1) Develop a Java program that print all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c & use the quadratic formula. If the discriminate $b^2 - 4ac$ is -ive, display a message stating that there are no real solution.

```java
import java.lang.Math;
import java.util.*;

class quadraticEquation {
    public static void main (String[] args){
        Scanner s= new Scanner (System.in);
        Double a, b, c, det, r1, r2;
        System.out.println("Enter 3 numbers in a quadratic equation.");
        a = s.nextDouble();
        b = s.next Double();
        c = s.next Double();
        det = (b*b) - (4 * a*c);
        if (det > 0) {
            r1 = (-b + Math.sqrt(det)) / (2*a);
            r2 = (-b - Math.sqrt(det)) / (2*a);
            System.out.println("Roots are real and unequal.\n Root: " + r1 + ", " + r2);
        }
        elseif (det == 0) {
            r1 = -b / (2*a);
            System.out.println("Roots are real and equal.\n Roots: " + r);
        }
        else {
            System.out.println("No real root.");
        }
    }
}
```
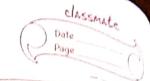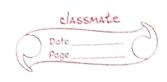
2 Accept an array of n integers. Find the number of positive numbers, negative numbers and zeros.

```java
import java.util.*;

class noOfPNZ {
    public static void main(String [] args) {
        Scanner s = new Scanner(System.in);
        int [] a = new int[10];
        int n, pCount = 0, ncount = 0, zcount = 0;
        System.out.println("Enter size of array.");
        n = s.nextInt();
        System.out.println("Enter elements of array.");
        for (int i = 0, i < n; i++) {
            a[i] = s.nextInt();
            If (a[i] > 0)
                pCount++;
            else if (a[i] < 0)
                nCount++;
            else
                zCount++;
        }

        System.out.println("Number of positive
                values: " + pCount);
        System.out.println("Number of negative
                values: " + nCount);
        System.out.println("Number of zeros:"
                + zCount);
    }
}
```

3 Accept an array of size n from the user. Find the sum of even indices (i.e. 0, 2, 4, ---) & sum of odd indices (1, 3, 5) & print the same.

```java
import java.util.*;

class SumOfIndices {
    public static void main (String[] args) {
        Scanner s = new Scanner (System.in);
        int[] a = new int[10];
        int n, oddIndexSum=0, evenIndexSum=0;
        System.out.println ("Enter size of array.");
        n = s.nextInt ();
        System.out.println ("Enter element of array");

        for (int i=0; i<n; i++){
            a[i] = s.nextInt ();

            if (i%2 == ==0)
                evenIndexSum = evenIndexSum +a[i];
            else
                oddIndexSum = oddIndexSum +a[i];
        }

        System.out.println ("Sum of even index
        values : " + evenIndexSum);
        System.out.println ("Sum of odd index
        values : " +oddIndexSum);
    }
}
```

4 Consider a super market bill. Accept a double array
holding rate per item of say x items &
and an int array showing the quantity
purchased by a customer. Calculate the
total bill amount & the final bill
amount after giving discounts as per
the following slabs.

If the total bill amount >= 10000, discount = 5%.
If the total bill amount >= 7500 & < 10000,
discount = 3%.
If the total bill amount >= 5000, discount = 2%.

```java
import java.util.*;

class billcalculator {
    public static void main (String [] args) {
        Scanner s = new Scanner (system.in);

        int [] [] a = new int [10] [2];
        double bill = 0, discount, items, totalbill;
        System.out.println ("Enter number of
            items.");
        item = s.nextInt ();
        System.out.println ("Enter quantity and
            price of item.");

        for (int i=0; i<items; i++) {
            for (int j=0; j<2; j++)
            a [i] [j] = s.nextInt ();
        }

        for (int i=0; i < items; i++) {
            int quantity = a [i][0];
            int pricePerItem = a [i][1];
```

```
        bill += quantity * price per Item;
            9

        System.out.println ("Bill = " + bill);

        if (bill >= 10000)
            discount = 0.05D;
        else if (bill < 10000 && bill >= 7500)
            discount = 0.03D;
        else
            discount = 0.02D;

        totalBill = bill * discount;

        System.out.println (" Bill after discount:"
                        - totalBill);
            9
    9
```

5 Accept an array A of n elements. Create two new arrays where the first one say B that holds all the odd numbers from array A & the second say C holds the even numbers from array D. Display the Sum, average, max & min of array C.

```java
import java.util.*;

class arrayOrganizer{

    public static void main (String[] args){

        Scanner s= new Scanner (System.in);

        int[] a= new int[10], b= new int[10],
             c= new int[10];
        int cSum=0, cAvg, cMin, cMax, j=0, k=0, n;

        System.out.println ("Enter Size of array.");
        n= s.nextInt ();
        System.out.println ("Enter elements of array.");

        for (int i=0; i<n ; i++){
            a[i]= s.nextInt ();

            If (a[i] % 2 != 0){
                b[j]= a[i];
                j++;
            }
                    else {
                c[k]= a[i];
                k++;
            }
```