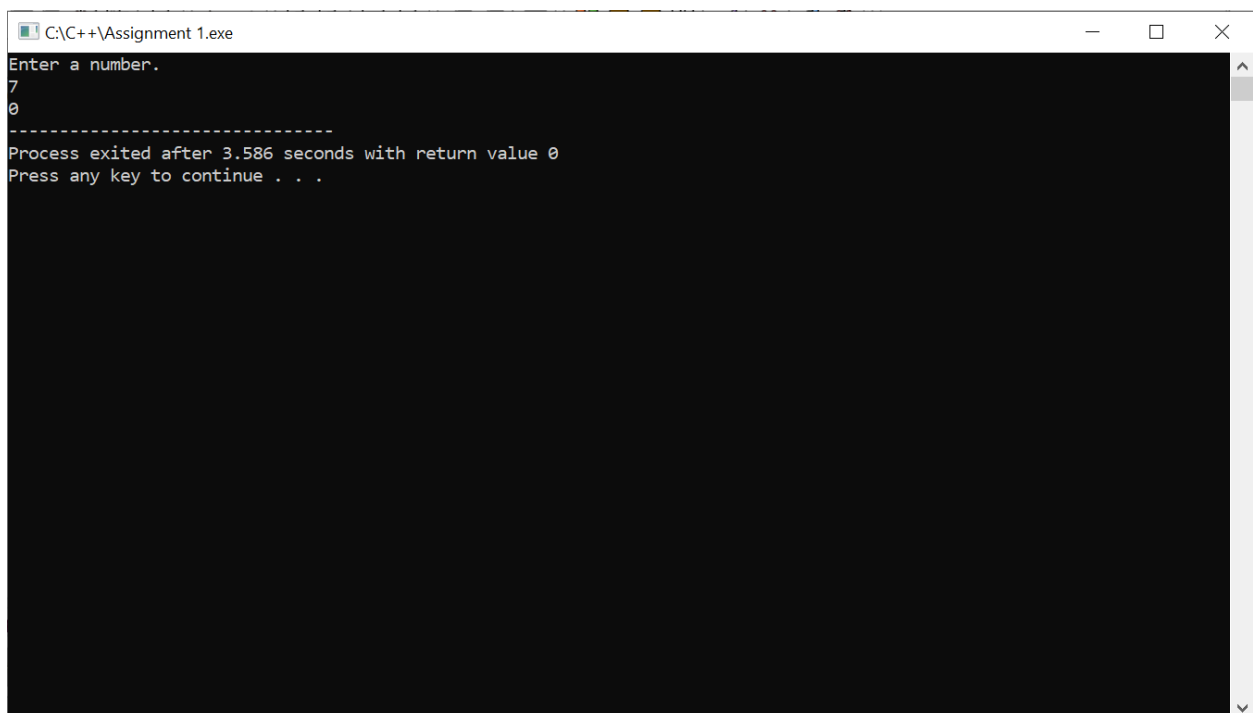
}

else {

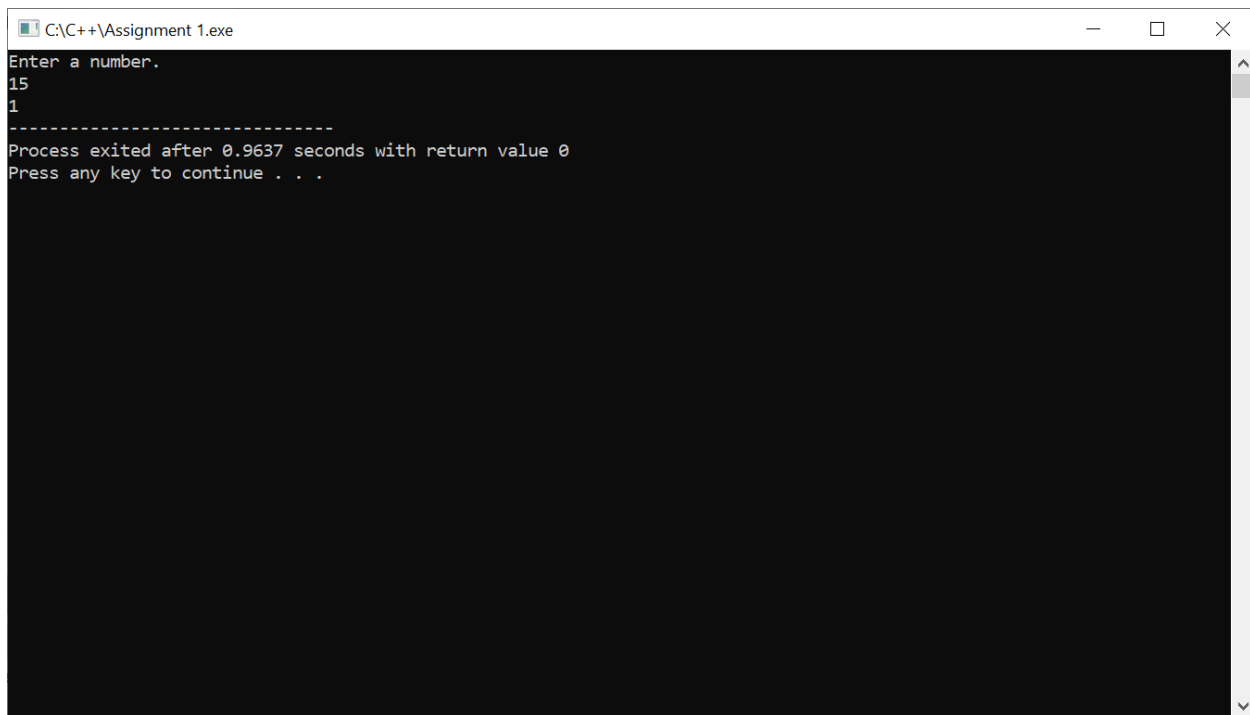
    within_range= false;

}

cout<<within_range;
```



```
C:\C++\Assignment 1.exe
Enter a number.
7
0
-----
Process exited after 3.586 seconds with return value 0
Press any key to continue . . .
```



```
C:\C++\Assignment 1.exe
Enter a number.
15
-----
Process exited after 0.9637 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.

```
int num,i,j;

bool prime;

cout<<"Enter a positive integer."<<endl;

cin>>num;

i=num-1;


if (num==1)    {

                cout<<"There is no prime number less than 1."<<endl;

            }

if(num<=0)    {

                cout<<"Invalid input."<<endl;

            }

while(i>=2)    {

    prime=true;

    j=2;

    while(j<i)    {

        if(i%j==0)    {

            prime=false;

            break;

        }

        j++;

    }

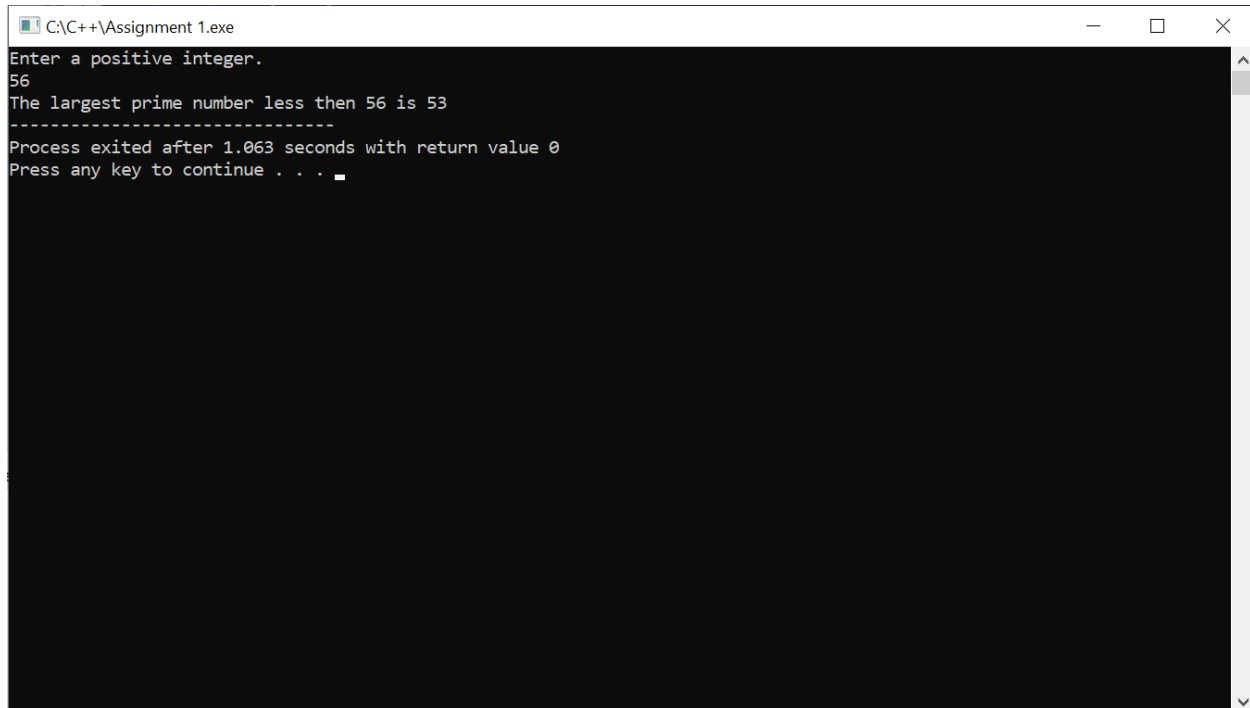
    if(prime==true){

        break;

    }

    i--;
```

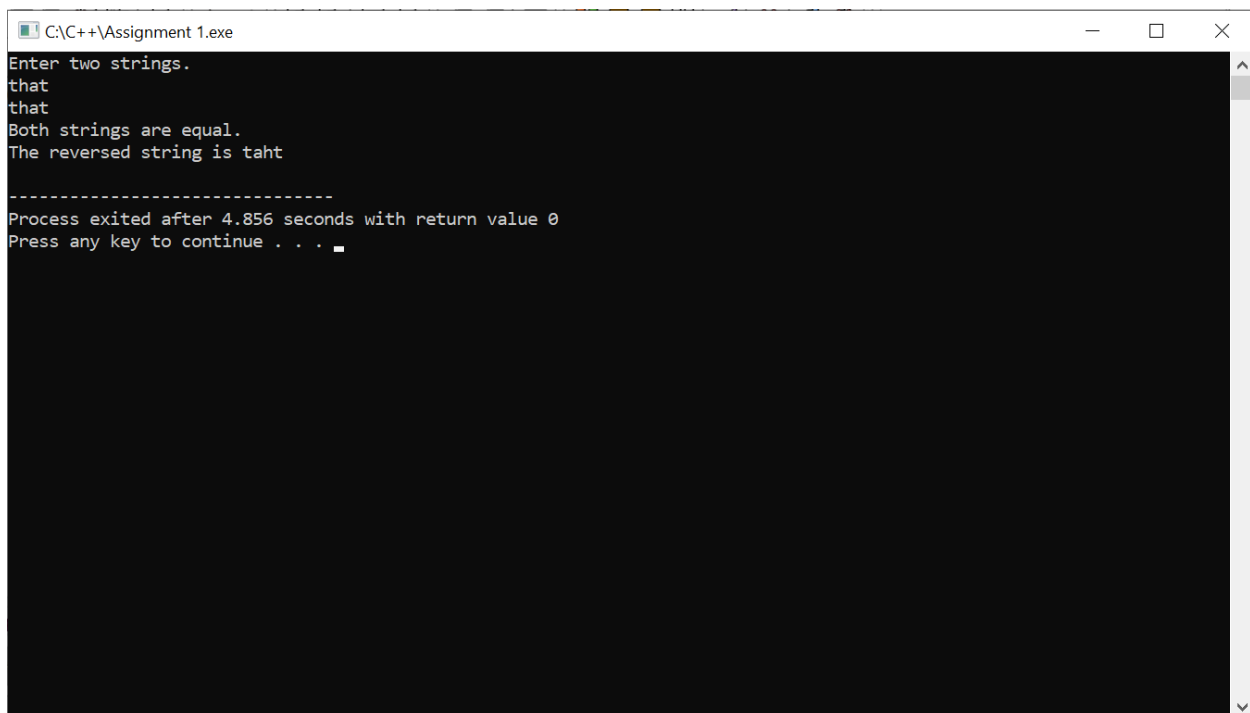
```
}  
  
if(prime==true) {  
    cout<<"The largest prime number less then "<<num<<" is "<<i;  
}  
  
else {  
    cout<<"There is no prime number less then "<<num;  
}
```



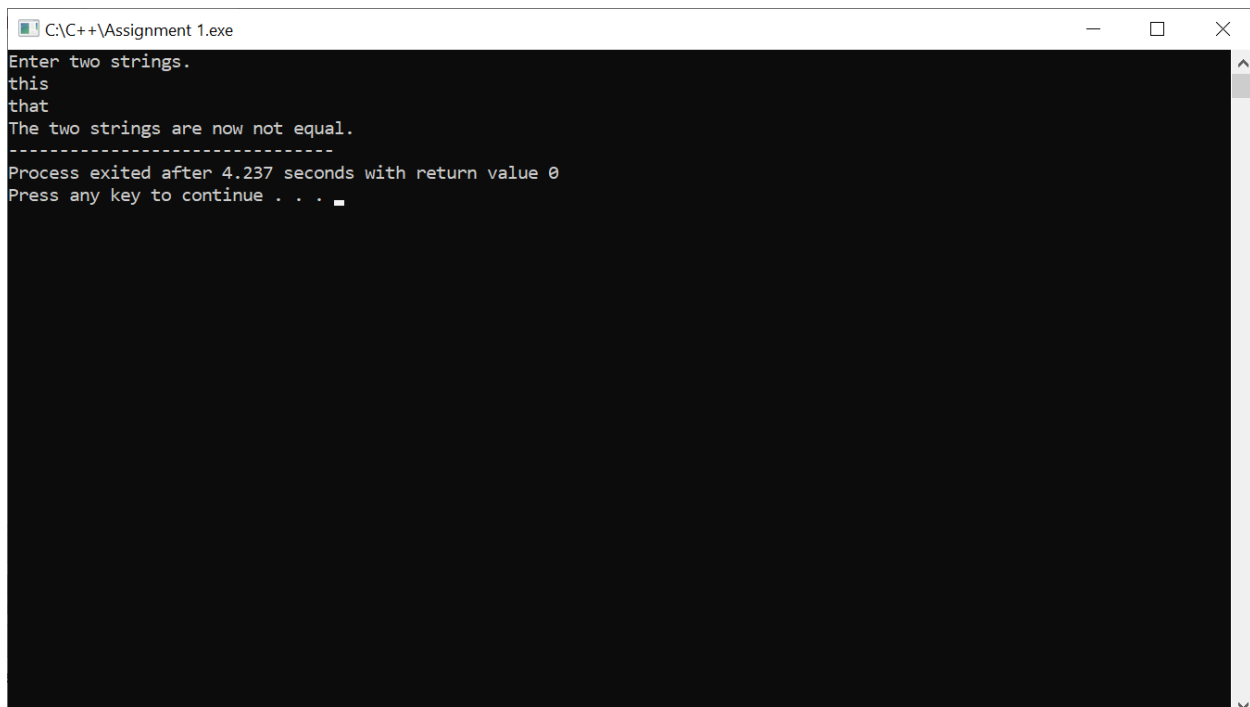
```
C:\C++\Assignment 1.exe  
Enter a positive integer.  
56  
The largest prime number less then 56 is 53  
-----  
Process exited after 1.063 seconds with return value 0  
Press any key to continue . . .
```

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.

```
string input1,input2;
string rotated_string="";
cout<<"Enter two strings."<<endl;
cin>>input1>>input2;
if (input1==input2)    {
    cout<<"Both strings are equal."<<endl;
    for(int i=input1.length(); i>=0; i--)    {
        rotated_string+=input1[i];
    }
    cout<<"The reversed string is"<< rotated_string <<endl;
}
else    {
    cout<<"The two strings are now not equal.";
}
}
```



```
C:\C++\Assignment 1.exe
Enter two strings.
that
that
Both strings are equal.
The reversed string is taht
-----
Process exited after 4.856 seconds with return value 0
Press any key to continue . . .
```

```
C:\C++\Assignment 1.exe
Enter two strings.
this
that
The two strings are now not equal.
-----
Process exited after 4.237 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.

```
int copy,dividend, divisor, quotient=0;
cout<<"Enter a dividend."<<endl;
cin>>dividend;
cout<<"Enter a divisor."<<endl;
cin>>divisor;
copy=dividend;
if(dividend<divisor)    {
    cout<<"The dividend must be greater than the divisor."<<endl;
}
else if (dividend>0 && divisor>0)    {
    for (int i=dividend;i>=divisor; i--)    {
        if (i%divisor==0){
            quotient=quotient+1;
        }
    }
    cout<<"The quotient is "<<quotient<<endl;
    cout<<"The remainder is "<<copy%divisor;
}
```

```
C:\C++\Assignment 1.exe
Enter a dividend.
4
Enter a divisor.
7
The dividend must be greater than the divisor.

-----
Process exited after 9.681 seconds with return value 0
Press any key to continue . . .
```

```
C:\C++\Assignment 1.exe
Enter a dividend.
9
Enter a divisor.
2
The quotient is 4
The remainder is 1
-----
Process exited after 5.142 seconds with return value 0
Press any key to continue . . .
```

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.

```
string str;

cout<<"Enter a string\n";

cin>>str;

for(int i=0;i<str.length();i++){
    for(int j=0;j<str.length();j++){
        if(i!=j){
            if (tolower(str[i])==tolower(str[j])){
                str[j]=str[j+1];
                str[j+1]=' ';
            }
        }
    }
}

cout<<"The new string is "<<str;
```

```
C:\C++\Assignment 1.exe
Enter a string
trying
The new string is trying
-----
Process exited after 5.334 seconds with return value 0
Press any key to continue . . .
```

```
C:\C++\Assignment 1.exe
Enter a string
slay
The new string is slay
-----
Process exited after 5.532 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++.

```
int numbers[5]={1,2,3,4,5};
int newsize;
cout<<"Enter the size of the new array\n";
cin>>newsize;
int numbers_updated[newsize];
for (int i=0;i<5;i++){
    numbers_updated[i]=numbers[i];
}
cout<<"Previous array is :\n";
for (int i=0;i<5;i++){
    cout<<numbers[i]<<endl;
}
for (int i=5;i<newsize;i++){
    cout<<"Add an element to the array."<<endl;
    cin>>numbers_updated[i];
}
cout<<endl;
for (int i=0;i<newsize;i++){
    cout<<i<<"th element : "<<numbers_updated[i]<<endl;
}
```

```
C:\C++\Assignment 1.exe
Enter the size of the new array
10
Previous array is :
1
2
3
4
5
Add an element to the array.
6
Add an element to the array.
7
Add an element to the array.
8
Add an element to the array.
9
Add an element to the array.
10

0th element : 1
1th element : 2
2th element : 3
3th element : 4
4th element : 5
5th element : 6
6th element : 7
7th element : 8
8th element : 9
9th element : 10
```

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 n,x,sum;

int numbers[n];

cout<<"Enter the array size and it can not be less than 3.\n";

cin>>n;

for (int j=0; j<n;j++){

    cout<<"Enter an element into the array.\n";

    cin>>numbers[j];

}

cout<<endl;

cout<<"Enter the number for which the triplet need to be found\n";

cin>>x;

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

    for (int j=i+1;j<n;j++){

        for (int k=j+1;k<n;k++){

            sum=numbers[i]+numbers[j]+numbers[k];

            if (sum==x){

                cout<<numbers[i]<<" "<<numbers[j]<<" "<<numbers[k]<<endl;

            }

        }

    }

}
```



```
C:\C++\Assignment 1.exe
Enter the array size and it can not be less than 3.
10
Enter an element into the array.
1
Enter an element into the array.
2
Enter an element into the array.
3
Enter an element into the array.
4
Enter an element into the array.
5
Enter an element into the array.
6
Enter an element into the array.
7
Enter an element into the array.
8
Enter an element into the array.
9
Enter an element into the array.
10

Enter the number for which the triplet need to be found
10
1 2 7
1 3 6
1 4 5
2 3 5
```

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

```
int temp;
int numbers[6];
for (int i=0; i<6;i++){
    cout<<"Enter elements into the array.\n";
    cin>>numbers[i];
}
for(int j=0;j<6;j++){
    for(int k=0;k<5;k++){
        if(numbers[k]>numbers[k+1]){
            temp = numbers[k];
            numbers[k] = numbers[k + 1];
            numbers[k + 1] = temp;
        }
    }
    cout<<endl;

}
for (int k=0;k<6;k++){
    cout<<numbers[k]<<endl;
}
```

```
C:\C++\Assignment 1.exe
Enter elements into the array.
4
Enter elements into the array.
8
Enter elements into the array.
2
Enter elements into the array.
10
Enter elements into the array.
87
Enter elements into the array.
1

1
2
4
8
10
87

-----
Process exited after 9.593 seconds with return value 0
Press any key to continue . . .
```