Lab 03 – Classes and Objects

1. Write a JAVA program to write a class **Box**. Instantiate **width, height,** and **depth** instance variables inside the class. Write methods to compute set the dimensions (**setDim**) and **volume**.

2. Define a class to represent a complex number called **Complex**. Provide the following methods:

    a. To assign initial values to the Complex object

    b. To display a complex number in ***a+ib*** format

    c. To add 2 complex numbers (return type is **Complex**)

    d. To subtract 2 complex numbers

    e. Main method to test the class

3. Create a class **Time** that has instance variables to represent hours, minutes and seconds. Provide the following methods:

    a. To assign initial values to the Time object

    b. To display a Time object in the form of hh:mm:ss {24 hours format}

    c. To add 2 Time objects (the return type should be a Time)

    d. To subtract 2 Time objects (the return type should be a Time)

    e. To compare 2 Time objects and to determine if they are equal or if the first if greater or smaller than the second one.

4. Create a class **Mixer** to merge **<u>two sorted integer arrays</u>** in ascending order with the following instance variables and methods:

    a. Int arr[] // to s

    b. Void accept() // to accept the elements of the array in ASC order without duplicates

    c. Mixer mix(Mixer A) // to merge the current object array elements with the parameterized array elements and return the result

    d. Void display() // to display the elements of the array

    e. Main method to test

5. Create a class called **Stack** for storing integers. The instance variables are:

    a. An integer array

    b. An integer for storing the top of stack (tos)

    c. display() method to display the contents of the stack

    d. push() and pop() elements, checking for stack overflow and underflow respectively.

6. Write a program to implement the **ISBN** (International Standard Book Number) as follows:

    a. inputISBN() // reads the ISBN code as a **10-digit** number

    b. checkISBN() // checks if the code entered is legal ISBN

    sum(i x digit[i]) % 11 == 0, i spans from 1 to 10

7. Create a **Die** class with the following instructions:

    a. one integer instance variable called sideUp

    b. getSideUp() method that returns the value of sideUp

    c. rollUp() method that changes sideUp to a random value from 1-6

    d. DieDemo main class that creates two Die objects, rolls them and prints the sum of the two sides up