```
 1 import components.simplereader.SimpleReader;
 5
 6 /**
 7  * In this project, I ask the user if they want to calculate the
   square root of
 8  * a number and calculate the number within an error of 0.01.
   After some
 9  * calculations, the result is printed out excluding the number
   0.
10  *
11  * @author Mohamed Jama
12  *
13  */
14 public final class Newton4 {
15
16     /**
17      * No argument constructor--private to prevent
   instantiation.
18      */
19     private Newton4() {
20     }
21
22     /**
23      * Put a short phrase describing the static method Newton1
   here.
24      */
25     /**
26      * Computes estimate of square root of x to within relative
   error number
27      * asked by the user.
28      *
29      * @param x
30      * @param epsilon
31      *            positive number to compute square root of
32      * @return estimate of square root with epsilon given by
   user.
33      */
34     private static double sqrt(double x, double epsilon) {
35         double r = x;
```

```
36          double e = epsilon;
37          if (r != 0 && r > 0) {
38              while (Math.abs(r * r - x) / x - (e * e) > 0) {
39                  r = (r + x / r) / 2;
40              }
41          }
42          return r;
43
44      }
45
46      /**
47       * Main method.
48       *
49       * @param args
50       *            the command line arguments
51       */
52      public static void main(String[] args) {
53          SimpleReader in = new SimpleReader1L();
54          SimpleWriter out = new SimpleWriter1L();
55          double number;
56          double epsilon;
57          String con;
58          out.println("Would you like to proceed and calculate?(y/
    n): ");
59          con = in.nextLine();
60
61          while (con.equals("y")) {
62              out.println("Enter a value for x: ");
63              number = in.nextDouble();
64              if ((number - 0) <= 0) {
65                  out.println("Goodbye");
66              }
67              out.println("Enter a value of ε: ");
68              epsilon = in.nextDouble();
69              double result = sqrt(number, epsilon);
70              if ((result - 0) > 0) {
71                  out.println("Your x value of: " + number
72                          + " within a relative error of " +
    epsilon + " is "
```

```
73                          + result);
74                  out.println("Goodbye");
75              }
76          }
77          /*
78           * Close input and output streams
79           */
80
81          out.println("Goodbye");
82          in.close();
83          out.close();
84      }
85  }
86
```