

Assignment 1



Course: **Fundamentals of Programming (CS 114)**

Instructor: Muhammad Affan

Name	Muhammad Abdullah
ID	460901
Section	C

Task 1

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

Input:

```
vscode > G Assignment1#01.cpp
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int n, i;
6
7      cout << "enter any integer: ";
8      cin >> n;
9
10     cout << "factors of " << n << " are: ";
11     for(i=1; i<=n; ++i)
12     {
13         if(n%i==0)
14             cout << i << " ";
15     }
16
17     return 0;
18 }
```

Output:

```
TERMINAL
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#01.cpp -o Assignment1#01 } ; i
f ($?) { .\Assignment1#01 }
enter any integer: 55
factors of 55 are: 1 5 11 55
PS C:\Users\muham\Downloads\Lab\.vscode> |
```

Task 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;
}
```

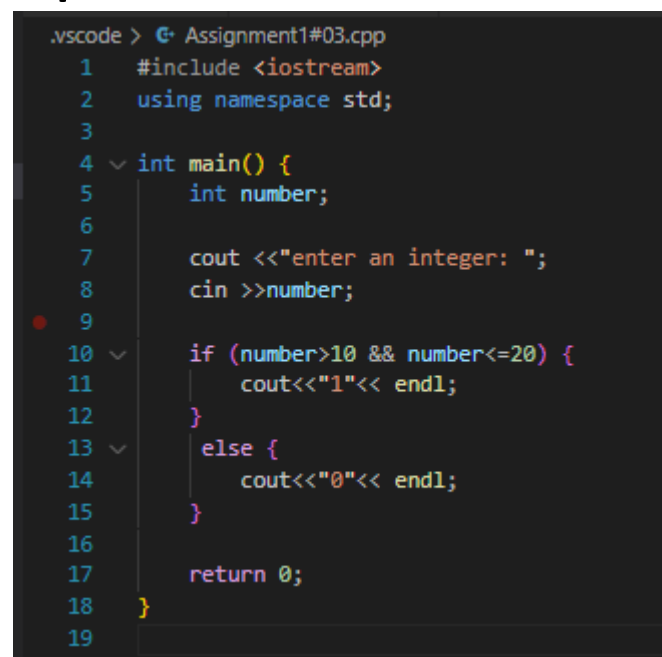
Output:

X=5 and Y=10

Task 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.

Input:

A screenshot of a code editor showing a C++ program. The code is as follows:

```
.vscode > Assignment1#03.cpp
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int number;
6
7      cout << "enter an integer: ";
8      cin >> number;
9
10     if (number > 10 && number <= 20) {
11         cout << "1" << endl;
12     }
13     else {
14         cout << "0" << endl;
15     }
16
17     return 0;
18 }
19
```

Output:

```
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#03.cpp -o Assignment1#03 } ; i
f ($?) { .\Assignment1#03 }
enter an integer: 18
1
PS C:\Users\muham\Downloads\Lab\.vscode> |
```

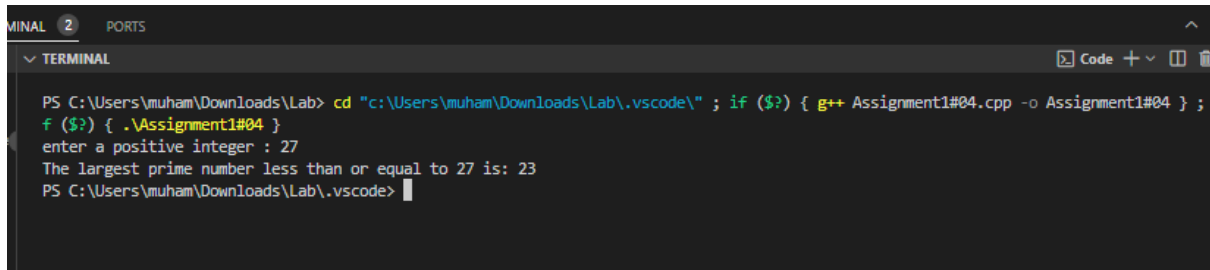
Task 4

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.

Input:

```
vscode > Assignment1#04.cpp
1  #include<iostream>
2  using namespace std;
3
4  int main() {
5      int num;
6
7      cout << "enter a positive integer : ";
8      cin >> num;
9
10     int largestPrime=num-1;
11     while (largestPrime>=2) {
12         bool isPrime=true;
13
14         for (int i=2;i*i<=largestPrime;i++) {
15             if (largestPrime%i==0)
16             {
17                 isPrime=false;
18                 break;
19             }
20         }
21
22         if (isPrime) {
23             break;
24         }
25
26         largestPrime--;
27     }
28
29     if (largestPrime >= 2) {
30         cout<<"The largest prime number less than or equal to "<< num << " is: " << largestPrime << endl;
31     } else {
32         cout<<"no prime number found"<<endl;
33     }
34
35     return 0;
36 }
37
38
```

Output:

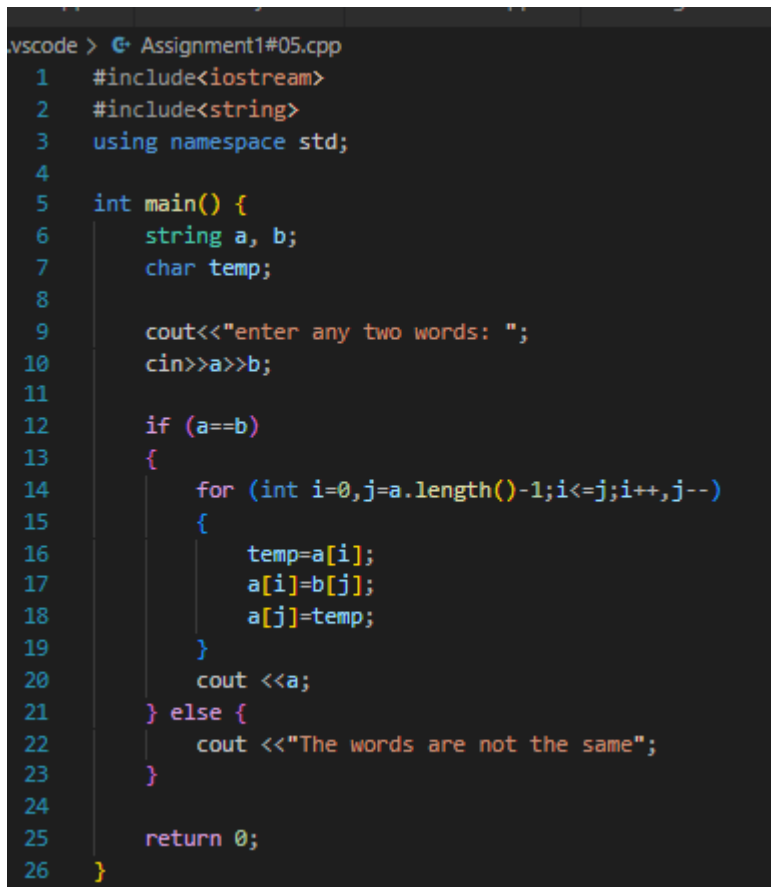


```
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#04.cpp -o Assignment1#04 } ;  
f ($?) { .\Assignment1#04 }  
enter a positive integer : 27  
The largest prime number less than or equal to 27 is: 23  
PS C:\Users\muham\Downloads\Lab\.vscode>
```

Task 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.

Input:



```
vscode > Assignment1#05.cpp  
1  #include<iostream>  
2  #include<string>  
3  using namespace std;  
4  
5  int main() {  
6      string a, b;  
7      char temp;  
8  
9      cout<<"enter any two words: ";  
10     cin>>a>>b;  
11  
12     if (a==b)  
13     {  
14         for (int i=0,j=a.length()-1;i<=j;i++,j--)  
15         {  
16             temp=a[i];  
17             a[i]=b[j];  
18             a[j]=temp;  
19         }  
20         cout <<a;  
21     } else {  
22         cout <<"The words are not the same";  
23     }  
24  
25     return 0;  
26 }
```

Output:

```
MINIMAL 2 PORTS
▼ TERMINAL
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#05.cpp -o Assignment1#05 } ; i
f ($?) { .\Assignment1#05 }
enter any two words: hello
hello
olleh
PS C:\Users\muham\Downloads\Lab\.vscode> |
```

Task 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.

Input:

```
.vscode > G+ Assignment1#06.cpp
1  #include <iostream>
2  using namespace std;
3
4  int main()
5  {
6      int num=0;
7      cout<<"enter a number: ";
8      cin>>num;
9
10     int quotient = 0;
11     int divisor = 0;
12
13     cout<<"enter a divisor: ";
14     cin>>divisor;
15
16     while (num>=divisor)
17     {
18         num -= divisor;
19         quotient++;
20     }
21
22     cout << "result is: " << quotient << endl;
23     return 0;
24 }
25
```

Output:

```
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#06.
f ($?) { .\Assignment1#06 }
enter a number: 15
enter a divisor: 5
result is: 3
PS C:\Users\muham\Downloads\Lab\.vscode> |
```

Task 7

Input:

Output:

Task 8

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

Input:

```
vscode > G+ Assignment1#08.cpp
1  #include <iostream>
2  using namespace std;
3
4  int main()
5  {
6      int a[8]={1, 2, 3, 4, 5};
7      a[5]=6;
8      a[6]=7;
9      a[7]=8;
10     a[8]=9;
11     a[9]=10;
12     a[10]=11;
13
14     cout <<"array with added elements: ";
15     for (int i=0;i<11;i++)
16     {
17         cout <<a[i]<< " ";
18     }
19     cout<< endl;
20
21     return 0;
22 }
23
```

Output:

```
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#08.cpp -o Assignment1#08 } ; if ($?) { .\Assignment1#08 }
array with added elements: 1 2 3 4 5 6 7 8 9 10 11
PS C:\Users\muham\Downloads\Lab\.vscode>
```

Task 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.

Input:

```
.vscode > Assignment1#09.cpp
9
10     cout <<"enter a number: ";
11     cin >> num;
12     cout <<"enter numbers of the array: ";
13
14     for (int i=0;i<5;i++)
15     |     cin >>a[i];
16
17     for (int i=0;i<5 && !found;i++)
18     | {
19     |     for (int j=0; j<5 && !found;j++) {
20     |         for (int k=0;k<5;k++) {
21     |             if (a[i] + a[j] + a[k]==num) {
22     |                 found=true;
23     |                 break;
24     |             }
25     |         }
26     |         if (found) break;
27     |     }
28     |     if (found) break;
29     | }
30
31     if (!found)
32     |     cout <<"triplet not found" << endl;
33     | else
34     |     cout <<"triplet found" << endl;
35
36     return 0;
37 }
38
```


Output:

```

TERMINAL
PS C:\Users\muham\Downloads\Lab> cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#09.cpp -o Assignment1#09 }
f ($?) { .\Assignment1#09 }
enter a number: 10
enter numbers of the array: 12345

cd "c:\Users\muham\Downloads\Lab\.vscode\" ; if ($?) { g++ Assignment1#09.cpp -o Assignment1#09 } ; if ($?) { .\Assignment1#09 }
triplet not found
PS C:\Users\muham\Downloads\Lab\.vscode> 
```

Task 10

Implement Bubble Sort on an array of 6 integers.

Input:

Output: