



NUST

NATIONAL UNIVERSITY
OF SCIENCES & TECHNOLOGY

CS-114 - Fundamental of Programming

Assignment # 1

Course Instructor: Dr Khwaja Fahad Iqbal

Student Name: **Abdul Moiz**

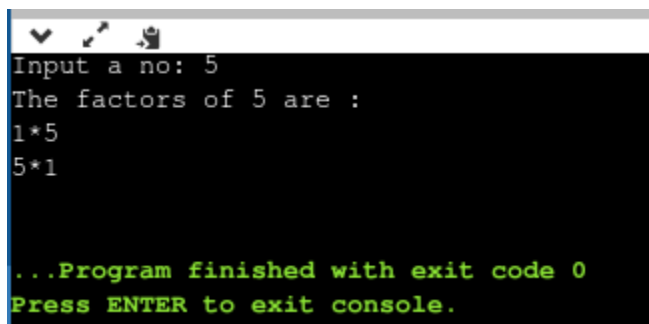
CMS ID: **474550**

Q1) Write a C++ program to display factors of a number using for loops.

```
#include <iostream>
```

```
using namespace std;
int main(){
    int number;
    cout << "Input a no: ";
    cin >> number;
    cout << "The factors of "<<num<<" are :"<<endl;
    for(int i=1;i<=number;i++){
        if (number % i == 0){
            cout << i << "*" << num/i << endl;
        }
    }
    return 0;
}
```

Example Output:



```
Input a no: 5
The factors of 5 are :
1*5
5*1

...Program finished with exit code 0
Press ENTER to exit console.
```

Q2) Write output to the following code.

```
#include <iostream>

int main(){
    int x=5;
    int y=5;

    if (x==5){
        if (y==5){
            std::cout<<"x is 5 and y is 10"<<std::endl;
        }
    }
    else{
        std::cout<<"x is not 5"<<std::endl;
    }
    return 0
}
```

Output:

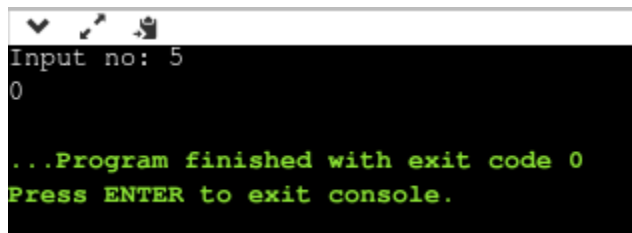
X is 5 and y is 10

Q3) 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 num;  
bool flag;  
cout << "Input no: ";  
cin >> num;  
if (num > 10 && num <= 20){  
    flag = true;  
}  
else{  
    flag =false;  
}  
cout << flag;  
return 0;  
}
```

Example Output:

A screenshot of a console window with a black background and white text. The text shows the program's execution: it prompts for input, receives the number 5, and outputs 0. It also displays a green message indicating the program finished with exit code 0 and a prompt to press ENTER to exit the console.

```
Input no: 5  
0  
...Program finished with exit code 0  
Press ENTER to exit console.
```

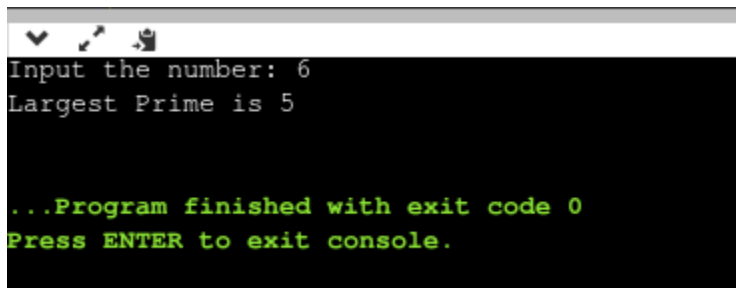
Q4) Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N. Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N. You are not allowed to use any library or pre-existing functions to check for prime numbers.

```

#include <iostream>
using namespace std;
int main(){
    int num, i;
    bool value;
    cout<<"Input the number: ";
    cin>>num;
    while (num>=2){
        i=2;
        value=false;
        while(i<num){
            if(num%i==0){
                value=true;
                break;
            }
            i++;
        }
        if(value==false){
            cout<<"Largest Prime is "<<num<<endl;
            break;
        }
        num--;
    }
    return 0;
}

```

Example Output:



```

Input the number: 6
Largest Prime is 5

...Program finished with exit code 0
Press ENTER to exit console.

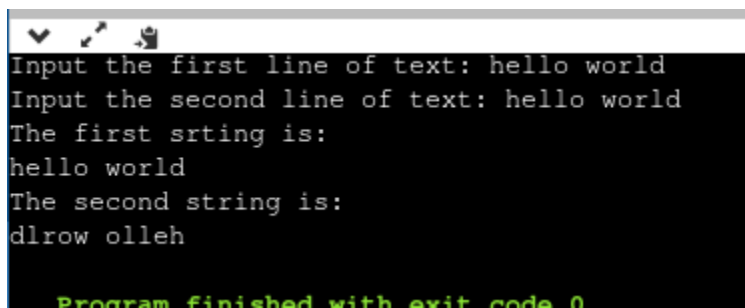
```

Q5) Write a C++ program, take two strings 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>
#include <limits>
using namespace std;
int main(){
    char a[25], b[25];
    cout<<"Input the first line of text: ";
    cin.get(a, 25);
    cin.ignore(numeric_limits<streamsize>::max(), '\n');
    cout<<"Input the second line of text: ";
    cin.get(b, 25);
    cout<<"The first srting is: \n"<<a<<endl;
    cout<<"The second string is: \n";
    for (int i=24; i>=0; i--){
        if (a[i]==b[i]){
            cout<<b[i];
        }
    }
    return 0;
}
```

Example output:

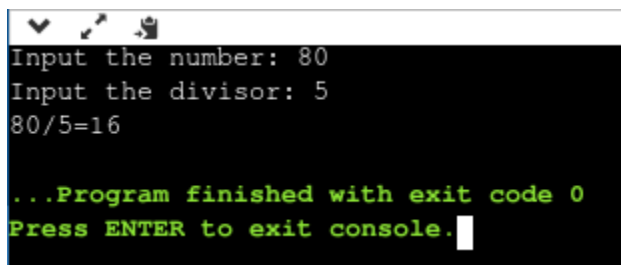
A screenshot of a terminal window with a black background and white text. The text shows the program's execution: it prompts for two lines of input, both of which are "hello world". It then prints the first string as "hello world" and the second string as "dlrow olleh". At the bottom, a green message states "Program finished with exit code 0".

```
Input the first line of text: hello world
Input the second line of text: hello world
The first srting is:
hello world
The second string is:
dlrow olleh
Program finished with exit code 0
```

Q6) 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 num, divisor, ans;
    cout<<"Input the number: ";
    cin>>num;
    cout<<"Input the divisor: ";
    cin>>divisor;
    for (ans=1; ans<=num; ans++){
        if(divisor*ans==num){
            cout<<num<<"/"<<divisor<<"="<<ans;
            break;
        }
    }
    return 0;
}
```

Example Output:

A screenshot of a terminal window with a black background and white text. At the top, there are three small icons: a downward arrow, a magnifying glass, and a document icon. The text in the terminal shows the program's execution: it prompts for a number (80) and a divisor (5), then displays the result 80/5=16. At the bottom, it shows the program finished with exit code 0 and prompts the user to press ENTER to exit the console.

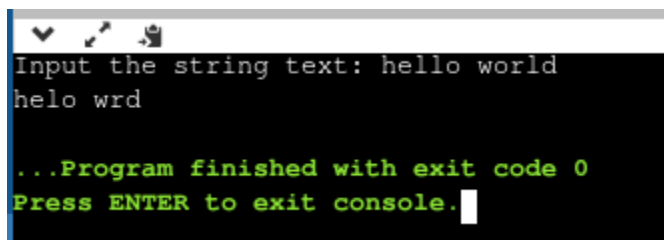
```
Input the number: 80
Input the divisor: 5
80/5=16

...Program finished with exit code 0
Press ENTER to exit console.
```

Q7) 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>
#include <string>
using namespace std;
int main(){
    string a;
    int l;
    cout<<"Input the string text: ";
    getline(cin, a);
    l= a.length();
    for (int i=0; i<=l; i++){
        for (int j=0; j<=l; j++){
            if (tolower(a[i])==tolower(a[j]) && i!=j){
                a.erase(j, 1);
                j--;
                l=a.length();
            }
        }
    }
    cout<<a;
    return 0;
}
```

Example Output:

A screenshot of a console window with a black background and white text. The text shows the program's execution: it prompts for a string, the user enters 'hello world', and the program outputs 'helo wrd'. At the bottom, it shows the program finished with exit code 0 and prompts the user to press ENTER to exit the console.

```
Input the string text: hello world
helo wrd
...Program finished with exit code 0
Press ENTER to exit console.
```


Q8) 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 a[50]={1,2,3,4,5};
    cout<<"Input digits into the array. \n"
        <<"Enter 0 to stop the input stream and display the array. \n";
    for (int i=5; i<=49; i++){
        cin>>a[i];
        if (a[i]==0){
            break;
        }
    }
    cout<<"The current values stored in the array are: \n";
    for (int j=0; j<=49; j++){
        if (a[j]==0){
            break;
        }
        cout<<a[j]<<endl;
    }
    return 0;
}
```

```
Input digits into the array.
Enter 0 to stop the input stream and display the array.
5
6
7
0
The current values stored in the array are:
1
2
3
4
5
5
6
7
...Program finished with exit code 0
Press ENTER to exit console.
```

Q9) 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.

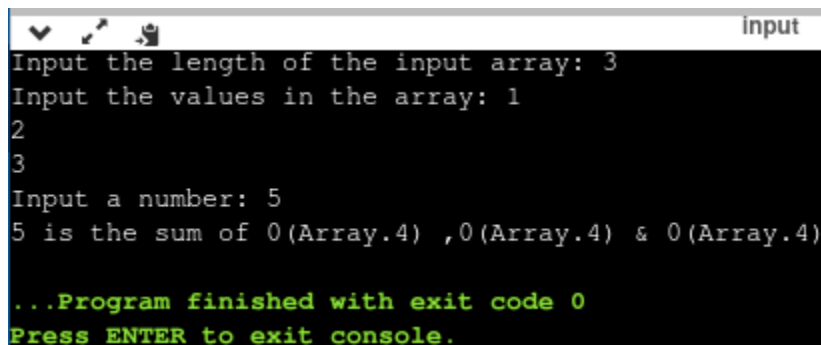
```
#include <iostream>
using namespace std;
int main(){
    int length, a[length], num, j, k, l;
    bool value=false;
    cout<<"Input the length of the input array: ";
    cin>>length;
    cout<<"Input the values in the array: ";
    for (int i=0; i<length; i++){
        cin>> a[i];
    }
    cout<<"Input a number: ";
    cin>>num;
    for(j=0; j<length; j++){
        for(k=j+1; k<length; k++){
            for (l=k+1; l<length; l++){
                if (a[j]+a[k]+a[l]==num){
                    value=true;
                }
            }
        }
    }
}
```

```

        break;
    }
}
if(value==true){
    break;
}
}
if(value==true){
    break;
}
}
cout<<num<<" is the sum of "<<a[j]<<"(Array."<<j+1<<" , "
<<a[k]<<"(Array."<<k+1<<" ) & "
<<a[l]<<"(Array."<<l+1<<"");

return 0;
}

```



```

input
Input the length of the input array: 3
Input the values in the array: 1
2
3
Input a number: 5
5 is the sum of 0(Array.4) ,0(Array.4) & 0(Array.4)

...Program finished with exit code 0
Press ENTER to exit console.

```

Q10) Implement Bubble Sort on an array of 6 integers.

```
#include <iostream>
using namespace std;
int main(){
    int a[6];
    cout<<"Input 6 integers in the array: \n";
    for (int i=0; i<=5; i++){
        cin>>a[i];
    }
    for(int j=0; j<=5; j++){
        for (int k=0; k<=5; k++){
            if (a[k]>a[k+1]){
                swap(a[k], a[k+1]);
            }
        }
    }
    cout<<"The sorted values are: \n";
    for (int l=0; l<=5; l++){
        cout<<a[l]<<"\n";
    }
    return 0;
}
```

```
Input 6 integers in the array:
9
8
7
6
5
4
The sorted values are:
4
5
6
7
8
9

...Program finished with exit code 0
Press ENTER to exit console.
```