```java
import components.simplereader.SimpleReader;

/**
 * Put a short phrase describing the program here.
 *
 * @author Bashir Ali Newton iteration program to find square roots
 *
 */
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) {
        double r = x;
        double epsilon = 0.0001;
        //condition for checking if sqrt method is in the range
        double condition = Math.abs((r * r) - x) / 2;
        //while double r is still not in the range
        while (condition > (epsilon * epsilon)) {
            r = ((r + (x / r)) / 2);
            condition = Math.abs((r * r) - x) / 2;
        }
        return r;
    }

    /**
     * Main method.
     *
     * @param args
     *            the command line arguments
     */
    public static void main(String[] args) {
        SimpleReader in = new SimpleReader1L();
        SimpleWriter out = new SimpleWriter1L();
        /*
         * Put your main program code here; it may call myMethod as shown
         */
        out.print("Would you like to calculate a square root? ");
        String answer = in.nextLine();
        //while user continues to enter y
        if (answer.equals("y") || answer.equals("Y")) {
            while (answer.equals("y") || answer.equals("Y")) {
                out.print("Enter a number: ");
                double num = in.nextDouble();
                double squareRoot = sqrt(num);
                out.println("The square root of that number is within 0.01% of "
```

```
61                      + squareRoot + ".");
62                out.print("Would you like to calculate a square root again? ");
63                answer = in.nextLine();
64            }
65        }
66        //if they didnt enter y then print
67        out.print("Goodbye!");
68        /*
69         * Close input and output streams
70         */
71        in.close();
72        out.close();
73    }
74
75}
76
```