

Fundamentals of Programming

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ASSIGNMENT

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

```
#include<iostream>

using namespace std;

int main()
{
    int x;

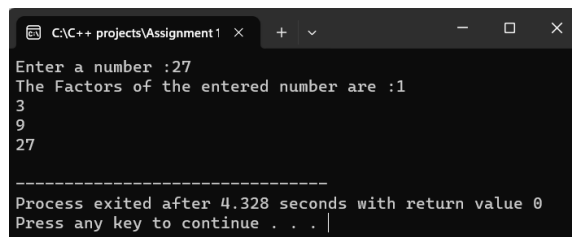
    cout<<"Enter a number :";

    cin>>x;

    cout<<"The Factors of the entered number are :";

    for(int i=1; i<=x; i++){
        if(x%i==0) cout<<i<<endl;
        else
            continue;
    }

    return 0;
}
```



The screenshot shows a Windows command prompt window titled "C:\C++ projects\Assignment1". The program has been executed, and the output is as follows:

```
Enter a number :27
The Factors of the entered number are :1
3
9
27

-----
Process exited after 4.328 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;
}
```

Answer:

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.

```
#include<iostream>

using namespace std;

int main()
{
    int x;

    cout<<"Enter an Integer Value :";

    cin>>x;

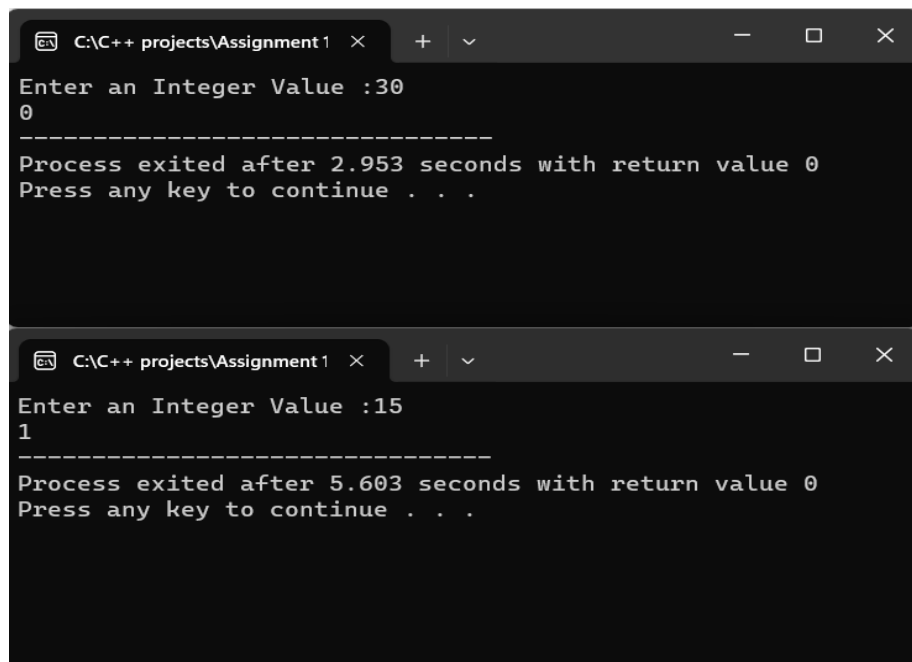
    if(x>10 && x<=20)

        cout<<"1";

    else

        cout<<"0";

    return 0;
}
```



```
C:\C++ projects\Assignment1 x + - □ ×
Enter an Integer Value :30
0
-----
Process exited after 2.953 seconds with return value 0
Press any key to continue . . .

C:\C++ projects\Assignment1 x + - □ ×
Enter an Integer Value :15
1
-----
Process exited after 5.603 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.

```
#include<iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    int N, x, j;
```

```
    bool prime;
```

```
    cout<<"Enter an Integer :";
```

```
    cin>>N;
```

```
    if(N<=0)
```

```
        cout<<"Invalid Entry.";
```

```
    if(N==1)
```

```

        cout<<"There is no prime.";
        j=N-1;

        while(N>1){
            while(j>1){
                if(N%j==0){
                    prime = false;
                    break;
                }
                else if(N%j!=0){
                    prime=true;
                    x=N; }
                j--;
            }
            if(prime==true){
                cout<<N;
                break; }
            N--;
        }
        return 0;
    }
}

```

The screenshot shows a Windows-style application window titled "C:\C++ projects\Assignment 1". The window contains a terminal-like interface with the following text:

```

Enter an Integer :40
37
-----
Process exited after 4.773 seconds with return value 0
Press any key to continue . . .

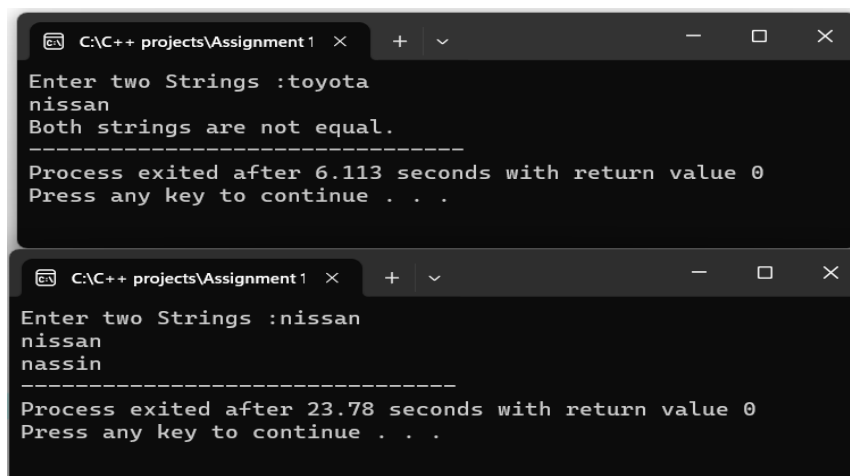
```

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.

```
#include<iostream>

using namespace std;

int main()
{
    string n1, n2;
    string r;
    cout<<"Enter two Strings :";
    cin>>n1>>n2;
    if(n1==n2){
        for(int i=n1.length(); i>=0; --i){
            r=n1[i];
            cout<<r;
        }
    }
    if(n1!=n2)
    cout<<"Both strings are not equal.";
    return 0;
}
```



```
C:\C++ projects\Assignment1 x + - □ ×
Enter two Strings :toyota
nissan
Both strings are not equal.
-----
Process exited after 6.113 seconds with return value 0
Press any key to continue . . .

C:\C++ projects\Assignment1 x + - □ ×
Enter two Strings :nissan
nissan
nassin
-----
Process exited after 23.78 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<iostream>

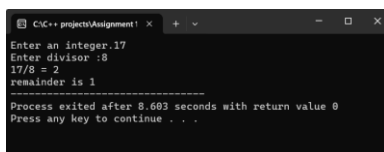
using namespace std;

int main()
{
    int n, d, q=0, r=0;

    cout<<"Enter an integer.";    //n is dividend
    cin>>n;                        // d is divisor
    cout<<"Enter divisor .";      // r is remainder
    cin>>d;                        // q is quotient
    if(n>d)
    {
        for(int i=n; i>=d; i--){
            if(i%d==0)
                q=q+1;
        }

        cout<<n<< '/' <<d<<" = "<<q<<endl;
        r=n%d;
        cout<<"remainder is "<<r;
    }
    else
        cout<<"Invalid Entry.";

    return 0;
}
```



The screenshot shows a Windows command prompt window titled "C:\C++ projects\Assignment1". The program has been executed with the following input and output:

```
Enter an integer 17
Enter divisor 8
17/8 = 2
remainder is 1
-----
Process exited after 8.603 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.

```
#include<iostream>

using namespace std;

int main()
{
    string a, t;

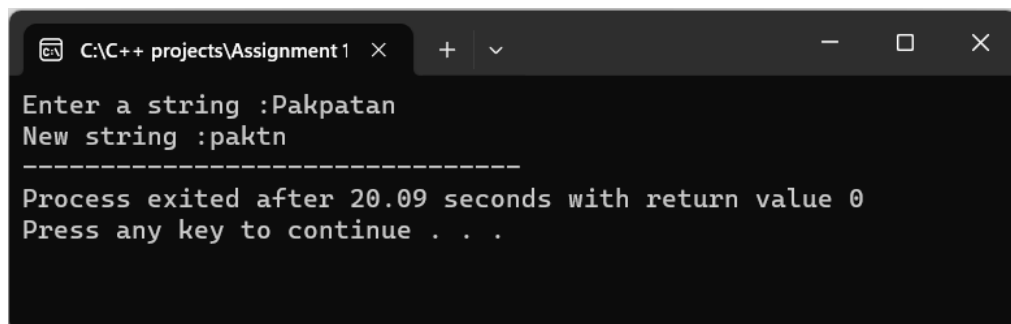
    cout<<"Enter a string :";

    cin>>a;

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

    cout<<"New string :"<<a;

    return 0;
}
```

A screenshot of a Windows command prompt window titled "C:\C++ projects\Assignment 1". The window shows the execution of a C++ program. The user is prompted to "Enter a string :" and enters "Pakpatan". The program then outputs "New string :paktn". Below this, a separator line of dashes is shown, followed by the message "Process exited after 20.09 seconds with return value 0" and "Press any key to continue . . .".

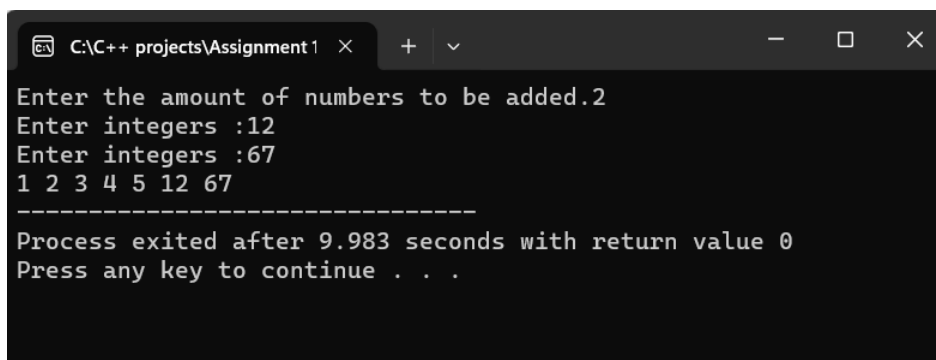
```
C:\C++ projects\Assignment 1  X  +  v  -  □  X
Enter a string :Pakpatan
New string :paktn
-----
Process exited after 20.09 seconds with return value 0
Press any key to continue . . .
```

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

```
{
    int n=5;
    int a[n]= {1,2,3,4,5};
    int x, y;
    int b[y];

    cout<<"Enter the amount of numbers to be added.";
    cin>>x;
    for(int i=0; i<5; i++){
        b[i]=a[i];
    }

    for(int i=0; i<x; i++){
        cout<<"Enter integers :";
        cin>>b[n+i];
    }
    for(int i=0; i<n+x; i++){
        cout<<b[i]<<" ";
    }
}
```



```
C:\C++ projects\Assignment 1  ×  +  ▾
Enter the amount of numbers to be added.2
Enter integers :12
Enter integers :67
1 2 3 4 5 12 67
-----
Process exited after 9.983 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.

```
#include<iostream>

using namespace std;

int main()
{
    int n,l=0, a[n], s=0;

    cout<<"Enter an Integer :";

    cin>>l;

    cout<<"Enter length of array:";

    cin>>n;

    cout<<"Enter integers in the array:";

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

        cin>>a[i];

    }

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

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

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

                s=a[i]+a[j]+a[k];

                if(s==l){

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

                }

            }

        }

    }

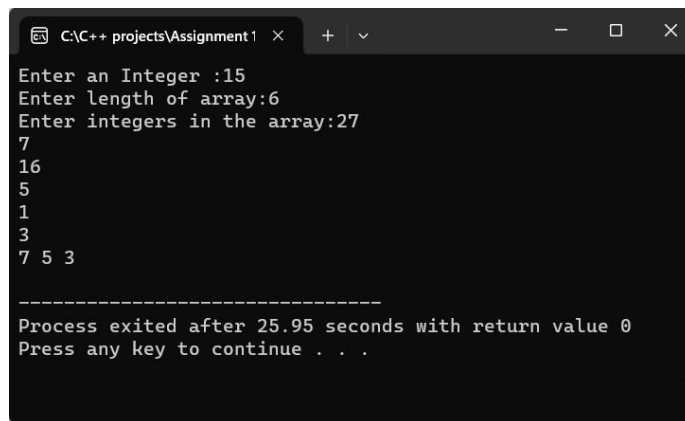
    if(s!=l){

        cout<<"No triplet found.";

    }

    return 0;
```

}



A screenshot of a C++ program execution window. The window title is "C:\C++ projects\Assignment1". The program prompts the user to "Enter an Integer :15", "Enter length of array:6", and "Enter integers in the array:27". The user inputs the integers 7, 16, 5, 1, 3, and 7 5 3. The program then displays "-----" and "Process exited after 25.95 seconds with return value 0".

```
C:\C++ projects\Assignment1
Enter an Integer :15
Enter length of array:6
Enter integers in the array:27
7
16
5
1
3
7 5 3

-----
Process exited after 25.95 seconds with return value 0
Press any key to continue . . .
```

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

```
#include<iostream>

using namespace std;

int main()
{
    int n=6;
    int a[n];
    cout<<"Enter 6 integers in an array :";
    for(int i=0; i<6; i++){
        cin>>a[i];
    }
    int counter=1;
    int temp=0;
    while(counter<n){
        for(int i=0; i<n-counter; i++){
            if(a[i]>a[i+1]){
                temp=a[i];
                a[i]=a[i+1];
                a[i+1]=temp;
            }
        }
        counter++;
    }
}
```

```
        a[i+1]=temp;
    }
}

counter++;

}

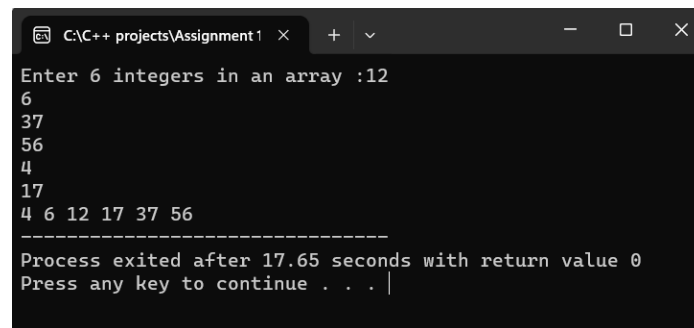
for(int i=0; i<6; i++){

    cout<<a[i]<<" ";

}

return 0;

}
```



The screenshot shows a Windows-style application window titled "C:\C++ projects\Assignment 1". The window contains a text-based interface for a C++ program. It prompts the user to "Enter 6 integers in an array :12". The user has entered the numbers 6, 37, 56, 4, 17, and 12. The program then displays the array elements: "4 6 12 17 37 56". Below this, a separator line is shown. The final output indicates the program's execution details: "Process exited after 17.65 seconds with return value 0" and "Press any key to continue . . . |".

```
C:\C++ projects\Assignment 1  x  +  -  □  x
Enter 6 integers in an array :12
6
37
56
4
17
4 6 12 17 37 56
-----
Process exited after 17.65 seconds with return value 0
Press any key to continue . . . |
```