CLASSWORK APPLICATIONS FOR FORMATTED I/O AND FILE PROCESSING

Q1. Write a program that reads three integers from a file named as A.TXT. Then write their summation, multiplication and Square root of their square summation to a file named as B.TXT. The files are shown below:

```
A.TXT                    B.TXT

11            Sum Mult      Sqrt(a^2+b^2+c^2)

22            ...   ...          ...

33
```

Solution 1.

```cpp
1   #include<iostream>
2   #include<iomanip>
3   #include<fstream>
4   #include<cmath>
5   using namespace std;
6
7   int main(){
8       double a,b,c;
9       ifstream path1("A.txt");
10      ofstream path2("B.txt");
11      path1>>a>>b>>c;
12      path2<<setw(8)<<left<<"Sum"<<setw(8)<<"Mult"<<setw(17)<<"Sqrt(a^2+b^2+c^2)"<<endl;
13      path2<<setw(32)<<setfill('=')<<"="<<endl;
14      path2<<setfill(' ')<<setw(8)<<a+b+c<<setw(8)<<a*b*c<<setw(17)<<sqrt(a*a+b*b+c*c)<<endl;
15  }
```

Solution 2.

```cpp
1   #include<iostream>
2   #include<iomanip>
3   #include<fstream>
4   #include<cmath>
5   using namespace std;
6
7   int main(){
8       double a,b,c;
9       ifstream path1("A.txt");
10      ofstream path2("B.txt");
11      path1>>a>>b>>c;
12      path2<<setw(8)<<left<<"Sum"<<setw(8)<<"Mult"<<setw(17)<<"Sqrt(a^2+b^2+c^2)"<<endl;
13      path2<<setw(32)<<setfill('=')<<"="<<endl;
14      path2<<setw(8)<<setfill(' ')<<a+b+c<<setw(8)<<a*b*c<<setw(17)<<sqrt(a*a+b*b+c*c)<<endl;
15  }
```

2. Write a program to construct length unit conversion Table to a file named as UnConT.txt. The table should appear as shown below: (Hint: 1m ->1/2.54e-2 in;   1m ->1/ 3.048e-1 ft)

```
UnConT.txt
```

```
                   Length
        in meter   in inch    in feet

           001     ???.???    ???.???
           002     ???.???    ???.???
            .
            .
           010     ???.???    ???.???
            .
            .
           100     ???.???    ???.???
```

```cpp
1    #include<iostream>
2    #include<iomanip>
3    #include<fstream>
4    #include<cmath>
5    using namespace std;
6
7    int main(){
8        ofstream output("UnCont.txt");
9        output<<setw(20)<<right<<"Length"<<endl;
10       output<<setw(10)<<"in meter"<<setw(10)<<"in inch"<<setw(10)<<"in feet"<<endl;
11       output<<setw(30)<<setfill('=')<<"="<<endl;
12       for (int i=1; i<=100; i++){
13       output<<setw(7)<<setfill(' ')<<" "<<setw(3)<<setfill('0')<<i
14       <<setw(10)<<setfill(' ')<<fixed<<setprecision(3)<<i/2.54e-2
15       <<setw(10)<<setfill(' ')<<fixed<<setprecision(3)<<i/3.048e-1<<endl;
16       }
17   }
```

3. Write a program to construct temperature unit conversion Table to a file named as TempConT.txt. The table should appear as shown below:

Hint: F=(9/5)*C+32;

```
TempConT.txt
```

in Celcius	in Fahrenheit
000	?.??e+???
005	?.??e+???
.	
.	
055	?.??e+???
.	
.	
200	?.??e+???

```cpp
1   #include<iostream>
2   #include<iomanip>
3   #include<fstream>
4   #include<cmath>
5   using namespace std;
6
7   int main(){
8       ofstream output("TempConT.txt");
9       output<<setw(10)<<"in Celcius"<<setw(19)<<right<<"in Fahrenheit"<<endl;
10      output<<setw(29)<<setfill('=')<<"="<<endl;
11      for (int C=0; C<=200; C+=5){
12      output<<setw(7)<<setfill(' ')<<" "<<setw(3)<<setfill('0')<<C
13      <<setw(19)<<setfill(' ')<<scientific<<setprecision(2)<<(9/5.)*C+32<<endl;
14      }
15  }
```

4. Write a program to obtain the load-deflection diagram in a tension test. The load-deflection table should appear as shown below: Hint: Deflection=P L/(A E).

P=10 kN

A=0.01 m²
E=210 GPa
L=0.1m

P=10 kN
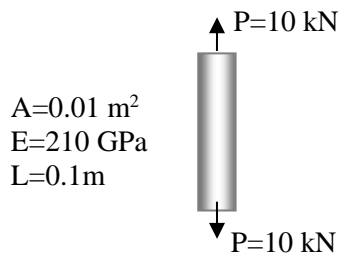
LoadDeflection.txt

Load (in kN)	Deflection(in m)
00	?.???e+???
01	?.???e+???
.	
.	
07	?.???e+???
.	
.	
10	?.???e+???

```cpp
1   #include<iostream>
2   #include<iomanip>
3   #include<fstream>
4   #include<cmath>
5   using namespace std;
6
7   int main(){
8       ofstream output("LoadDeflection.txt");
9       output<<setw(14)<<left<<"Load (in kN)"<<setw(16)<<"Deflection (in m)"<<endl;
10      output<<endl;
11      output<<setw(30)<<setfill('=')<<"="<<endl;
12      for (int p=0; p<=10; p++){
13      output<<setw(7)<<setfill(' ')<<" "<<setw(2)<<setfill('0')<<p
14      <<setw(8)<<setfill(' ')<<" "<<scientific<<setprecision(3)<<p*0.1/(0.01*210e9)<<endl;
15      }
16  }
```