

```
1 import components.simplereader.SimpleReader;
2
3 /**
4  * Put a short phrase describing the program here.
5  *
6  * @author Put your name here
7  */
8
9 public final class Newton3 {
10
11     /**
12      * Private constructor so this utility class cannot be instantiated.
13      */
14     private Newton3() {
15     }
16
17     /**
18      * Computes estimate of square root of x to within relative error 0.01%.
19      *
20      * @param x
21      *         positive number or zero to compute square root of
22      * @param epsilon
23      *         used to compute the root with the boolean statement of the
24      *         while loop
25      * @return estimate of square root
26      */
27     private static double sqrt(double x, double epsilon) {
28         double r = x;
29
30         if (x != 0) {
31             while (!(Math.abs(r * r - x) / x < epsilon * epsilon)) {
32                 r = (r + x / r) / 2;
33             }
34         } else {
35             r = 0;
36         }
37         return r;
38     }
39
40     /**
41      * Main method.
42      *
43      * @param args
44      *         the command line arguments
45      */
46     public static void main(String[] args) {
47         SimpleReader in = new SimpleReader1L();
48         SimpleWriter out = new SimpleWriter1L();
49
50         /*
51          * Put your main program code here; it may call myMethod as shown
52          */
53         double input;
54
55         out.println("If you would like to calculate a square root, enter y");
56         String repeat = in.nextLine();
57
58         while (repeat.equals("y")) {
59
60
```

```
61         out.print("Enter a positive decimal point number:");
62         input = in.nextDouble();
63
64         out.print("Enter the value of epsilon:");
65         double epsilon = in.nextDouble();
66
67         out.println("The squared root of " + input + " is: "
68             + sqrt(input, epsilon));
69
70         out.println(
71             "If you would like to calculate another square root, enter y");
72         repeat = in.nextLine();
73
74     }
75     /*
76     * Close input and output streams
77     */
78     in.close();
79     out.close();
80 }
81
82 }
83
```