GIT Department of Computer Engineering
CSE 222/505
Spring 2014
Homework 04

Lists, Stacks and Expression Evaluation
Due date: April 3rd 2014 23:59

In this homework, you will use a number of data structures that we learned in the class. You will implement a simple interpretive language (GIT language) that can do arithmetic expressions with variables (and for later homeworks draw graphs) . You will read your expressions from a given file. For example, if a file named **`program.git`** contains

```
var a
var b
a = 2.0 *  12.0 / 3.0
b = a / 4.0
print b
var c
c = sin a  * sin a + 1.0
print c
```

and if you run your program on this file

```
Gitlanguage program.git
```

you will see

```
6.0
1.165434
```

on the screen.

Here are the rules for this simple language

- Operators: `+, -, *, /, =` have the same meaning and same precedence as in Java.
- Uniary operators `sin, cos, sqrt, log, abs, tan, exp` have the same meaning as in Java Math functions. These operators take one double and return a double as the result. For example `sin 90` returns `1.0`.
- Other uniary oprators have different meanings:
    - Operator `var` defines a double variable in memory, returns 0.0
    - operator `print` prints the given parameter on the screen and returns the printed value
    - operator `input` asks the user to enter a value from keyboard and assings that value to the paremeter variable. Also returns the assigned value.
- Uniary operators have higher precedence than the binary operators.
- Variables can be regular Java variable names other than reserved uniary operator names
- If there is an error in the expressions then you should print it clearly such as
    - Undefined variables
    - Uninitialized variables
    - Unknown operators
    - Unmatched parenthesis, etc
    - No Lvalue, etc

Here is how you should design your language

- Keep the variables in a linked list. When you see a new variable, make a search to find the variable in the list to see its value
- You may use any classes that we developed in the lectures or any Java class that we have used during the lectures.

In your submission, show your work for software engineering phases. You should use EA as much as possible.

Provide at least 5 test programs and their outputs. Finally, do not forget to follow the homework submission rules.