ASSIGNMENT 04

1) Design a class Time having data members hour, minute and second. It should also have methods displayTime() to display the time in HH:MM:SS format and addTime() to add two Time objects. Test these methods by creating a main() method in another class. Implement it by using parameterized constructor to initialize its data members.

```
import java.util.*;
class Time{
    public int hour;
    public int minute;
    public int second;
    public int day = 0;

    Time(){
    }
    Time(int h, int m, int s){
        hour = h;
        minute = m;
        second = s;
    }


    void add(Time ob1, Time ob2){
        hour = ob1.hour + ob2.hour;
        minute = ob1.minute + ob2.minute;
        second = ob1.second + ob2.second;

        if(second>=60){
            minute = minute + (second/60);
            second = second % 60;
        }
        if(minute>=60){
            hour = hour + (minute/60);
            minute = minute % 60;
        }
        if(hour>=24){
            day = day + (hour/24);
            hour = hour % 24;
        }
    }
}
```

OUTPUT:

```
Result Time is: 1 D 10 H 56 M 23 S
```

2) Create a class Complex for performing arithmetic with complex numbers. Complex numbers have the form realPart + imaginaryPart * i. Write a program to test your class. Use floating point variables to represent the private data of the class. Provide a constructor that enables an object of this class to be initialized when it is declared.

Provide a no argument constructor with default values in case no initializers are provided. Provide public methods that perform the following operations:

a. Add two complex numbers: The real parts are added together and the imaginary parts are added together.

b. Subtract two complex numbers: The real parts of the right operand is subtracted from the real part of the left operand, and the imaginary part of the right operand is subtracted from the imaginary part of the left operand.

c. Print complex numbers in the form (realPart, imaginaryPart)

```
import java.util.*;
class Complex{
    public int real;
    public int img;

    Complex(){
        real = 1;
        img = 1;
    }
    Complex(int r, int i){
        real = r;
        img = i;
    }

    void add(Complex ob1, Complex ob2){
        real = ob1.real + ob2.real;
        img = ob1.img + ob2.img;
    }
    void sub(Complex ob1, Complex ob2){
        real = ob1.real - ob2.real;
        img = ob1.img - ob2.img;
    }
}

class Driver4{
    public static void main(String args[]){
        /*Complex ob1 = new Complex();
        Complex ob2 = new Complex();
        Complex ob3 = new Complex();
        ob1.input();
        ob2.input();
        ob3.add(ob1, ob2);*/
        int real1, real2, img1, img2;
        Complex ob1 = new Complex();

        Scanner in = new Scanner(System.in);
        System.out.println("Enter the real part of num1");
        real1 = in.nextInt();
        System.out.println("Enter the imaginary of num1");
        img1 = in.nextInt();
        System.out.println("Enter the real part of num2");
```

```
        real2 = in.nextInt();
        System.out.println("Enter the imaginary of num2");
        img2 = in.nextInt();

        Complex ob2 = new Complex(real1, img1);
        Complex ob3 = new Complex(real2, img2);

        Complex ob4 = new Complex();
        Complex ob5 = new Complex();

        ob4.add(ob2, ob3);
        ob5.sub(ob2, ob3);

        System.out.println("Addition Result: "+ob4.real+" + "+ob4.img+"i");
        System.out.println("Subtraction Result: "+ob5.real+" + "+ob5.img+"i");
    }
}
```

OUTPUT:

```
Enter the real part of num1
4
Enter the imaginary of num1
5
Enter the real part of num2
2
Enter the imaginary of num2
3
Addition Result: 6 + 8i
Subtraction Result: 2 + 2i
```

3) Design a class named Rectangle to represent a rectangle. The class contains:

a. Two double data fields names width and height that specify the width and height of the rectangle. The default values are 1 for both width and height.

b. A no-argument constructor that creates a default rectangle.

c. A constructor that creates a rectangle with the specified width and height.

d. A method named getArea() that returns the area of this rectangle. e. A method named getPerimeter() that returns the perimeter.

```
class Rectangle{
    double width;
    double height;
    Rectangle(){
        width = 1;
        height = 1;
    }
    Rectangle(double w, double h){
        width = w;
        height = h;
    }
```

```
    double getArea(){
        return width*height;
    }
    double getPerimeter(){
        return 2*(width+height);
    }
}
class Driver{
    public static void main(String args[]){

        Rectangle ob1 = new Rectangle(20,30);
        double area = ob1.getArea();
        double perimeter = ob1.getPerimeter();
        System.out.println("The area of rectangle is "+area+" m^2 and the perimeter is
"+perimeter+" m");
    }
}
```

OUTPUT:

```
The area of rectangle is 600.0 m^2 and the perimeter is 100.0 m
```

4) Write a program to find the sum and average if values of an array.

```
import java.util.Scanner;

public class Arr {
    public static void main(String[] args) {
        int arr[] = new int[10];
        int n;
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the size of the array");
        n = in.nextInt();
        System.out.println("Enter the array");
        for(int i = 0; i<n; i++){
            arr[i] = in.nextInt();
        }
        float sum = 0;
        for(int i = 0; i<n; i++){
            sum = sum + arr[i];
        }
        float avg = sum/n;
        System.out.println("Sum is: "+sum+" Avarage is: "+avg);
    }
}
```

OUTPUT:

```
Enter the size of the array
5
Enter the array
1 3 2 4 1
Sum is: 11.0 Avarage is: 2.2
```

5) Write a program to implement linear search. If present, display the number of times it is present.

```
import java.util.*;
public class LS {
    public static void main(String[] args) {
        int arr[] = new int[10];
        int n, c = 0;
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the size of the array");
        n = in.nextInt();
        System.out.println("Enter the array");
        for(int i = 0; i<n; i++){
            arr[i] = in.nextInt();
        }
        System.out.println("Enter the key");
        int k = in.nextInt();
        for(int i = 0; i<n; i++){
            if(k == arr[i]){
                c++;
            }
        }
        if(c==0){
            System.out.println("The key is not present");
        }
        else{
            System.out.println(c+" number of times the key is present");
        }
    }
}
```

OUTPUT:

```
Enter the size of the array
5
Enter the array
1 1 1 2 3
Enter the key
1
3 number of times the key is present
```

6) Design a class Student having data members age and mark. It should have methods input() to take details of student and show() method to display the details of the student. Test these methods by creating an array of object of Student.

```
import java.util.Scanner;

class Student{
    int age;
    float mark;
    void input(){
```

```
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the age of the student");
        age = in.nextInt();
        System.out.println("Enter the mark");
        mark = in.nextFloat();
    }
    void show(){
        System.out.println("Age: "+age);
        System.out.println("Mark: "+mark);
    }

}
public class Driver {
    public static void main(String[] args) {
        Student st[];
        st = new Student[10];
        int n;
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the numebr of student");
        n = in.nextInt();

        for(int i=0; i<n; i++){
            st[i] = new Student();
        }

        for(int i=0; i<n; i++){
            System.out.println("Student "+(i+1));
            st[i].input();
        }
        for(int i=0; i<n; i++){
            System.out.println("Details of student "+(i+1));
            st[i].show();
        }

    }
}
```

OUTPUT:

```
Enter the numebr of student
3
Student 1
Enter the age of the student
12
Enter the mark
25
Student 2
Enter the age of the student
23
Enter the mark
24
Student 3
Enter the age of the student
12
```

```
Enter the mark
45
Details of student 1
Age: 12
Mark: 25.0
Details of student 2
Age: 23
Mark: 24.0
Details of student 3
Age: 12
Mark: 45.0
```

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