Fundamentals of Programming

Assignment : 1

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Question:1

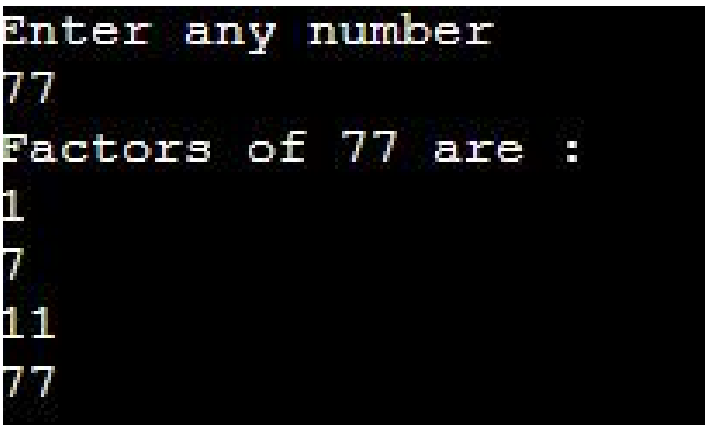
Statement:

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

Code:

```
#include <iostream>

using namespace std;

int main(){
    int x;
    cout << "Enter any number"<<endl;
    cin>>x;

    cout<<"Factors of "<<x<<" are : "<<endl;

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

    return 0;
}
```

Output:



Question:2

Statement:

Write output to the following code.

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

Question:3

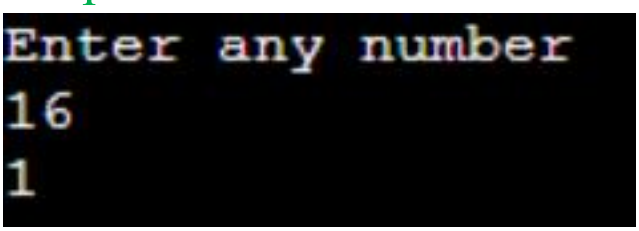
Statement:

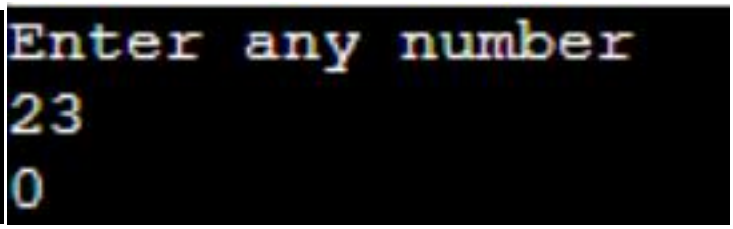
Write a C++ program, take an integer value from user and check if it's greater than 10 and less than equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

Code:

```
#include <iostream>
using namespace std;
int main(){
    int x;
    cout<<"Enter any number "<<endl;
    cin>>x;
    if (x > 10 && x <=20){
        cout<<"1";}

    else{cout<<"0";}
    return 0;
```

Output:





Question:4

Statement:

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:

```
#include <iostream>
using namespace std;

int main()
{
   int N, factors, i, j;
   cout<<"Enter any Number"<<endl;
   cin>>N;

   i = N;
   while (i >= 2) {
      factors = 0;

      j = 1;
      while (j <= i) {
         if (i%j==0) {
            factors++;
         }
         j++;
      }

      if (factors==2) {
         cout<<"The highest prime number lower than your Number is: "<<i;
         break;
      }

      i--;
```

```
    }
    return 0;
}
```

Output:

```
Enter any Number
78
The highest prime number lower than your Number is: 73
```

Question:5

Statement:

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:

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
    string str1, str2, reversed;
    reversed = "";
    cout<<"Enter 1st String: ";
    cin>>str1;
    cout<<"Enter 2nd String: ";
    cin>>str2;

    if (str1 == str2) {
        for (int i = 0; i < str1.length(); i++) {
            reversed = str1[i] + reversed;
        }
        cout<<"Strings are equal. Reversed string is: ";
        cout<<reversed;
    }
    else {
        cout<<"Strings are unequal";
    }
```

```
    return 0;
}
```

Output:

```
Enter 1st String: haseeb
Enter 2nd String: haseeb
Strings are equal. Reversed string is: beesah
```

Question:6

Statement:

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:

```
#include <iostream>
using namespace std;

int main()
{
    int dividend, divisor, remainder, quotient;
    cout<<"Enter Dividend Greater than Divisor"<<endl;
    cout<<"Enter The dividend"<<endl;
    cin>>dividend;
    cout<<"Enter The divisor"<<endl;
    cin>>divisor;

    if (dividend < divisor) {
        cout<<"Please Enter a dividend greater than divisor.";
        return 1;
    }
    remainder = dividend;

    for (int i = 1; i <= dividend; i++) {
        remainder -= divisor;

        if (remainder < divisor) {
            quotient = i;
```

```
            break;
        }
    }

    cout<<dividend<<" / "<<divisor<<" = "<<quotient;
    return 0;
}
```

Output:

```
Enter Dividend Greater than Divisor
Enter The dividend
20
Enter The divisor
4
20 / 4 = 5
```

Question:7

Statement:

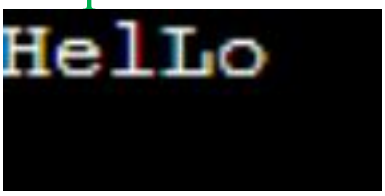
Write a C++program for a string which may contain lowercase and uppercase characters. The task is to remove all duplicate characters from the string and find the resultant string.

Code:

```
#include <iostream>
#include <string>
using namespace std;

int main() {
    string str1 = "HHHHHeeeeellllLLLLooooo";
    string result = "";
    for(int i = 0; i < str1.length(); i++){
        bool isDuplicate = false;
        for(int j = 0;j <result.length(); j++){
            if (str1[i] == result[j]){
                isDuplicate = true;
```

```
        }
      }
      if (isDuplicate == false){
        result += str1[i];
      }
   }
   cout << result << endl;

   return 0;
}
```

Output:



Question:8

Statement:

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

Code:

```
#include <iostream>
using namespace std;

int main()
{
   int newA[8], a[5] = {1,2,3,4,5};
   cout<<"Current array is: {";
   for (int i = 0; i<5; i++) {
      cout<<a[i];
      if (i==4)
         continue;
      cout<<", ";
   }
```

```
        cout<<"}\n";

        for (int i = 0; i<5; i++) {
            newA[i] = a[i];
        }

        cout<<"Enter 3 integers which will be added to the array: "<<endl;
        for (int i = 5; i<8; i++)
            cin>>newA[i];

        cout<<"Printing elements of array"<<endl;
        for (int i = 0; i<8; i++) {
            cout<<newA[i]<<" ";
        }
        return 0;
}
```

Output:

```
Current array is: {1, 2, 3, 4, 5}
Enter 3 integers which will be added to the array:
7 8 9
Printing elements of array
1 2 3 4 5 7 8 9
```

Question:9

Statement:

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

Code:

```
#include <iostream>
using namespace std;

int main()
{
    int a, b, c, X, sum, arr[10];
```

```
    cout<<"Enter 10 integers for array: ";
    for (int i = 0; i<10; i++) {
       cin>>arr[i];
    }

    bool found = false;
    cout<<"Enter integer X: ";
    cin>>X;

    cout<<"Triplets are: ";
    for (int i = 0; i<10; i++) {
       for (int j = 0; j<10; j++) {
          if (i == j)
             continue;

          for (int z = 0; z<10; z++) {
             if (z == i || z == j)
                continue;

             sum = arr[i] + arr[j] + arr[z];
             if (sum == X) {
                cout<<" ("<<arr[i]<<", "<<arr[j]<<", "<<arr[z]<<")";
                found = true;
             }
          }
       }
    }
    if (found == false) {
       cout<<"No Triplet Found";
    }
    return 0;
}
```

Output:

```
Enter 10 integers for array: 2
3
5
6
7
8
9
0
8
8
Enter integer X: 12
Triplets are:  (2, 3, 7) (2, 7, 3) (3, 2, 7) (3, 7, 2) (3, 9, 0) (3, 0, 9) (5, 7, 0) (5, 0, 7) (7, 2, 3) (7, 3, 2) (
7, 5, 0) (7, 0, 5) (9, 3, 0) (9, 0, 3) (0, 3, 9) (0, 5, 7) (0, 7, 5) (0, 9, 3)
```

Question:10

Statement:

Implement Bubble Sort on an array of 6 integers.

Code:

```
#include <iostream>
using namespace std;


int main() {
        #define MAX 6
int arr[MAX] ;
   int temp;
   int i,j;
   for(i=0;i<MAX;i++)
   {
        cout<<"Enter the Number " <<i<<endl;
        cin>>arr[i];
   }
   cout<<"Your Array is \n[";
      for(i = 0; i < MAX; i++) {
      cout << arr[i] << " ";
   }
   cout << "]" <<endl;
      for(i = 0; i < MAX-1; i++) {


      for(j = 0; j < MAX-1-i; j++) {

         if(arr[j] > arr[j+1]) {
            temp = arr[j];
            arr[j] = arr[j+1];
            arr[j+1] = temp;

}

}
```

```
}
cout<<"Sorted Array is "<<endl;
  cout << "[";

   for(i = 0; i < MAX; i++) {
      cout << arr[i] << " ";
   }
   cout << "]" << std::endl;

         return 0;
}
```

Output:

```
Enter the Number 0
23
Enter the Number 1
45
Enter the Number 2
67
Enter the Number 3
23
Enter the Number 4
345
Enter the Number 5
23
Your Array is
[23 45 67 23 345 23 ]
Sorted Array is
[23 23 23 45 67 345 ]
```