

```
1 import components.simplereader.SimpleReader;
2
3 /**
4  * Put a short phrase describing the program here.
5  *
6  * @author Bashir Ali Newton iteration program to find square roots
7  */
8
9 public final class Newton3 {
10
11     /**
12      * No argument constructor--private to prevent instantiation.
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 to compute square root of
22      * @return estimate of square root
23      */
24     private static double sqrt(double x, double epsilon) {
25         double r = x;
26         double condition = Math.abs((r * r) - x) / 2;
27         // variable to check if x is not 0
28         double check = 0.00001;
29         //if statement to check if the double is not 0
30         if (x > check || x < check) {
31             //while double r is still not in the range
32             while (condition > (epsilon * epsilon)) {
33                 r = ((r + (x / r)) / 2);
34                 condition = Math.abs((r * r) - x) / 2;
35             }
36         } else {
37             r = 0;
38         }
39         return r;
40     }
41
42     /**
43      * Main method.
44      *
45      * @param args
46      *      the command line arguments
47      */
48     public static void main(String[] args) {
49         SimpleReader in = new SimpleReader1L();
50         SimpleWriter out = new SimpleWriter1L();
51         /*
52          * Put your main program code here; it may call myMethod as shown
53          */
54         out.print("Would you like to calculate a square root? ");
55         String answer = in.nextLine();
56         if (answer.equals("y") || answer.equals("Y")) {
57             //while user continues to enter y
58         }
59     }
60 }
```

```
61         while (answer.equals("y") || answer.equals("Y")) {
62             out.print("Enter a number: ");
63             double num = in.nextDouble();
64             out.print("Enter a value for epsilon: ");
65             double num2 = in.nextDouble();
66             double squareRoot = sqrt(num, num2);
67             out.println("The square root of that number is approx. "
68                 + squareRoot + ".");
69             out.print("Would you like to calculate a square root again? ");
70             answer = in.nextLine();
71         }
72     }
73     //if they didn't enter y then print
74     out.print("Goodbye!");
75     /*
76     * Close input and output streams
77     */
78     in.close();
79     out.close();
80 }
81
82 }
83
```