

Interpreter Assignment #2: Statements

Issued: Monday, September 30

Due: Wednesday, October 30

Purpose

This assignment asks you to extend your Interpreter Assignment #1 interpreter.

Grammar

As before, your interpreter employs an ad-hoc scanner and a recursive-descent parser. The parser builds a strongly typed parse tree, which is then traversed and evaluated. A grammar for the extended source language is:

```
1  prog      : block
2  block     : stmt ';' block
3             | stmt
4  stmt      : assn
5             | 'rd' id
6             | 'wr' expr
7             | 'if' boolexpr 'then' stmt
8             | 'if' boolexpr 'then' stmt 'else' stmt
9             | 'while' boolexpr 'do' stmt
10            | 'begin' block 'end'
11  assn      : id '=' expr
12  expr      : term addop expr
13            | term
14  term      : fact mulop term
15            | fact
16  fact      : id
17            | num
18            | '(' expr ')'
19            | '-' fact
20  boolexpr  : expr relop expr
21  addop     : '+'
22            | '-'
```

| | | | |
|----|--------------------|---|-------------------------|
| 23 | <code>mulop</code> | : | <code>'*'</code> |
| 24 | | | <code>'/'</code> |
| 25 | <code>relop</code> | : | <code>'<'</code> |
| 26 | | | <code>'<='</code> |
| 27 | | | <code>'>'</code> |
| 28 | | | <code>'>='</code> |
| 29 | | | <code>'<>'</code> |
| 30 | | | <code>'=='</code> |

Assignment

There are several parts:

- Extend your scanner to recognize the new keywords and operators.
- Extend your parser to recognize the new statements and expressions.
- Extend your evaluator to execute the new constructs.
 - You can represent boolean values as double values (e.g., 1.0 and 0.0);
 - For I/O, read from `System.in` (hint: use a `JDK Scanner`) and write to `System.out`.
- Test your solution thoroughly. Add tests to your test suite. The quality of your suite will influence your grade.