```java
import components.simplereader.SimpleReader;
import components.simplereader.SimpleReader1L;
import components.simplewriter.SimpleWriter;
import components.simplewriter.SimpleWriter1L;
import components.xmltree.XMLTree;
import components.xmltree.XMLTree1;

/**
 * Program to evaluate XMLTree expressions of {@code int}.
 *
 * @author Put your name here
 *
 */
public final class XMLTreeIntExpressionEvaluator {

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

    /**
     * Evaluate the given expression.
     *
     * @param exp
     *            the {@code XMLTree} representing the expression
     * @return the value of the expression
     * @requires <pre>
     * [exp is a subtree of a well-formed XML arithmetic
expression]  and
     *  [the label of the root of exp is not "expression"]
     * </pre>
     * @ensures evaluate = [the value of the expression]
     */
    private static int evaluate(XMLTree exp) {
        assert exp != null : "Violation of: exp is not null";

        int subExpression = 0;

        // if the root of exp is an operation, recursive call must
take place
        if (!exp.hasAttribute("value")) {
            String op = exp.label();
```

```
42
43              // recursive call to evaluate both children
44              int first = evaluate(exp.child(0));
45              int second = evaluate(exp.child(1));
46
47              // which expression based off of operation name
48              if (op.equals("plus")) {
49                  subExpression = first + second;
50              } else if (op.equals("minus")) {
51                  subExpression = first - second;
52              } else if (op.equals("times")) {
53                  subExpression = first * second;
54              } else {
55                  subExpression = first / second;
56              }
57
58          } else {
59              // subExpression becomes the number and simply returns
  itself as an int
60              subExpression =
  Integer.parseInt(exp.attributeValue("value"));
61          }
62
63          return subExpression;
64      }
65
66      /**
67       * Main method.
68       *
69       * @param args
70       *            the command line arguments
71       */
72      public static void main(String[] args) {
73          SimpleReader in = new SimpleReader1L();
74          SimpleWriter out = new SimpleWriter1L();
75
76          out.print("Enter the name of an expression XML file: ");
77          String file = in.nextLine();
78          while (!file.equals("")) {
79              XMLTree exp = new XMLTree1(file);
80              out.println(evaluate(exp.child(0)));
81              out.print("Enter the name of an expression XML file:
  ");
82              file = in.nextLine();
```

```
83          }
84
85          in.close();
86          out.close();
87      }
88
89  }
```