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IBM19CS090

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Lab Program -1 :

Develop a Java prog 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 -ve, display message stating there are no real solutions.

code:

```
import java.util.*;
class roots
{
    public static void main (String args[])
    {
        double a, b, c, x, y, d;
        System.out.println ("Enter the coefficients a, b, c: ");
        Scanner s = new Scanner (System.in);
        a = s.nextFloat();
        b = s.nextFloat();
        c = s.nextFloat();
        d = (b*b) - (4*a*c);
        if (d == 0)
        {
            x = -b / (2*a);
            y = x;
            System.out.println ("Both Roots Are Real and Equal");
            System.out.println ("R1 = " + x + " And R2 = " + y);
        }
        else if (d > 0)
        {
            x = (-b + Math.sqrt(d)) / (2*a);
            y = (-b - Math.sqrt(d)) / (2*a);
        }
    }
}
```

```
System.out.println("Roots Are Real and Distinct");  
System.out.println("R1 = " + x + " And R2 = " + y);
```

```
}
```

```
else
```

```
{
```

```
System.out.println("Roots Are Imaginary. No  
Real Solutions!");
```

```
}
```

```
}
```

```
}
```

(12) Given print 3 more lines about solving quadratic equations

1. If $b^2 - 4ac > 0$, then the equation has two distinct real roots.

2. If $b^2 - 4ac = 0$, then the equation has one real root (a double root).

3. If $b^2 - 4ac < 0$, then the equation has two complex conjugate roots.

$(x + 2)(x + 3) = (x + 2.5)^2 - 0.25$
 $(0 = -0.25)$ No

$(x + 2)(x + 3) = (x + 2.5)^2 - 0.25$
 $x = -2.5$

(13) Given print 3 more lines about solving quadratic equations

1. If $b^2 - 4ac > 0$, then the equation has two distinct real roots.



Roots.java

Saved

```
1 import java.util.*;
2 class roots
3 {
4     public static void main(String args[])
5     {
6         double a,b,c,x,y,d;
7         System.out.println("Enter the coefficients a,b,c:");
8         Scanner s=new Scanner(System.in);
9         a=s.nextFloat();
10        b=s.nextFloat();
11        c=s.nextFloat();
12        d=(b*b)-(4*a*c);
13        if(d==0)
14        {
15            x=-b/(2*a);
16            y=x;
17            System.out.println("Both Roots Are Real and Equal ");
18            System.out.println("R1="+x+" And R2="+y);
19        }
20        else if(d>0)
21        {
22            x=(-b+Math.sqrt(d))/(2*a);
23            y=(-b-Math.sqrt(d))/(2*a);
24            System.out.println("Roots Are Real and Distinct");
25            System.out.println("R1="+x+" And R2="+y);
26        }
27        else
28        {
29            System.out.println("Roots Are Imaginary. No Real Solution!");
30        }
31    }
32 }
33
```

× Terminal



Enter the coefficients a,b,c:

1

-16

64

Both Roots Are Real and Equal

R1=8.0 And R2=8.0

Process finished.

× Terminal



Enter the coefficients a,b,c:

2

-3

-1

Roots Are Real and Distinct

R1=1.7807764064044151 And R2=-0.2807764064044

Process finished.

× Terminal



Enter the coefficients a,b,c:

5

-4

2

Roots Are Imaginary. No Real Solution!

Process finished.



Roots.java

Saved

```
1 import java.util.*;
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14        {
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16            y=x;
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18            System.out.println("R1="+x+" And R2="+y);
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21        {
22            x=(-b+Math.sqrt(d))/(2*a);
23            y=(-b-Math.sqrt(d))/(2*a);
24            System.out.println("Roots Are Real and Distinct");
25            System.out.println("R1="+x+" And R2="+y);
26        }
27        else
28        {
29            System.out.println("Roots Are Imaginary. No Real Solution!");
30        }
31    }
32 }
33
```

× Terminal



Enter the coefficients a,b,c:

1

-16

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Both Roots Are Real and Equal

R1=8.0 And R2=8.0

Process finished.

× Terminal



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2

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Roots Are Real and Distinct

R1=1.7807764064044151 And R2=-0.2807764064044

Process finished.

× Terminal



Enter the coefficients a,b,c:

5

-4

2

Roots Are Imaginary. No Real Solution!

Process finished.



ArrPosNeg.java

Saved

```
1 import java.util.*;
2
3 class ArrPosNeg
4 {
5     public static void main(String args[])
6     {
7         int n,a[],p=0,neg=0,z=0;
8         System.out.println("Enter Number of Elements:");
9         Scanner s=new Scanner(System.in);
10        n=s.nextInt();
11        a=new int[n];
12        for(int i=0;i<n;i++)
13        {
14            System.out.println("Enter Array Elements:");
15            System.out.println("A["+(i+1)+"]");
16            a[i]=s.nextInt();
17            if(a[i]>0)
18                p++;
19            else if(a[i]<0)
20                neg++;
21            else
22                z++;
23        }
24        System.out.println("No of positive elements:"+p);
25        System.out.println("No of negative elements:"+neg);
26        System.out.println("No of Zeroes:"+z);
27    }
28 }
```



Enter Number of Elements:

5

Enter Array Elements:

A[1]:

0

Enter Array Elements:

A[2]:

1

Enter Array Elements:

A[3]:

-1

Enter Array Elements:

A[4]:

4

Enter Array Elements:

A[5]:

5

No of positive elements:3

No of negative elements:1

No of Zeroes:1



```
Enter Number of Elements:
6
Enter Array Elements:
A[1]:
12
Enter Array Elements:
A[2]:
78
Enter Array Elements:
A[3]:
34
Enter Array Elements:
A[4]:
-123
Enter Array Elements:
A[5]:
-11
Enter Array Elements:
A[6]:
7
No of positive elements:4
No of negative elements:2
No of Zeroes:0
```



EvnOddArray.java

Saved



```
3 public class Odd_even_array {
4     public static void main(String[] args){
5         int n, j = 0, k = 0, sum = 0, avg, max , min;
6         Scanner s = new Scanner(System.in);
7         System.out.print("Enter the number of elements in array:");
8         n=s.nextInt();
9         int[] a = new int[n];
10        int[] b = new int[n];
11        int[] c = new int[n];
12        System.out.println("Enter the elements of the array:");
13        for(int i = 0;i<n;i++){
14            a[i] = s.nextInt();
15        }
16        for(int i = 0;i<n;i++){
17            if (a[i] % 2 == 0) {
18                c[j] = a[i];
19                sum += a[i];
20                j++;
21            } else {
22                b[k] = a[i];
23                k++;
24            }
25        }
26        //avg = sum / j;
27        max = c[0];
28        min = c[0];
29        for(int i = 0; i<j;i++){
30            if (c[i] > max){
31                max = c[i];
32            }
33            if (c[i] < min){
34                min = c[i];
35            }
36        }
37        System.out.println("For the even array sum is "+sum+" average is "+(sum/j)+" maximum is "+max+" minimum is "+
38
39 }
40 }
```

× Terminal

```
Enter the number of elements in array:6
Enter the elements of the array:
2
11
42
17
5
6
For the even array sum is 50 average is 16 maximum is 42 minimum is 2
```