```java
1 import components.simplereader.SimpleReader;
5
6 /**
7  * Put a short phrase describing the program here.
8  *
9  * @author Bashir Ali Newton iteration program to find square roots
10 *
11 */
12 public final class Newton2 {
13
14     /**
15      * No argument constructor--private to prevent instantiation.
16      */
17     private Newton2() {
18     }
19
20     /**
21      * Computes estimate of square root of x to within relative error 0.01%.
22      *
23      * @param x
24      *            positive number including zero to compute square root of
25      * @return estimate of square root
26      */
27     private static double sqrt(double x) {
28         double r = x;
29         double epsilon = 0.0001;
30         //condition for checking if sqrt method is in the range
31         double condition = Math.abs((r * r) - x) / 2;
32         //if statement to check if the double is not 0
33         if (x > epsilon || x < (epsilon * -1)) {
34             //while double r is still not in the range
35             while (condition > (epsilon * epsilon)) {
36                 r = ((r + (x / r)) / 2);
37                 condition = Math.abs((r * r) - x) / 2;
38             }
39         } else {
40             r = 0;
41         }
42         return r;
43     }
44
45     /**
46      * Main method.
47      *
48      * @param args
49      *            the command line arguments
50      */
51     public static void main(String[] args) {
52         SimpleReader in = new SimpleReader1L();
53         SimpleWriter out = new SimpleWriter1L();
54         /*
55          * Put your main program code here; it may call myMethod as shown
56          */
57         out.print("Would you like to calculate a square root? ");
58         String answer = in.nextLine();
59         //while user continues to put in x
60         if (answer.equals("y") || answer.equals("Y")) {
```

```java
61              while (answer.equals("y") || answer.equals("Y")) {
62                  out.print("Enter a number: ");
63                  double num = in.nextDouble();
64                  double squareRoot = sqrt(num);
65                  out.println("The square root of that number is within 0.01% of "
66                          + squareRoot + ".");
67                  out.print("Would you like to calculate a square root again? ");
68                  answer = in.nextLine();
69              }
70          }
71          //if they didnt enter y then print
72          out.print("Goodbye!");
73          /*
74           * Close input and output streams
75           */
76          in.close();
77          out.close();
78      }
79
80 }
81
```