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

```
import java.util.*;
public class static void main (String [] args)
{
  double a,b,c;
  double root1, root2, imaginary, discriminant;
  Scanner sc = new Scanner (System.in);
  System.out.print(" Enter Co-Efficients a,b,c : \n");
    a = sc.nextDouble();
    b = sc.nextDouble();
    c = sc.nextDouble();
  discriminant = (b*b) - (4*a*c);
  if (discriminant > 0)
{
  root1 = (-b + Math.sqrt(discriminant)/(2*a));
  root2 = (-b - Math.sqrt(discriminant)/(2*a));
System.out.println("Two distinct real roots are :
                    root1 = %.4f and root2 = %.4f", root1,
                                                    root2);
}
  else if (discriminant == 0)
  {
  root1 = & root2 = -b/(2*a);
System.out.printf("Two equal roots : %.4f", root1);
}
```

```
else if (discriminant<0)
{
System.out.println("Roots are not Real");
}
}
}
```

Extra programs

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

```
import java.util.Scanner;
public class Main
{
public static void main(String[]args)
{
int n, sumE=0, sumO=0;
Scanner s = new Scanner(System.in);
System.out.println("Enter the number of elements in array:");
n = s.nextInt();
int[] a = new Int[n];
System.out.println("Enter the elements of the array:");
for(int i=0; i<n; i++)
{
a[i] = s.nextInt();
}
```

```
for (int i=0; i<n; i++)
{
  if (a[i] % 2==0)
  {
    sumE = sumE + a[i];
  else
  {
    sumO = sumO + a[i];
  }
  }
System.out.println("Sum of Even Numbers: "+sumE);
System.out.println("Sum of Odd Numbers : "+sumO);
  }
}
```

2) Accept an array of size n from the user. Find the sum of number of positive numbers, negative numbers and zeroes.

```
import java.util.Scanner;
public class Main
  {
  public static void main (String args [])
    {
    int n, positive=0, negative=0, zero=0, i;
    int arr [] = new int[50];
    Scanner scan = new Scanner (System.in);
    System.out.print ("How many number you want to
                       enter");
    n = scan.nextInt();
    System.out.println ("Enter " +n+ "Numbers:");
```

```
for(i=0; i<n; i++)
{
 arr[i]= scan.nextInt();
}
for (i=0; i<n; i++)
 {
 if(arr[i]<0)
 {
 negative++;
 }
 else if (arr[i]==0)
 {
  zero++;
 }
 else
 {
 positive++;
 }
}
System.out.print("Positive numbers are:" +positive);
System.out.print("\n Negative Numbers are:" +negative);
System.out.print("\n Zeros are:" +zero);
}
}
```

3) 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 and 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 and < 10000, discount = 3%.
If the total bill amount >=5000, discount = 2%.

```
import java.util.Scanner;
public class Bill{
  public static void main (String [] args)
  {
  Scanner sc = new Scanner (System.in);
  System.out.println ("Enter the number of items:");
  int n= sc.nextInt();
  double indTot, tot=0;
  double [] rpi = new double [n];
  int [] quant = new int [n];
   for (int i = 0; i<n; i++) {
  System.out.println ("enter quantity of purchase and
  rate per item for item" + (i+1));
  int q, = sc.nextInt();
  double r = sc.nextDouble ();
  quant [i] = q;
  rpi [i] = r;
  }
   for (int i = 0; i<n; i++) {
```

```
indTot = quant[i] * rupi[i];
tot += indTot;
}
if (tot >= 10000){
System.out.println("Discount = 5%. Total bill = "+tot+
        " Discounted bill = "+(tot - tot * 0.05));
}
else if (tot >= 7500)
{
System.out.println("Discount = 3%. Total bill = "+tot+
 Discounted bill = "+(tot - tot * 0.03));
}
else if (tot >= 5000){
System.out.println("Discount = 2%. Total bill = "+tot+
 " Discounted bill = "+(tot - tot * 0.02));
}
else{
System.out.println("No discount. Total bill = "+tot);
}
}
}
```

4) 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 and the second say C holds the even numbers from array A. Display the sum, average, max and min of array C.

```
import java.util.Scanner;
public class Odd_even_array {
int n, j=0, b=0, sum=0, avg, max, min;
Scanner s = new Scanner (System.in);
System.out.print("Enter the number of elements
in array: ");
n = s.nextInt();
int[] a = new int[n];
int[] b = new int[n];
int[] c = new int[n];
System.out.println("Enter the elements of the
array:");
for(int i=0; i<n; i++) {
    a[i] = s.nextInt();
}
 for (int i=0; i<n; i++) {
 if (a[i] % 2==0) {
    c[j] = a[i];
sum += a[i];
 j++
  } else {
    b[b] = a[i];
  b++;
 }
}
```

```
//avg = sum / j;
max = c[0];
min = c[0];
for (int i = 0; i < j; i++)
{
if (c[i] > max) {
  max = c[i];
}
if (c[i] < min) {
  min = c[i];
}
}
System.out.println("For the given array sum is
" + sum + " average is " + (sum/j) + " maximum
is " + max + " minimum is " + min);
}
}
```