

School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering



## CS-114 - Fundamentals of Programming

### Assignment # 1

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**DATE: 24/11/2023**

**\*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.

main.cpp	Output
<pre>1 // Online C++ compiler to find factors of a number using loops, q1 2 #include &lt;iostream&gt; 3 using namespace std; 4 int main() { 5     int x; 6     cout&lt;&lt;"Enter a positive integer:"; 7     cin&gt;&gt;x; 8     cout&lt;&lt;"Factors of "&lt;&lt;x&lt;&lt;":"&lt;&lt;endl; 9     for(int i=1; i&lt;=x; i++) 10    { 11        if (x%i==0) 12        { 13            cout&lt;&lt;i&lt;&lt;","; 14        } 15    } 16    return 0; 17 }</pre>	<pre>/tmp/qsxpqUv5Nr.o Enter a positive integer:8 Factors of 8: 1,2,4,8,</pre>

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 than or equal to 20. Print 1 if yes and print 0 if no. Use appropriate datatype for output.

main.cpp	Output
<pre>1 // Online C++ compiler to check if 10&lt;integer&lt;20, output 0,1, q3 2 #include &lt;iostream&gt; 3 using namespace std; 4 int main() { 5     int a; 6     bool b; 7     cout&lt;&lt;"Enter an integer: "; 8     cin&gt;&gt;a; 9     if (a&gt;10 &amp;&amp; a&lt;=20) 10    { 11        b=true; 12    } 13    cout&lt;&lt;b; 14    return 0; 15 }</pre>	<pre>/tmp/o0QXgtJjVp.o Enter an integer: 11 1</pre>

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	Output
<pre> 1 // C++ Program to find greatest prime number smaller than N, q4 2 #include &lt;iostream&gt; 3 using namespace std; 4 int main() { 5     int a,N,x,y; 6     bool b=false; 7     cout&lt;&lt;"Insert Integer:"&lt;&lt;endl; 8     cin&gt;&gt;N; 9     x=N-1; 10    y=2; 11    while (x&gt;=2) 12    { 13        while (y&lt;x) 14        { 15            if (x%y==0) 16                break; 17            else if (y==x-1) 18                {b=true;} 19            y++; 20        } 21        if (b==true) 22            {cout&lt;&lt;x; 23             break;} 24        x--; 25    } 26    return 0; 27 }</pre>	<pre> /tmp/GIPwlY0Y0s.o Insert Integer: 11 7</pre>

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	Output
<pre> 1 // Online C++ compiler to reverse string if same, q5 2 #include&lt;iostream&gt; 3 #include&lt;string&gt; 4 using namespace std; 5 6 int main() { 7     string p,q; 8     cout&lt;&lt;"Insert First String:"; 9     cin&gt;&gt;p; 10    cout&lt;&lt;"Insert Second String:"; 11    cin&gt;&gt;q; 12    for (int x=0;x&lt;p.length ();x++) 13    { 14        if(p[x]!=q[x]) 15        { 16            cout&lt;&lt;"Strings are not equal"&lt;&lt;endl; 17            cout&lt;&lt;p[x]&lt;&lt;" "&lt;&lt;q[x]&lt;&lt;endl; 18        } 19        if (p[x]==q[x]) 20        { 21            q[x]= p[p.length()-x-1]; 22            cout&lt;&lt;q[x]; 23        } 24    } 25 26    return 0; 27 }</pre>	<pre> /tmp/q0GSsduR4P.o Insert First String:yeet Insert Second String:yeet teey</pre>

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	Output
<pre>1 // Online C++ compiler to run C++ program online, q6 2 #include &lt;iostream&gt; 3 using namespace std; 4 5 int main() { 6     int x,d,r,q,a; 7     cout&lt;&lt;"Enter number:"; 8     cin&gt;&gt;x; 9     cout&lt;&lt;"Enter divisor:"; 10    cin&gt;&gt;d; 11    a=x; 12    q=0; 13    while (x&gt;=d) 14    { 15        x=x-d; 16        q++; 17        if (x&lt;a &amp;&amp; x!=0) 18            r=x; 19        else 20            r=0; 21    } 22    cout&lt;&lt;"Quotient="&lt;&lt;q&lt;&lt;endl; 23    cout&lt;&lt;"Remainder="&lt;&lt;r; 24    return 0; 25 }</pre>	<pre>/tmp/ZkBf7EFM2T.o Enter number:10 Enter divisor:2 Quotient=5 Remainder=0</pre>

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.

```
1 // Online C++ compiler to run C++ program online, q7
2 #include <iostream>
3 #include <string>
4 using namespace std;
5
6 int main() {
7     string a;
8     cout<<"Insert String:";
9     cin>>a;
10    for (int x=0;x<a.length();x++)
11    {
12        for(int z=x+1;z<a.length();z++)
13        {
14            if (a[x]==a[z])
15                a[z]=0;
16        }
17    }
18    for (int x=0;x<a.length();x++)
19    {
20        cout<<a[x];
21    }
22    return 0;
23 }
```

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	Output
<pre>1 // Online C++ compiler to input an array in a larger array, q8 2 #include &lt;iostream&gt; 3 using namespace std; 4 int main() { 5     int arr[5]={1,2,3,4,5}; 6     int j[7]; 7     for (int x=0;x&lt;5;x++) 8     { 9         j[x]=arr[x]; 10    } 11    for (int x=5;x&lt;7;x++) 12    { 13        cout&lt;&lt;"Enter a number:"; 14        cin&gt;&gt;j[x]; 15    } 16    cout&lt;&lt;"The Array is:"&lt;&lt;endl; 17    for (int x=0;x&lt;7;x++) 18    { 19        cout&lt;&lt;j[x]&lt;&lt;" "; 20    } 21    return 0; 22 }</pre>	<pre>/tmp/xVTPpDdwn7.o Enter a number:5 Enter a number:2 The Array is: 1 2 3 4 5 5 2</pre>

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	Output
<pre>1 // Online C++ code to find triplet sum of X, q9 2 #include &lt;iostream&gt; 3 using namespace std; 4 5 int main() { 6     int arr[7]={3,6,1,2,8,4,7}; 7     int X; 8     cout&lt;&lt;"Enter an Integer:"; 9     cin&gt;&gt;X; 10    for(int i=0;i&lt;7;i++) 11    { 12        for(int j=0;j&lt;7;j++) 13        { 14            for(int k=0;k&lt;7;k++) 15            { 16                if (arr[i]==arr[j]  arr[i]==arr[k]  arr[j]==arr[k]) 17                    continue; 18                if(arr[i]+arr[j]+arr[k]==X) 19                { 20                    cout&lt;&lt;arr[i]&lt;&lt;arr[j]&lt;&lt;arr[k]&lt;&lt;endl; 21                } 22            } 23        } 24    } 25    return 0; 26 }</pre>	<pre>/tmp/Y7I3y2ZAaI.o Enter an Integer:10 361 316 631 613 136 163 127 172 217 271 712 721</pre>

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

main.cpp	Output
<pre>1 // Online C++ compiler to run C++ program online, q10 2 #include &lt;iostream&gt; 3 using namespace std; 4 int main() { 5     int x; 6     int arr[5]; 7     for (int x=0;x&lt;=5;x++) 8     { 9         cout&lt;&lt;"Insert Integer:"; 10        cin&gt;&gt;arr[x]; 11    } 12    for (int a=0;a&lt;=5;a++) 13    { 14        for (int y=1;y&lt;=5;y++) 15        { 16            if (arr[y-1]&gt;=arr[y]) 17            { 18                x=arr[y]; 19                arr[y]=arr[y-1]; 20                arr[y-1]=x; 21            } 22        } 23        cout&lt;&lt;"In Ascending Order:"&lt;&lt;endl; 24        for (int d=0;d&lt;=5;d++) 25        { 26            cout&lt;&lt;arr[d]&lt;&lt;" "; 27        } 28        return 0; 29    }</pre>	<pre>/tmp/1YpBMD7C3T.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</pre>

### 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;  
}
```