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

/**
 * prompt users to type the number which could not be 0 and negative number to
 * find the square root of number, the relative would be the number that the
 * users type.
 *
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 *
 */
public final class Newton4 {

    /**
     * Private constructor so this utility class cannot be instantiated.
     */
    private Newton4() {
    }

    /**
     * Computes estimate of square root of x to within relative error 0.01%.
     *
     * @param x
     *            positive number to compute square root of
     * @param a
     *            relative error that users would accept
     * @return estimate of square root
     */
    private static double sqrt(double x, double a) {
        double r = x;
        /*
         * set r that is equal x as the initial value
         */
        while (Math.abs(r * r - x) / x > a * a) {
            r = (r + x / r) / 2;
            /*
             * calculate the right number of the square root within ε^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.println("Type a positive number");
        double number = in.nextDouble();
        while (number == 0) {
            /*
             * the number could not be 0
             */
```

```
63              out.println("Type a positive number");
64              number = in.nextDouble();
65          }
66
67          if (number < 0) {
68              out.println("It is time to quit!");
69              /*
70               * the negative number would not have square root.
71               */
72          } else {
73              out.println("Type a relative error");
74              double error = in.nextDouble();
75              /*
76               * prompt the users to type the relative errors that they could
77               * accept
78               */
79              /*
80               * get the right answer of the square root
81               */
82              out.println(sqrt(number, error));
83
84          }
85
86          /*
87           * Close input and output streams
88           */
89          in.close();
90          out.close();
91      }
92
93  }
```