```java
import components.simplereader.SimpleReader;
import components.simplereader.SimpleReader1L;
import components.simplewriter.SimpleWriter;
import components.simplewriter.SimpleWriter1L;

/**
 * Program for calculating the square root of a number to within 0.01% relative
 * error.
 *
 * @FayeLeigh
 *
 */
public final class Newton2 {

    /**
     * No argument constructor--private to prevent instantiation.
     */
    private Newton2() {
    }

    /**
     * Checks if input is close to zero.
     *
     * @param x
     *            number to be compared to number close to zero
     * @return true if input is close enough to zero, false if input is not zero
     */
    private static boolean isZero(double x) {
        final double eps = 1E-10;
        return x < eps;
    }

    /**
     * Computes estimate of square root of x to within relative error 0.01%.
     *
     * @param x
     *            positive number to compute square root of
     * @return estimate of square root
     */
    private static double sqrt(double x) {
        final double error = 0.0001;
        double r = x;
        boolean flag = true;

        if (isZero(x)) { //If input is zero, skip calculation and return 0
            return 0.0;
        }
        while (flag) { //Compute square root of x until error is acceptable
            r = (r + x / r) / 2; //Newton iteration formula
            if (Math.abs(r * r - x) / x < error * error) { //Error calculation
                flag = false;
            }
        }
        return r;
    }

    /**
     * Main method.
     *
```

```
60      * @param args
61      *             the command line arguments
62      */
63     public static void main(String[] args) {
64         SimpleReader in = new SimpleReader1L();
65         SimpleWriter out = new SimpleWriter1L();
66
67         final int digits = 2; //Number of digits of output
68         boolean flag = true;
69         double input = 0.0, output = 0.0;
70
71         //Prompt to ask if user wishes to continue
72         out.println("This program computes the square root "
73                 + "of any positive number. ");
74         out.println("Would you like to continue? (y/n)");
75
76         //Sets flag to false if user does not enter "y"
77         String yn = in.nextLine();
78         if (!yn.equals("y")) {
79             flag = false;
80         }
81
82         /**
83          * Until user declines, keep requesting numbers and outputting their
84          * square roots
85          */
86         while (flag) {
87             out.println("Enter any positive number: "); //Prompt for number
88             input = in.nextDouble();
89             output = sqrt(input); //Call method sqrt() to find sqrt of number
90             out.print("The square root of " + input + " is ");
91             out.print(output, digits, false);
92             out.println();
93             out.println("Would you like to enter another number? (y/n)");
94             yn = in.nextLine();
95             if (!yn.equals("y")) {
96                 flag = false;
97             }
98         }
99         in.close();
100        out.close();
101    }
102}
```