Lab IV

4.1 Working with Basic Structures

```
// this program uses a structure to hold data about a rectangle
// PLACE YOUR NAME HERE

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

// Fill in code to declare a structure named rectangle which has
// members length, width, area, and perimeter all of which are floats

int main()
{
        // Fill in code to define a rectangle variable named box
        cout << "Enter the length of a rectangle: ";
        // Fill in code to read in the length member of box
        cout << "Enter the width of a rectangle: ";
        // Fill in code to read in the width member of box
        cout << endl << endl;
        // Fill in code to compute the area member of box
        // Fill in code to compute the perimeter member of box
        cout << fixed << showpoint << setprecision(2);
        // Fill in code to output the area with an appropriate message
        // Fill in code to output the perimeter with an appropriate message
        return 0;
}
```

4.2 Finding your age with structures

Write a C++ program to find the age of a given student by accepting the date of birth as input and calculate the following details as given in sample input. Use the concept of structures to store the date of birth.

Sample Input:

Enter your name: ABC

Enter the date of birth (dd/mm/yyyy):20/10/2000

Hey ABC! Your age is 12 years, 9 months, and 6 days

Your Age in Days: 4662 days since your birth

Your Age in Hours: 111888 hours since your birth

Your Age in Minutes 6713280 minutes since your birth

86 days left for your next birthday

Modify the above program to store date of birth of many people and sort according to the descending order of age. Use the concept of functions, reference arguments and return by reference. The details of the person must be displayed by an inline function called display.

4.3 C++programs using manipulators for generating following outputs

a)

1
1.4
1.41
1.414
1.4142
1.41421
1.414214
1.4142136
1.41421356
1.414213562

b) Generate the truth table as shown.

i)

A	B	A and B	A or B
True	True	True	True
True	False	False	True
False	True	False	True
False	False	False	False

ii)

x	y	x XOR y
0	0	0
0	1	1
1	0	1
1	1	0

c)

```
Enter a sentence:
This is a test of the width member function
This
   is
     a
   test
      of
      the
      widt
          h
        memb
           er
          func
           tion
```

d)

Enter a decimal number: **20**

20 in hexadecimal is: 14

20 in octal is: 24

20 in decimal is: 20

e)

```
Using various padding characters:
*****10000
10000%%%%%
0x^^^^2710
```

Bonus Questions

1. *Sum of digits*

   As an example, the sum of the digits of 2 to the 10th power is:

   ```
   2^10 = 1024 => 1+0+2+4 => 7
   ```

   What is the sum of the digits of 2^50?

2. *Factorials*

   Given the first few factorials:

   ```
   1! = 1
   2! = 2 x 1 = 2
   3! = 3 x 2 x 1 = 6
   4! = 4 x 3 x 2 x 1 = 24
   ```

What is the sum of the first 15 factorials, NOT INCLUDING `0`!?