Introduction to Programming

with Java

Class: Quadratic.java

Score: ★★★

Prerequisites: Java ACM Task Force

Description: In high-school algebra, you learned that the standard quadratic equation

$ax^2 + bx + c = 0$ has two solutions given by the formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

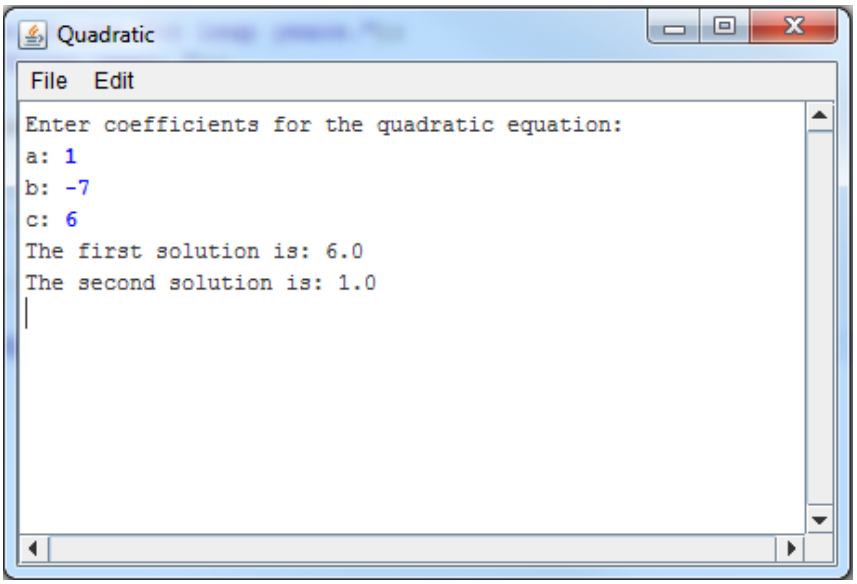
The first solution is obtained by using + in place of ±; the second is obtained by using – in place of ±. Most of this expression contains simple operators covered in Chapter 3. The one piece that's missing is taking square roots, which you can do by calling the standard function Math.sqrt. For example, the statement

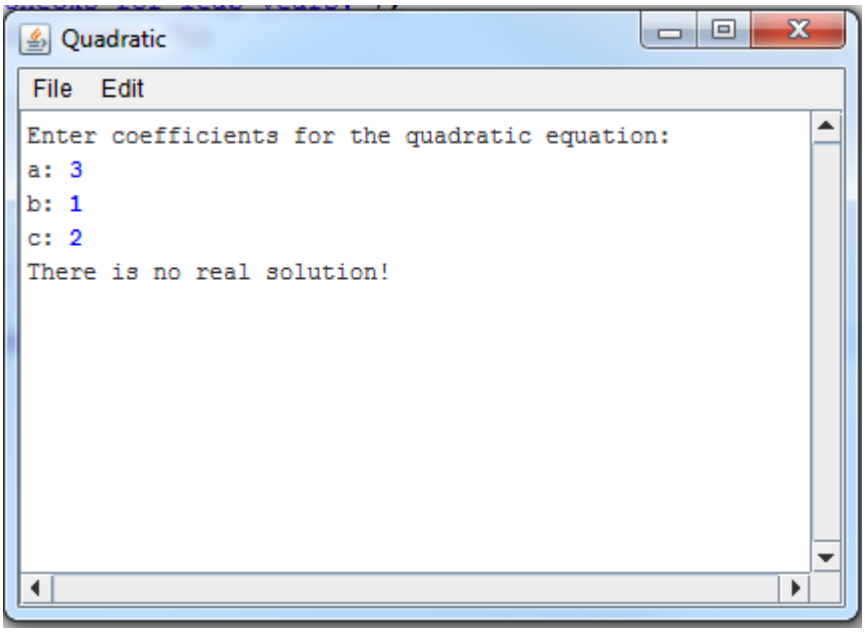
double y = Math.sqrt(x);

sets y to the square root of x.

Write a ConsoleProgram that accepts values for a, b, and c, and then calculates the two solutions (which may both be the same). If the quantity under the square root sign is negative, the equation has no real solutions, and your program should display a message to that effect. You may assume that the value for a is nonzero. Your program should be able to duplicate the following sample run:

Sample Run:


Quadratic
File Edit
Enter coefficients for the quadratic equation:
a: 1
b: -7
c: 6
The first solution is: 6.0
The second solution is: 1.0


Quadratic
File Edit
Enter coefficients for the quadratic equation:
a: 3
b: 1
c: 2
There is no real solution!