Fundamentals of Programming
ME-15
Section B
1st Semester
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Q1 . Write a C++ program to display factors of a number using for loops.

```
#include<iostream>

using namespace std;

int main(){

        int table=3, multiply;

        for(int i=1; i<11; i++){

                multiply=table*i;

                cout<<i<<" * 3 "<<" = "<<multiply<<endl;

        }


        return 0;

}
```

```
1 * 3  = 3
2 * 3  = 6
3 * 3  = 9
4 * 3  = 12
5 * 3  = 15
6 * 3  = 18
7 * 3  = 21
8 * 3  = 24
9 * 3  = 27
10 * 3  = 30

--------------------------------
Process exited after 0.06515 seconds with return value 0
Press any key to continue . . .
```

Q2 Write output to the following code.

OUTPUT:

```
#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 the code is just "x is 5 and y is 10" because x and y have been defined with 5 and 10 respectively at the beginning of the code, and since x will remain 5 throughout, the else statement will not be printed.

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 number;
        bool larger = true;
        cout<<"Enter a number:"<<endl;
        cin>>number;


        if(number>10 && number<=20){
                larger = true;
                cout<<"1"<<endl;}
        else{
                larger = false;
                cout<<"0"<<endl;
        }


        return 0;
}
```

```
Enter a number:
12
1

--------------------------------
Process exited after 2.814 seconds with return value 0
Press any key to continue . . .
```

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.

```
int main()

{
```

```
int number, i,j,factors  ;
cout<<"Enter a number: ";
cin>>number;
i = number;
while (i >= 2) {
factors = 0;
j = 1;
   while (j <= i) {
      if (i%j==0) {
         factors++;  }
      j++;}
if (factors == 2) {
        cout<<"The largest prime number less than or equal to 'N':"<<i;
        break;}
   i--;}
return 0;}
```

```
Enter a number: 20
The largest prime number less than or equal to 'N':19
--------------------------------
Process exited after 1.572 seconds with return value 0
Press any key to continue . . .
```

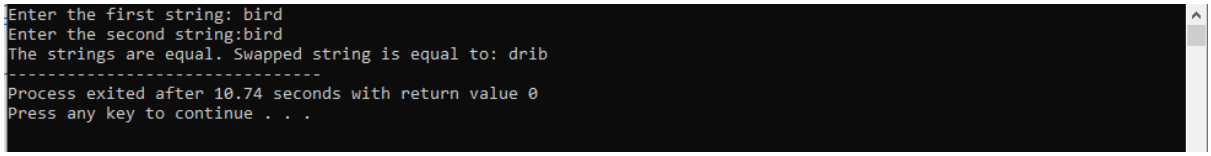
Q5 Write a C++ program, take two string as input from user and check if both strings are equal or not. If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.

```
#include <iostream>
#include <string>
using namespace std;
int main()
{
   string one, two, swap;
   swap = "";
   cout<<"Enter the first string:";
   cin>>one;
   cout<<"Enter the second string:";
```

```
    cin>>two;
    if (one == two){
        for (int i=0;i<one.length();i++){
            swap=one[i]+swap;
        }
        cout<<"The strings are equal. Swapped string is equal to: ";
        cout<<swap;
        }
        else {
            cout<<"Strings are unequal";


        }
    return 0;
}
```

/*if the strings are equal, then the array one[i] is added to 'swap' which is just a space (""). Since the first letter in the string (bird) is 'b' when i=0, the letter 'b' is added to swap. After each iteration, 'i' is incremented and i=1 means the next letter in the word bird is added to swap which is now equal to 'b'. Swap will now equal to 'ib'. The process repeats until 'i' is equal to the number of letters in the string (the length of the string) */



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 dividend=40, divisor=5, quotient=0;
    for(int i=dividend; i>=divisor; i-=divisor){
        quotient++;
    }
    cout<<dividend<<" / "<<divisor<<" = "<<quotient<<endl;
```

```
    return 0;
}
```

```
40 / 5 = 8

--------------------------------
Process exited after 0.05982 seconds with return value 0
Press any key to continue . . .
```

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 phr= "heeelllooo";
   string final= "";
   for (int i = 0; i<phr.length(); i++) {
      bool identical = false;
      for (int j = 0; j<final.length(); j++) {
         if (phr[i]==final[j]) {
            identical=true;
            break;
         }}
      if (!identical)   //not identical
{final+=phr[i];}}

   cout<<final<<endl;

   return 0;
}
```

```
helo

--------------------------------
Process exited after 0.06017 seconds with return value 0
Press any key to continue . . .
```

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 x, y, i;
   int arr[7] = {1,2,3,4,5};
   cout<<"Enter two new integers:"<<endl;
   cin>>x>>y;
   for(int i=0; i<5; i++){
      cout<<arr[i]<<endl;
   }
    arr[i] = x;
    cout<<arr[i]<<endl;
    arr[i+1] = y;
    cout<<arr[i+1]<<endl;
   return 0;
}
```

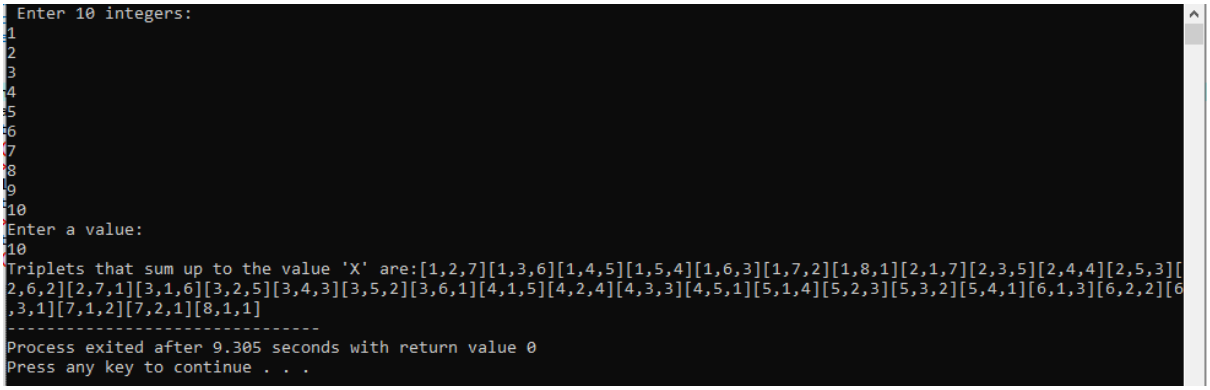
```
Enter two new integers:
12 23
1
2
3
4
5
12
23

--------------------------------
Process exited after 6.458 seconds with return value 0
Press any key to continue . . .
```

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.

```
int main(){
int X, a, sum, arr[10];
        cout<<" Enter 10 integers:"<<endl;
        for(int x=0; x<10; x++){
        cin>>arr[x];}
   bool checked = false;
        cout<<"Enter a value:"<<endl;
        cin>>X;
        cout<<"Triplets that sum up to the value 'X' are:";
```

```
        for(int x=0; x<10; x++){
                for(int y = 0; y<10; y++){
                        if(x==y)
                        continue;
                        for(int z=0; z<10; z++){
                                if(a==x || a==y)
                                continue;
                                sum=arr[x]+arr[y]+arr[z];
                                if (sum==X) {
                                cout<<"["<<arr[x]<<","<<arr[y]<<","<<arr[z]<<"]";
                                checked = true;}
                                }}}
        return 0;
}
```



Q10 Implement Bubble Sort on an array of 6 integers.

```
int main() {
#define terms 10
int arr[terms], k, i, j;
  for(i=0;i<terms;i++)
  {cout<<"Enter a number " <<i<<endl;
        cin>>arr[i]; }
for(i = 0; i < terms-1; i++) {
```

```
    for(j = 0; j < terms-1-i; j++) {
      if(arr[j] > arr[j+1]) {
        k = arr[j];
        arr[j] = arr[j+1];
        arr[j+1] = k;    }}}
cout<<"Final array is :"<<endl;
  cout << "[ ";

   for(i = 0; i < terms; i++) {
     cout << arr[i] <<" "; }
   cout << "]" << endl;
return 0;
}
```

```
Enter a number 0
3
Enter a number 1
2
Enter a number 2
5
Enter a number 3
798
Enter a number 4
6
Enter a number 5
2
Final array is :
[ 2 2 3 5 6 798 ]

--------------------------------
Process exited after 6.026 seconds with return value 0
Press any key to continue . . .
```