

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;
```

```
}
```

```

1  /*1. Write a C++ program to display factors of a number using for loops.*/
2
3  #include<iostream>
4  using namespace std;
5
6  int main()
7  {
8      //Declaring variables and assigning values
9      int number = 100;
10     cout<<"The factors of "<<number<<" are : ";
11
12     //Computing result and displaying output
13     for (int i=1; i<=number; i++)
14     {
15         if (number%i == 0)
16             cout<<i<<" ";
17     }
18     cout<<endl;
19 }

```

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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;
}
```

```
1  /*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.
2     Print 1 if yes and print 0 if no. Use appropriate datatype for output.*/
3
4  #include<iostream>
5  using namespace std;
6
7  int main()
8  {
9      //Declaring variables and taking inputs
10     int number;
11     cout<<"Enter the number value = ";
12     cin>>number;
13     cout<<endl;
14
15     if (number>10 && number<=20)
16     cout<<true<<endl;
17
18     else
19     cout<<false<<endl;
20
21     return 0;
22 }
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\C++
Enter the number value = 10
0
-----
Process exited after 8.601 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\C++
Enter the number value = 20
1
-----
Process exited after 7.257 seconds with return value 0
Press any key to continue . . .
```

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;
}

}

```



```

1  /*4. Write a C++ program that uses a while loop to find the largest prime number less than a given positive integer N.
2  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.
3  You are not allowed to use any library or pre-existing functions to check for prime numbers.*/
4
5  #include<iostream>
6  using namespace std;
7
8  int main()
9  {
10     //Declaring variables and taking inputs
11     int N, number=2, prime_number;
12     cout<<"Enter the value of N = ";
13     cin>>N;
14     cout<<endl;
15
16     //Computing values and displaying output
17     if (N<=1)
18     {cout<<"Invalid Input."<<endl;}
19
20     else
21     {
22         while (number<=N)
23         {
24             for (int i=2; i<number; i++)
25             {if (number%i == 0)
26             {break;}
27             if (number%i != 0)
28             {if (i == number-1)
29             {prime_number = number;}
30
31             else
32             {continue;}}}
33             number++;
34         }
35         cout<<"The largest prime number less than or equal to N is "<<prime_number<<."<<endl;
36     }
37 }

```

```

C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\Co
Enter the value of N = 100
The largest prime number less than or equal to N is 97.
-----
Process exited after 5.822 seconds with return value 0
Press any key to continue . . .

```

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;  
}
```

```

1  /*5. Write a C++ program, take two string as input from user and check if both strings are equal or not.
2  If they are equal make them unequal by rotating string. e.g., Hello is turned into olleH etc.*/
3
4  #include<iostream>
5  #include<string>
6  using namespace std;
7
8  int main()
9  {
10     string a,b;
11     cout<<"Enter the first word : ";
12     cin>>a;
13     cout<<endl;
14     cout<<"Enter the second word : ";
15     cin>>b;
16     cout<<endl;
17
18     for (int i=0; i<a.length(); i++)
19     {
20         cout<<a[i]<<" = "<<b[i];
21         if (a[i] == b[i])
22             cout<<" (Equal)"<<endl;
23         else
24             cout<<" (Not Equal)"<<endl;
25     }
26     cout<<endl<<endl;
27     if (a == b)
28     {cout<<"The string is now : ";
29       for (int i=0; i<=a.length(); i++)
30       {b[i] = a[a.length()-i-1];
31        cout<<b[i];}}
32
33     else
34         cout<<"The strings are not equal."<<endl;
35
36     return 0;
37 }

```

```

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;}

}

```

```

1  /*6. Perform division in C++ without / using for loops. You can use / only to display the final results.
2     Your dividend must be greater than divisor.*/
3
4  #include<iostream>
5  using namespace std;
6
7  int main()
8  {
9      //Declaring variables and taking inputs
10     int dividend, divisor, remainder, quotient = 0;
11
12     cout<<"Enter the values to perform division :\n\n";
13     cout<<"Dividend = ";
14     cin>>dividend;
15     cout<<"Divisor = ";
16     cin>>divisor;
17     cout<<"\n\n";
18     //Checking for Invalid conditions
19     if (dividend<=divisor || divisor==0)
20     {cout<<"Invalid Input."<<endl;}
21
22     else
23     //Computing values using for loops and displaying output
24     {for (int n=dividend; n>=divisor; n-=divisor)
25     {quotient++;}
26     cout<<"Using for loops,\n\n";
27     cout<<dividend<<"/"<<divisor<<" = "<<quotient<<"\n\n";
28
29     //Computing values using dividend formula and displaying output
30     remainder = dividend%divisor;
31     quotient = (dividend-remainder)/divisor;
32
33     cout<<"Using dividend formula,\n\n";
34     cout<<("(<<dividend<<"-"<<remainder<<")"<<"/"<<divisor<<" = "<<quotient;
35 }

```

```

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];}
```

```
}
```

```
}
```

```

1  /*7. Write a C++ program for a string which may contain lowercase and uppercase characters.
2  The task is to remove all duplicate characters from the string and find the resultant string.*/
3
4  #include<iostream>
5  #include<string>
6  using namespace std;
7
8  int main()
9  {
10     //Declaring string
11     string a = "Hello";
12
13     //Computing result
14     for (int i=0; i<a.length(); i++)
15     {
16         for (int j=0; j<a.length(); j++)
17         {if (i != j)
18             {if (a[i] == a[j])
19                 {a[j] = a[j+1];
20                 a[j+1] = ' ';}}}}
21
22     //Displaying output
23     cout<<"The string is : ";
24     for (int i=0; i<a.length(); i++)
25     {
26         if (a[i] == ' ')
27         {a[i] = a[i+1];
28         a[i+1] = ' ';
29         cout<<a[i];}
30     else
31     {cout<<a[i];}
32     }
33 }

```

```

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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;
```

```
}
```

```
1  /*8. Suppose an integer array a[5] = {1,2,3,4,5}.
2  Add more elements to it and display them in C++.*/
3
4  #include<iostream>
5  using namespace std;
6
7  int main()
8  {
9      //Declaring variables and assigning values
10     int n, a[5] = {1, 2, 3, 4, 5}, b[5+n];
11
12     cout<<"Enter the number of elements you want to add = ";
13     cin>>n;
14     cout<<endl;
15
16     for (int i=0; i<5; i++)
17     {b[i]=a[i];}
18     for (int i=5; i<5+n; i++)
19     {cout<<"Enter Element #"<<i-4<<" : ";
20      cin>>b[i];
21      cout<<endl;}
22
23     //Displaying output
24     cout<<"The Elements of a = ";
25     for (int i=0; i<5+n; i++)
26     {cout<<b[i]<<" ";
```

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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     }

```

```

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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]<<" ";

}
```

```

1  /*10. Implement Bubble Sort on an array of 6 integers.*/
2
3  #include<iostream>
4  using namespace std;
5
6  int main()
7  {
8      //Declaing variables and assigning values
9      int num, a[6];
10
11      cout<<"Enter the number values for bubble sorting :\n\n";
12
13      for (int i=0; i<6; i++)
14      {
15          cout<<"Enter Value #"<<i+1<<" : ";
16          cin>>a[i];
17          cout<<endl;
18      }
19
20
21      //Computing bubble sort
22      for (int i=0; i<6; i++)
23      {
24          for (int j=0; j<6; j++)
25          {if (a[j+1] < a[j])
26              {num = a[j];
27                a[j] = a[j+1];
28                a[j+1] = num;}}
29      }
30
31      //Displaying output
32      cout<<"Bubble Sort = ";
33      for (int i=0; i<6; i++)
34          cout<<a[i]<<" ";
35  }

```

```

C:\Users\SA\Downloads\ME-15-Sec-A\1st Semester\Courses\C
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 . . .

```