Interpreter Assignment #1: Expressions and Assignments

Issued: Tuesday, September 16 **Due:** Tuesday, September 30

Purpose

This assignment asks you to extend a small interpreter.

Source Code and Grammar

A Java implementation of the interpreter is at:

```
"buff/classes/354/pub/ia1
```

The 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 source language is:

```
stmt : assn ';'
    assn
          : id '=' expr
    expr : term addop expr
          | term
          : fact mulop term
    term
          | fact
         : id
    fact
          | num
          | '('
                expr ')'
    addop : '+'
10
          | '-'
11
    mulop : '*'
12
          | '/'
13
```

The interpreter is an instance of the object-oriented design pattern named Interpreter (243), from the well-known "Gang of Four" textbook used in CS 472.

Assignment

There are several parts:

- Document the provided source code.
- Extend the scanner to support comments. Design your own form of comment.
- The grammar specifies that a program is exactly one assignment statement. However, main interprets each of its arguments as a separate program, trying to modify variable values, in the Environment object, accordingly. Change the interpreter so this works correctly. Eventually, we will change the grammar to allow a program to be multiple statements.
- Add a prefix unary minus operator. This is a grammatical change; simply allowing negative numbers is insufficient.
- The interpreter currently supports only integer values. Change it to instead support double values.
- Test your solution thoroughly. I have provided a simple regression tester, named run. Note that it uses the whole prg file as a single program. You cannot put multiple programs in a single prg file. Add tests to my rudimentary test suite. The quality of your suite will influence your grade.