School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamentals of Programming

Assignment # 1

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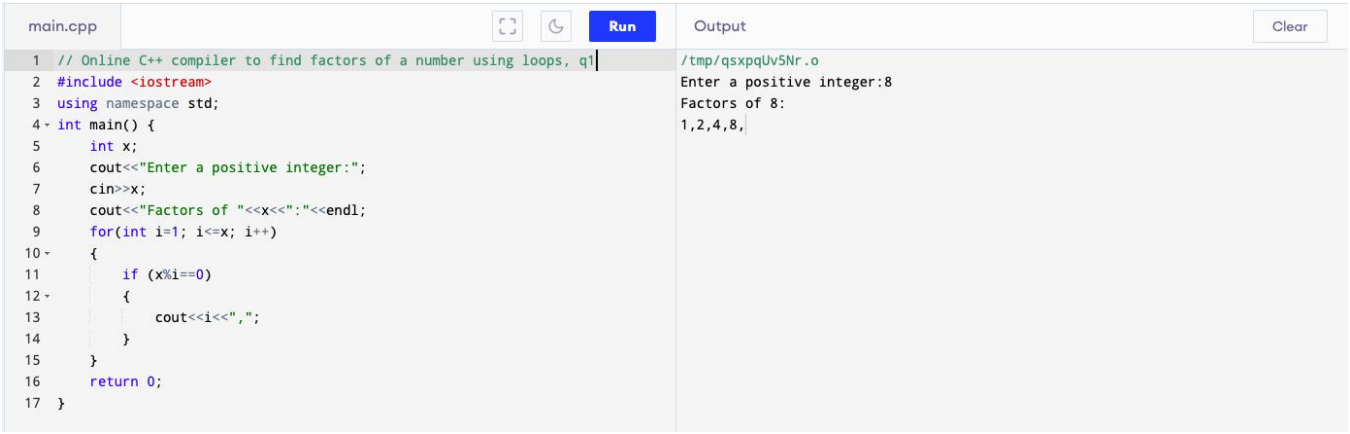
The codes are written in text at the end of this document

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



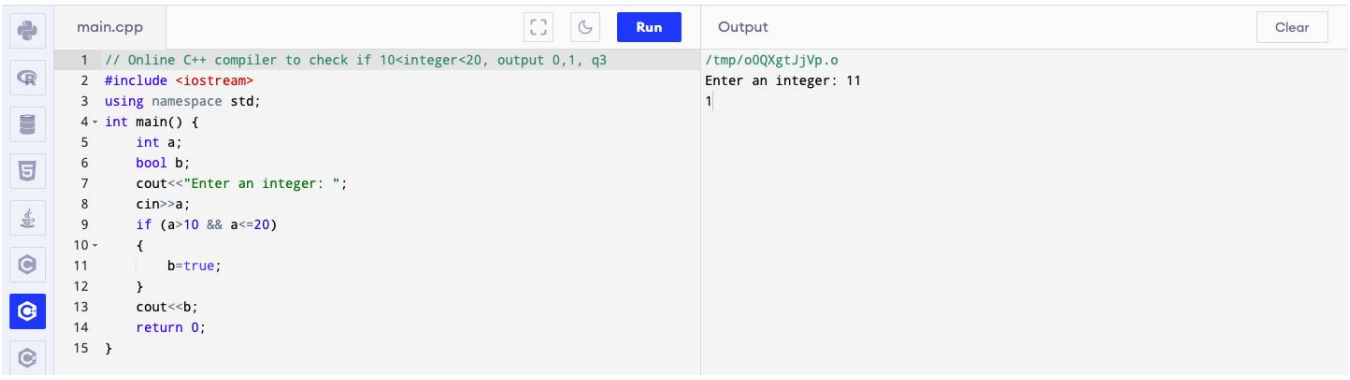
2. Write output to the following code.

```
#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 is 5 and y is 10

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



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.

main.cpp

Run

Output

Clear

```cpp
// C++ Programto find greatest prime number smaller than N, q4
#include <iostream>
using namespace std;
int main() {
    int a,N,x,y;
    bool b=false;
    cout<<"Insert Integer:"<<endl;
    cin>>N;
    x=N-1;
    y=2;
    while (x>=2)
    {
        while (y<x)
        {
            if (x%y==0)
            break;
            else if (y==x-1)
            {b=true;}
            y++;
        }
        if (b==true)
        {cout<<x;
        break;}
        x--;
    }
    return 0;
}
```

```
/tmp/GIPwlYOYOs.o
Insert Integer:
11
7
```

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.

main.cpp

Run

Output

Clear

```cpp
// Online C++ compiler to reverse string if same, q5
#include<iostream>
#include<string>
using namespace std;

int main() {
    string p,q;
    cout<<"Insert First String:";
    cin>>p;
    cout<<"Insert Second String:";
    cin>>q;
    for (int x=0;x<p.length ();x++)
    {
        if(p[x]!=q[x])
        {
            cout<<"Strings are not equal"<<endl;
            cout<<p[x]<<" "<<q[x]<<endl;
        }
        if (p[x]==q[x])
        {
            q[x]= p[p.length()-x-1];
            cout<<q[x];
        }
    }

    return 0;
}
```

```
/tmp/q0GSsduR4P.o
Insert First String:yeet
Insert Second String:yeet
teey
```

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.

main.cpp Run Output

```cpp
// Online C++ compiler to run C++ program online, q6
#include <iostream>
using namespace std;

int main() {
    int x,d,r,q,a;
    cout<<"Enter number:";
    cin>>x;
    cout<<"Enter divisor:";
    cin>>d;
    a=x;
    q=0;
    while (x>=d)
    {
        x=x-d;
        q++;
        if (x<a && x!=0)
            r=x;
        else
            r=0;
    }
    cout<<"Quotient="<<q<<endl;
    cout<<"Remainder="<<r;
    return 0;
}
```

```
/tmp/ZkBf7EFM2T.o
Enter number:10
Enter divisor:2
Quotient=5
Remainder=0
```

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.

```cpp
// Online C++ compiler to run C++ program online, q7
#include <iostream>
#include <string>
using namespace std;

int main() {
    string a;
    cout<<"Insert String:";
    cin>>a;
    for (int x=0;x<a.length();x++)
    {
        for(int z=x+1;z<a.length();z++)
        {
            if (a[x]==a[z])
            a[z]=0;
        }
    }
    for (int x=0;x<a.length();x++)
    {
        cout<<a[x];
    }
    return 0;
}
```

Input

```
Insert String:SMME
SME

...Program finished with exit code 0
Press ENTER to exit console.
```

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

main.cpp

Run

```cpp
// Online C++ compiler to input an array in a larger array, q8
#include <iostream>
using namespace std;
int main() {
    int arr[5]={1,2,3,4,5};
    int j[7];
    for (int x=0;x<5;x++)
    {
        j[x]=arr[x];
    }
    for (int x=5;x<7;x++)
    {
        cout<<"Enter a number:";
        cin>>j[x];
    }
    cout<<"The Array is:"<<endl;
    for (int x=0;x<7;x++)
    {
        cout<<j[x]<<" ";
    }
    return 0;
}
```

Output

Clear

```
/tmp/xVTPpDdWn7.o
Enter a number:5
Enter a number:2
The Array is:
1 2 3 4 5 5 2
```

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.

main.cpp

Run

```cpp
// Online C++ code to find triplet sum of X, q9
#include <iostream>
using namespace std;

int main() {
    int arr[7]={3,6,1,2,8,4,7};
    int X;
    cout<<"Enter an Integer:";
    cin>>X;
    for(int i=0;i<7;i++)
    {
        for(int j=0;j<7;j++)
        {
            for(int k=0;k<7;k++)
            {
                if (arr[i]==arr[j]||arr[i]==arr[k]||arr[j]==arr[k])
                continue;
                if(arr[i]+arr[j]+arr[k]==X)
                {
                    cout<<arr[i]<<arr[j]<<arr[k]<<endl;
                }}}}
    return 0;
}
```

Output

Clear

```
/tmp/Y7I3y2ZAaI.o
Enter an Integer:10
361
316
631
613
136
163
127
172
217
271
712
721
```

10. Implement Bubble Sort on an array of 6 integers.

main.cpp — Run — Output — Clear

```
// Online C++ compiler to run C++ program online, q10
#include <iostream>
using namespace std;
int main() {
    int x;
    int arr[5];
    for (int x=0;x<=5;x++)
    {
        cout<<"Insert Integer:";
        cin>>arr[x];
    }
    for (int a=0;a<=5;a++)
    {
    for (int y=1;y<=5;y++)
    {
        if (arr[y-1]>=arr[y])
        {
            x=arr[y];
            arr[y]=arr[y-1];
            arr[y-1]=x;
        }}}
        cout<<"In Ascending Order:"<<endl;
    for (int d=0;d<=5;d++)
    {
        cout<<arr[d]<<" ";
    }
    return 0;
}
```

```
/tmp/lYpBMD7C3T.o
Insert Integer:9
Insert Integer:4
Insert Integer:1
Insert Integer:3
Insert Integer:6
Insert Integer:8
In Ascending Order:
1 3 4 6 8 9
```

CODE TEXT

1
```
#include <iostream>
using namespace std;
int main() {
    int x;
    cout<<"Enter a positive integer:";
    cin>>x;
    cout<<"Factors of "<<x<<":"<<endl;
    for(int i=1; i<=x; i++)
    {
        if (x%i==0)
        {
            cout<<i<<",";
        }
    }
    return 0;
}
```

3
```
#include <iostream>
using namespace std;
int main() {
    int a;
    bool b;
    cout<<"Enter an integer: ";
    cin>>a;
    if (a>10 && a<=20)
    {
        b=true;
    }
    cout<<b;
    return 0;
}
```

4
```
#include <iostream>
using namespace std;
int main() {
   int a,N,x,y;
   bool b=false;
   cout<<"Insert Integer:"<<endl;
   cin>>N;
   x=N-1;
   y=2;
   while (x>=2)
   {
      while (y<x)
      {
         if (x%y==0)
         break;
         else if (y==x-1)
         {b=true;}
         y++;
      }
      if (b==true)
      {cout<<x;
      break;}
      x--;
   }
   return 0;
}
```

5
```
#include<iostream>
#include<string>
using namespace std;

int main() {
   string p,q;
   cout<<"Insert First String:";
   cin>>p;
   cout<<"Insert Second String:";
   cin>>q;
   for (int x=0;x<p.length ();x++)
   {
      if(p[x]!=q[x])
      {
         cout<<"Strings are not equal"<<endl;
         cout<<p[x]<<" "<<q[x]<<endl;
      }
      if (p[x]==q[x])
      {
         q[x]= p[p.length()-x-1];
         cout<<q[x];
      }
   }

   return 0;
}
```

6
```
#include <iostream>
using namespace std;
```

```
int main() {
    int x,d,r,q,a;
    cout<<"Enter number:";
    cin>>x;
    cout<<"Enter divisor:";
    cin>>d;
    a=x;
    q=0;
    while (x>=d)
    {
        x=x-d;
        q++;
        if (x<a && x!=0)
            r=x;
        else
            r=0;
    }
    cout<<"Quotient="<<q<<endl;
    cout<<"Remainder="<<r;
    return 0;
}
```

7
```
#include <iostream>
#include <string>
using namespace std;

int main() {
    string a;
    cout<<"Insert String:";
    cin>>a;
    for (int x=0;x<a.length();x++)
    {
        for(int z=x+1;z<a.length();z++)
        {
            if (a[x]==a[z])
            a[z]=0;
        }
    }
    for (int x=0;x<a.length();x++)
    {
        cout<<a[x];
    }
    return 0;
}
```

8
```
#include <iostream>
using namespace std;
int main() {
    int arr[5]={1,2,3,4,5};
    int j[7];
    for (int x=0;x<5;x++)
    {
        j[x]=arr[x];
    }
    for (int x=5;x<7;x++)
    {
        cout<<"Enter a number:";
```

```
        cin>>j[x];
    }
    cout<<"The Array is:"<<endl;
    for (int x=0;x<7;x++)
    {
        cout<<j[x]<<" ";
    }
    return 0;
}
```

9
```
#include <iostream>
using namespace std;

int main() {
    int arr[7]={3,6,1,2,8,4,7};
    int X;
    cout<<"Enter an Integer:";
    cin>>X;
    for(int i=0;i<7;i++)
    {
        for(int j=0;j<7;j++)
        {
            for(int k=0;k<7;k++)
            {
                if (arr[i]==arr[j]||arr[i]==arr[k]||arr[j]==arr[k])
                continue;
                if(arr[i]+arr[j]+arr[k]==X)
                {
                    cout<<arr[i]<<arr[j]<<arr[k]<<endl;
            }}}}
    return 0;
}
```

10
```
#include <iostream>
using namespace std;
int main() {
    int x;
    int arr[5];
    for (int x=0;x<=5;x++)
    {
        cout<<"Insert Integer:";
        cin>>arr[x];
    }
    for (int a=0;a<=5;a++)
    {
    for (int y=1;y<=5;y++)
    {
        if (arr[y-1]>=arr[y])
        {
            x=arr[y];
            arr[y]=arr[y-1];
            arr[y-1]=x;
        }}}
        cout<<"In Ascending Order:"<<endl;
    for (int d=0;d<=5;d++)
    {
```

```
        cout<<arr[d]<<" ";
    }
    return 0;
}
```