

```
1 import components.simplereader.SimpleReader;
2 import components.simplereader.SimpleReader1L;
3 import components.simplewriter.SimpleWriter;
4 import components.simplewriter.SimpleWriter1L;
5 import components.utilities.Reporter;
6 import components.xmltree.XMLTree;
7 import components.xmltree.XMLTree1;
8
9 /**
10  * Program to evaluate XMLTree expressions of {@code int}.
11  *
12  * @author David Park
13  *
14  */
15 public final class XMLTreeIntExpressionEvaluator {
16
17     /**
18      * Private constructor so this utility class cannot be instantiated.
19      */
20     private XMLTreeIntExpressionEvaluator() {
21     }
22
23     /**
24      * Evaluate the given expression.
25      *
26      * @param exp
27      *     the {@code XMLTree} representing the expression
28      * @return the value of the expression
29      * @requires <pre>
30      * [exp is a subtree of a well-formed XML arithmetic expression] and
31      * [the label of the root of exp is not "expression"]
32      * </pre>
33      * @ensures evaluate = [the value of the expression]
34      */
35     private static int evaluate(XMLTree exp) {
36         assert exp != null : "Violation of: exp is not null";
37
38         // TODO - fill in body
39
40         int result = 0;
41
42         if (exp.label().equals("times")) {
43             // If the operation is multiplication, recursively solve left n right
44             result = evaluate(exp.child(0)) * evaluate(exp.child(1));
45         } else if (exp.label().equals("divide")) {
46             if (evaluate(exp.child(1)) == 0) {
47                 Reporter.fatalErrorToConsole(
48                     "A number divided by zero is undefined.");
49             } else {
50                 result = evaluate(exp.child(0)) / evaluate(exp.child(1));
51             }
52         } else if (exp.label().equals("plus")) {
53             // If the operation is addition, recursively
54             // evaluate the left and right child
55             // of this node and add their results.
56             result = evaluate(exp.child(0)) + evaluate(exp.child(1));
57         } else if (exp.label().equals("minus")) {
```

```
58         // If the operation is subtraction, recursive solve left n right
59         result = evaluate(exp.child(0)) - evaluate(exp.child(1));
60     } else if (exp.label().equals("number")) {
61         result = Integer.parseInt(exp.attributeValue("value"));
62     }
63     return result;
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
```