```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 Newton1 {

    /**
     * No argument constructor--private to prevent instantiation.
     */
    private Newton1() {
    }

    /**
     * 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;

        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.
     *
     * @param args
     *            the command line arguments
     */
    public static void main(String[] args) {
        SimpleReader in = new SimpleReader1L();
        SimpleWriter out = new SimpleWriter1L();

        final int digits = 2; //Number of digits of output
        boolean flag = true;
        double input = 0.0, output = 0.0;

        //Prompt to ask if user wishes to continue
        out.println("This program computes the square root "
                + "of any positive number. ");
        out.println("Would you like to continue? (y/n)");
```

```
60
61          //Sets flag to false if user does not enter "y"
62          String yn = in.nextLine();
63          if (!yn.equals("y")) {
64              flag = false;
65          }
66
67          /**
68           * Until user declines, keep requesting numbers and outputting their
69           * square roots
70           */
71          while (flag) {
72              out.println("Enter any positive number: "); //Prompt for number
73              input = in.nextDouble();
74              output = sqrt(input); //Call method sqrt() to find sqrt of number
75              out.print("The square root of " + input + " is ");
76              out.print(output, digits, false);
77              out.println();
78              out.println("Would you like to enter another number? (y/n)");
79              yn = in.nextLine();
80              if (!yn.equals("y")) {
81                  flag = false;
82              }
83          }
84          in.close();
85          out.close();
86      }
87  }
```