CS & Programming Lab
Assignment 1

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Question #1

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

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

int main()
{
	//Declaring variables and assigning values
	int number = 100;
	cout<<"The factors of "<<number<<" are : ";

	//Computing result and displaying output
	for (int i=1; i<=number; i++)
	{
	if (number%i == 0)
	cout<<i<<" ";
	}
	cout<<endl;
}
```

```cpp
/*1. Write a C++ program to display factors of a number using for loops.*/

#include<iostream>
using namespace std;

int main()
{
    //Declaring variables and assigning values
    int number = 100;
    cout<<"The factors of "<<number<<" are : ";

    //Computing result and displaying output
    for (int i=1; i<=number; i++)
    {
    if (number%i == 0)
    cout<<i<<" ";
    }
    cout<<endl;
}
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Com
The factors of 100 are : 1 2 4 5 10 20 25 50 100

--------------------------------
Process exited after 0.1273 seconds with return value 0
Press any key to continue . . .
```

Question #2

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

Question #3

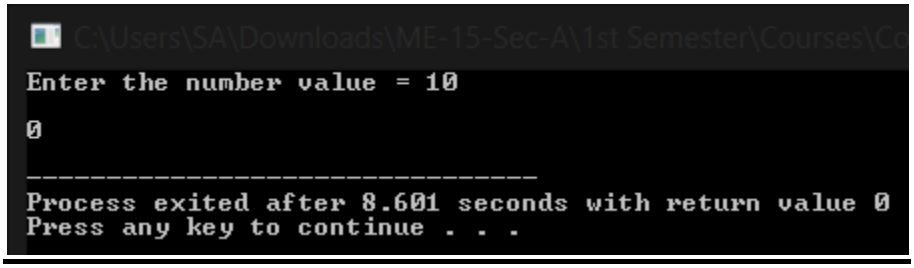
/*3. Write a C++ program, take an integer value from user and check if it's greater than 10 and less than equal to 20.

Print 1 if yes and print 0 if no. Use appropriate datatype for output.*/

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

int main()
{
	//Declaring variables and taking inputs
	int number;
	cout<<"Enter the number value = ";
	cin>>number;
	cout<<endl;

	if (number>10 && number<=20)
	cout<<true<<endl;

	else
	cout<<false<<endl;
```

```
    return 0;
}
```

```cpp
/*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()
{
    //Declaring variables and taking inputs
    int number;
    cout<<"Enter the number value = ";
    cin>>number;
    cout<<endl;

    if (number>10 && number<=20)
    cout<<true<<endl;

    else
    cout<<false<<endl;

    return 0;
}
```



Question #4

/*4. Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N.

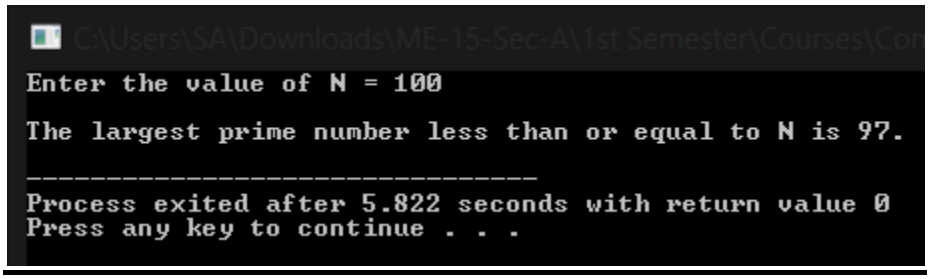
Your program should take the value of N as input from the user and then find the largest prime number less than or equal to N.

You are not allowed to use any library or pre-existing functions to check for prime numbers.*/

```
#include<iostream>

using namespace std;


int main()

{

	//Declaring variables and taking inputs

	int N, number=2, prime_number;

	cout<<"Enter the value of N = ";

	cin>>N;

	cout<<endl;


	//Computing values and displaying output

	if (N<=1)

	{cout<<"Invalid Input."<<endl;}
```

```
        else
        {
           while (number<=N)
           {
                for (int i=2; i<number; i++)
         {if (number%i == 0)
         {break;}
         if (number%i != 0)
                  {if (i == number-1)
                  {prime_number = number;}

                  else
                  {continue;}}}
                  number++;
                }
        cout<<"The largest prime number less than or equal to N is
"<<prime_number<<"."<<endl;
   }

}
```

```cpp
/*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()
{
    //Declaring variables and taking inputs
    int N, number=2, prime_number;
    cout<<"Enter the value of N = ";
    cin>>N;
    cout<<endl;

    //Computing values and displaying output
    if (N<=1)
    {cout<<"Invalid Input."<<endl;}

    else
    {
        while (number<=N)
        {
            for (int i=2; i<number; i++)
            {if (number%i == 0)
            {break;}
            if (number%i != 0)
            {if (i == number-1)
            {prime_number = number;}

            else
            {continue;}}}
            number++;
        }
    cout<<"The largest prime number less than or equal to N is "<<prime_number<<"."<<endl;
    }
}
```



Question #5

/*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>

#include<string>

using namespace std;


int main()

{

	string a,b;

	cout<<"Enter the first word : ";

	cin>>a;

	cout<<endl;

	cout<<"Enter the second word : ";

	cin>>b;

	cout<<endl;


	for (int i=0; i<a.length(); i++)

	{
```

```
        cout<<a[i]<<" = "<<b[i];
        if (a[i] == b[i])
        cout<<"  (Equal)"<<endl;
        else
        cout<<"  (Not Equal)"<<endl;
    }
    cout<<endl<<endl;
    if (a == b)
    {cout<<"The string is now : ";
    for (int i=0; i<=a.length(); i++)
    {b[i] = a[a.length()-i-1];
    cout<<b[i];}}

    else
    cout<<"The strings are not equal."<<endl;

        return 0;
}
```

```cpp
/*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>
#include<string>
using namespace std;

int main()
{
    string a,b;
    cout<<"Enter the first word : ";
    cin>>a;
    cout<<endl;
    cout<<"Enter the second word : ";
    cin>>b;
    cout<<endl;

    for (int i=0; i<a.length(); i++)
    {
    cout<<a[i]<<" = "<<b[i];
    if (a[i] == b[i])
    cout<<"  (Equal)"<<endl;
    else
    cout<<"  (Not Equal)"<<endl;
    }
    cout<<endl<<endl;
    if (a == b)
    {cout<<"The string is now : ";
    for (int i=0; i<=a.length(); i++)
    {b[i] = a[a.length()-i-1];
    cout<<b[i];}}

    else
    cout<<"The strings are not equal."<<endl;

    return 0;
}
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\
Enter the first word : Program

Enter the second word : Program

P = P  (Equal)
r = r  (Equal)
o = o  (Equal)
g = g  (Equal)
r = r  (Equal)
a = a  (Equal)
m = m  (Equal)


The string is now : margorP
--------------------------------
Process exited after 25.3 seconds with return value 0
Press any key to continue . . .
```

Question #6

/*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()

{

	//Declaring variables and taking inputs

	int dividend, divisor, remainder, quotient = 0;


	cout<<"Enter the values to perform division :\n\n";

	cout<<"Dividend = ";

	cin>>dividend;

	cout<<"Divisor = ";

	cin>>divisor;

	cout<<"\n\n";

	//Checking for Invalid conditions

	if (dividend<=divisor || divisor==0)

	{cout<<"Invalid Input."<<endl;}
```

```
        else
        //Computing values using for loops and displaying output
    {for (int n=dividend; n>=divisor; n-=divisor)
        {quotient++;}
        cout<<"Using for loops,\n\n";
        cout<<dividend<<"/"<<divisor<<" = "<<quotient<<"\n\n";

        //Computing values using dividend formula and displaying output
        remainder = dividend%divisor;
        quotient = (dividend-remainder)/divisor;

        cout<<"Using dividend formula,\n\n";
        cout<<"("<<dividend<<"-"<<remainder<<")"<<"/"<<divisor<<" =
"<<quotient;}
}
```

```cpp
/*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()
{
    //Declaring variables and taking inputs
    int dividend, divisor, remainder, quotient = 0;

    cout<<"Enter the values to perform division :\n\n";
    cout<<"Dividend = ";
    cin>>dividend;
    cout<<"Divisor = ";
    cin>>divisor;
    cout<<"\n\n";
    //Checking for Invalid conditions
    if (dividend<=divisor || divisor==0)
    {cout<<"Invalid Input."<<endl;}

    else
    //Computing values using for loops and displaying output
    {for (int n=dividend; n>=divisor; n-=divisor)
    {quotient++;}
    cout<<"Using for loops,\n\n";
    cout<<dividend<<"/"<<divisor<<" = "<<quotient<<"\n\n";

    //Computing values using dividend formula and displaying output
    remainder = dividend%divisor;
    quotient = (dividend-remainder)/divisor;

    cout<<"Using dividend formula,\n\n";
    cout<<"("<<dividend<<"-"<<remainder<<")"<<"/"<<divisor<<" = "<<quotient;}
}
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Co
Enter the values to perform division :

Dividend = 15
Divisor = 3


Using for loops,

15/3 = 5

Using dividend formula,

(15-0)/3 = 5
--------------------------------
Process exited after 6.713 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Co
Enter the values to perform division :

Dividend = 15
Divisor = 20


Invalid Input.

--------------------------------
Process exited after 5.434 seconds with return value 0
Press any key to continue . . .
```

Question #7

/*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>

#include<string>

using namespace std;


int main()

{

	//Declaring string

	string a = "Hello";


	//Computing result

	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] = ' ';}}}}

        //Displaying output
        cout<<"The string is : ";
        for (int i=0; i<a.length(); i++)
        {
        if (a[i] == ' ')
        {a[i] = a[i+1];
        a[i+1] = ' ';
        cout<<a[i];}
        else
        {cout<<a[i];}
        }
}
```

```cpp
/*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>
#include<string>
using namespace std;

int main()
{
    //Declaring string
    string a = "Hello";

    //Computing result
    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] = ' ';}}}}

    //Displaying output
    cout<<"The string is : ";
    for (int i=0; i<a.length(); i++)
    {
    if (a[i] == ' ')
    {a[i] = a[i+1];
    a[i+1] = ' ';
    cout<<a[i];}
    else
    {cout<<a[i];}
    }
}
```

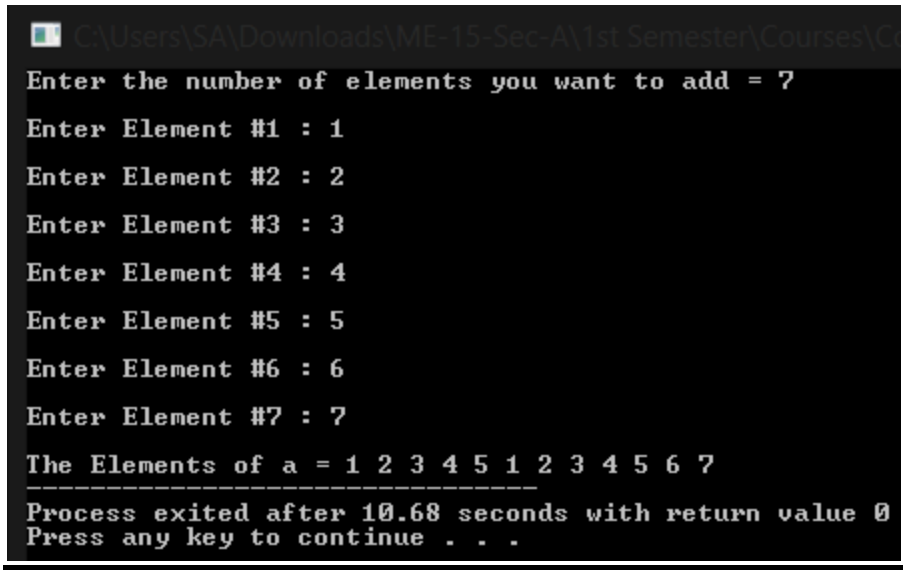
```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Co
The string is : Helo
--------------------------------
Process exited after 0.1047 seconds with return value 0
Press any key to continue . . .
```

Question #8

```
/*8. 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()
{
	//Declaring variables and assigning values
	int n, a[5] = {1, 2, 3, 4, 5}, b[5+n];

	cout<<"Enter the number of elements you want to add = ";
	cin>>n;
	cout<<endl;

	for (int i=0; i<5; i++)
	{b[i]=a[i];}
	for (int i=5; i<5+n; i++)
	{cout<<"Enter Element #"<<i-4<<" : ";
	cin>>b[i];
```

```
cout<<endl;}


//Displaying output
cout<<"The Elements of a = ";
for (int i=0; i<5+n; i++)
{cout<<b[i]<<" ";}


return 0;
}
```

```
/*8. 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()
{
    //Declaring variables and assigning values
    int n, a[5] = {1, 2, 3, 4, 5}, b[5+n];

    cout<<"Enter the number of elements you want to add = ";
    cin>>n;
    cout<<endl;

    for (int i=0; i<5; i++)
    {b[i]=a[i];}
    for (int i=5; i<5+n; i++)
    {cout<<"Enter Element #"<<i-4<<" : ";
    cin>>b[i];
    cout<<endl;}

    //Displaying output
    cout<<"The Elements of a = ";
    for (int i=0; i<5+n; i++)
    {cout<<b[i]<<" ";}

    return 0;
}
```


C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\C
Enter the number of elements you want to add = 7
Enter Element #1 : 1
Enter Element #2 : 2
Enter Element #3 : 3
Enter Element #4 : 4
Enter Element #5 : 5
Enter Element #6 : 6
Enter Element #7 : 7
The Elements of a = 1 2 3 4 5 1 2 3 4 5 6 7
Process exited after 10.68 seconds with return value 0
Press any key to continue . . .

Question #9

/*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()
{
	//Declaring variables and assigning values
	int X=9;
	int a[6] = {0, 1, 2, 3, 4, 5};

	//Computing result and displaying output
	cout<<"Different combinations of triplets\n\n";
	for (int i=0; i<6; i++)
	{
	for (int j=0; j<6; j++)
	{
	for (int k=0; k<6; k++)
	{if (((i != j) && (j != k) && (k != i)) && a[i]+a[j]+a[k] == X)
```

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

}

```
1   /*9. Given an integer array and an integer X.
2   Find if there's a triplet in the array which sums up to the given integer X.*/
3
4   #include<iostream>
5   using namespace std;
6
7   int main()
8   {
9       //Declaring variables and assigning values
10      int X=9;
11      int a[6] = {0, 1, 2, 3, 4, 5};
12
13      //Computing result and displaying output
14      cout<<"Different combinations of triplets\n\n";
15      for (int i=0; i<6; i++)
16      {
17      for (int j=0; j<6; j++)
18      {
19      for (int k=0; k<6; k++)
20      {if (((i != j) && (j != k) && (k != i)) && a[i]+a[j]+a[k] == X)
21      {cout<<a[i]<<" "<<a[j]<<" "<<a[k]<<endl;}}}}
22  }
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Cor
Different combinations of triplets

0 4 5
0 5 4
1 3 5
1 5 3
2 3 4
2 4 3
3 1 5
3 2 4
3 4 2
3 5 1
4 0 5
4 2 3
4 3 2
4 5 0
5 0 4
5 1 3
5 3 1
5 4 0

--------------------------------
Process exited after 0.07477 seconds with return value 0
Press any key to continue . . .
```

Question #10

```
/*10. Implement Bubble Sort on an array of 6 integers.*/

#include<iostream>
using namespace std;

int main()
{
	//Declaing variables and assigning values
	int num, a[6];

	cout<<"Enter the number values for bubble sorting :\n\n";

	for (int i=0; i<6; i++)
	{
	cout<<"Enter Value #"<<i+1<<" : ";
	cin>>a[i];
	cout<<endl;
	}
```

```
        //Computing bubble sort
        for (int i=0; i<6; i++)
        {
        for (int j=0; j<6; j++)
        {if (a[j+1] < a[j])
        {num = a[j];
        a[j] = a[j+1];
        a[j+1] = num;}}
        }

        //Displaying output
        cout<<"Bubble Sort = ";
        for (int i=0; i<6; i++)
        cout<<a[i]<<" ";
}
```

```cpp
/*10. Implement Bubble Sort on an array of 6 integers.*/

#include<iostream>
using namespace std;

int main()
{
    //Declaing variables and assigning values
    int num, a[6];

    cout<<"Enter the number values for bubble sorting :\n\n";

    for (int i=0; i<6; i++)
    {
    cout<<"Enter Value #"<<i+1<<" : ";
    cin>>a[i];
    cout<<endl;
    }


    //Computing bubble sort
    for (int i=0; i<6; i++)
    {
    for (int j=0; j<6; j++)
    {if (a[j+1] < a[j])
    {num = a[j];
    a[j] = a[j+1];
    a[j+1] = num;}}
    }

    //Displaying output
    cout<<"Bubble Sort = ";
    for (int i=0; i<6; i++)
    cout<<a[i]<<" ";
}
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Co
Enter the number values for bubble sorting :

Enter Value #1 : 56

Enter Value #2 : 38

Enter Value #3 : 90

Enter Value #4 : 2

Enter Value #5 : 83

Enter Value #6 : 79

Bubble Sort = 2 38 56 79 83 90
--------------------------------
Process exited after 46.72 seconds with return value 0
Press any key to continue . . .
```