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program-1:

WAP that prints all real solutions to the quadratic equation  $ax^2+bx+c=0$  meant in  $a, b, c$  and use the quadratic equation formula. If the discriminant  $b^2-4ac$  is negative, display a message stating that there are no real solutions.

```
import java.util.*;
```

```
public class Quad
```

```
{
```

```
public static void main (String args[])
```

```
{
```

```
float a,b,c,d,v1,v2;
```

```
System.out.println ("Enter a,b,c :");
```

```
Scanner read = new Scanner (System.in);
```

```
a = read.nextFloat();
```

```
b = read.nextFloat();
```

```
c = read.nextFloat();
```

```
d = 0.0f;
```

```
v1 = 0.0f;
```

```
v2 = 0.0f;
```

```
if (a == 0 || b == 0 || c == 0)
```

```
{
```

```
System.out.println ("Invalid Input!");
```

```
}
```

```
else
```

```
{
```

```
d = b * b - 4 * a * c;
```

```
If (d > 0)
```

```
{
```

```
v1 = (-b + Math.sqrt(d)) / 2 * a;
```

```
v2 = (-b - Math.sqrt(d)) / 2 * a;
```

System.out.println (" Roots are real and distinct  
 $R_1 = \frac{-b + \sqrt{d}}{2 + a}$  &  $R_2 = \frac{-b - \sqrt{d}}{2 + a}$  );

}  
else if ( $d < 0$ )

{  
System.out.println (" Roots are Imaginary");

}

else

{  
 $V_1 = -b/2 + a;$   
 $V_2 = V_1;$

System.out.println (" Roots are real & equal

$R_1 = R_2 = " + V_1);$

}  
}

### ALGORITHM:

Step-1 : Start

Step-2 : read a,b,c

Step-3 : if ( $a=0 \text{ || } b=0 \text{ || } c=0$ )

    print "Invalid output"

    goto step-2

end of if

Step-4 :  $d = b^2 - 4ac$

Step-5 : if ( $d > 0$ )

    print roots are real & distinct

$V_1 = (-b + \sqrt{d}) / 2 + a;$

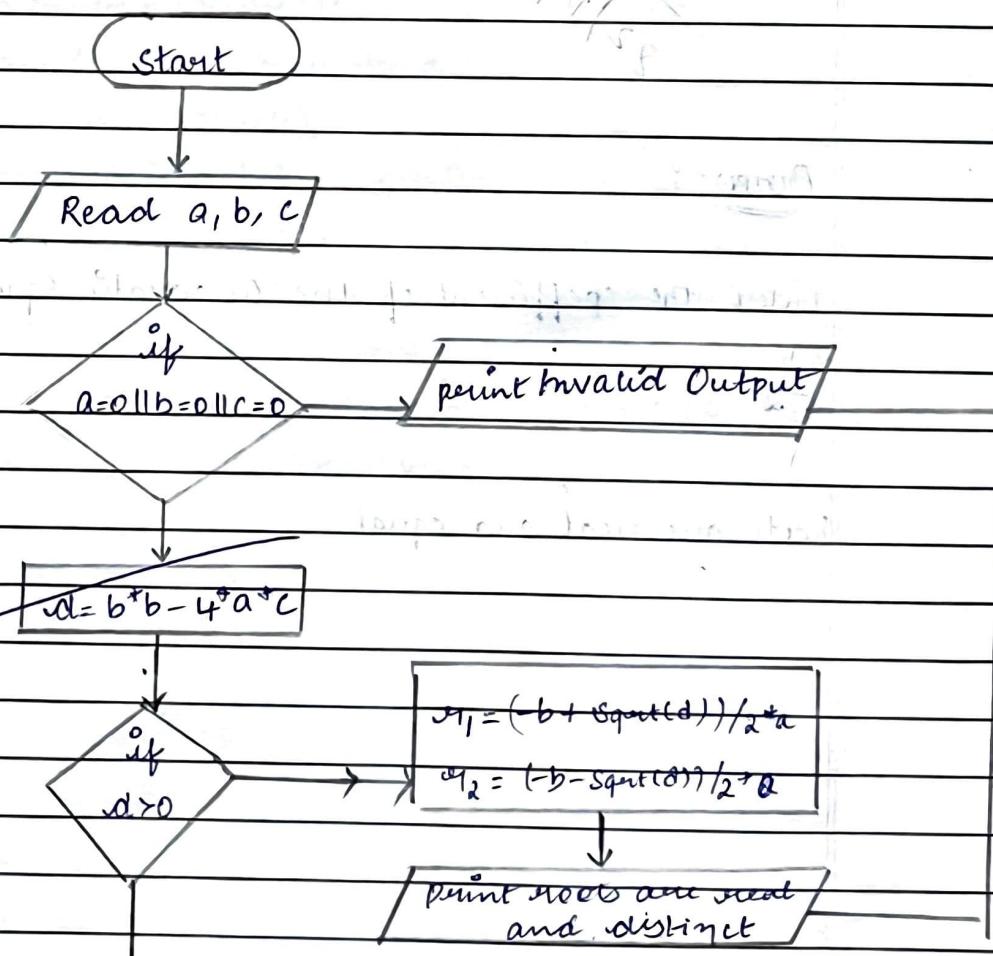
$V_2 = (-b - \sqrt{d}) / 2 + a;$

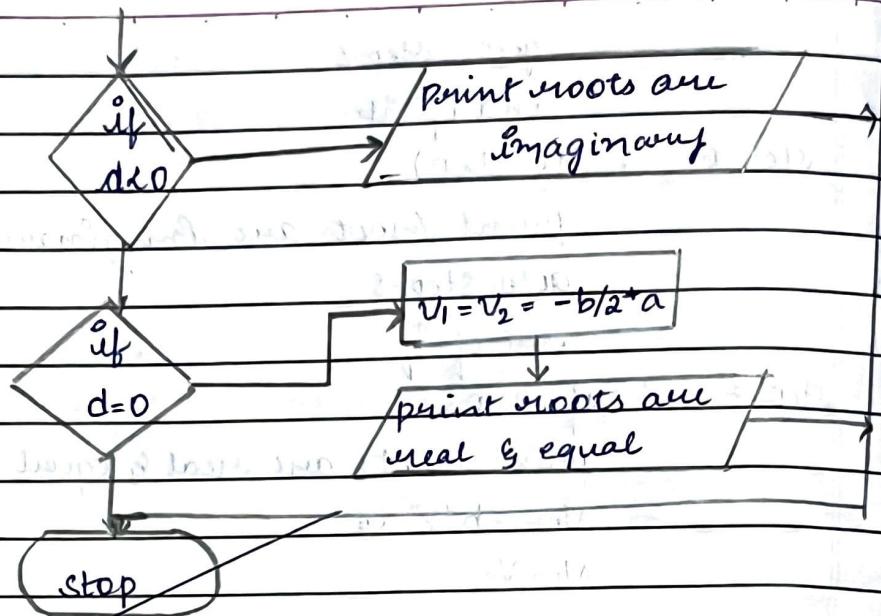
    print  $V_1, V_2$

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goto Step-8  
 end of if  
 step-6 : if ( $d \neq 0$ )  
 print (roots are Imaginary)  
 goto Step-8  
 end of if  
 step-7 : if ( $d = 0$ )  
 print roots are real & equal  
 $\lambda_1 = -b/2 + a\sqrt{a}$   
 $\lambda_2 = V_2$   
 goto Step-8  
 end of if  
 step-8 : stop

### Flowchart:





~~if  $d < 0$   
print roots are  
imaginary  
 $v_1 = v_2 = -b/2 + a$   
print roots are  
real & equal  
stop~~

### Output:

Enter the coefficient of the Quadratic Equation

1

-2

1

Roots are real and equal

Enter the coefficients of the quadratic equation (a, b, c):

1  
6  
1

Two distinct real roots exist:

Root 1: -0.1715728752538097

Root 2: -5.82842712474619

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Enter the coefficients of the quadratic equation (a, b, c):

21

18

15

No real solutions exist for the given quadratic equation.

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Enter the coefficients of the quadratic equation (a, b, c):

1

2

1

One real root exists:

Root: -1.0

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