

Programming Languages

Programming Assignment # 2 Interpreter for Scheme-Lite Expressions Due Dec. 11, 2007

Given the *Scheme* syntax described in EBNF rules (refer to the file *Scheme_EBNF.doc*) write an interpreter for a modified version of the Scheme language, call it *Scheme-Lite*. The language has the following characteristics:

- No functional definitions
- Non-Recursive
- Expression-based
- Literals
 - Numbers of the base 10
 - Boolean literals (#t, #f)
 - Character literals
 - Strings
- Simple Expressions
 - Arithmetic as an example (+ x y), (- x y), (* x y), (/ x y)
 - Boolean (and x y), (or x y), (not x y)
 - Relational (< x y), (> x y), (<= x y), (>= x y), (= x y), (<> x y)
- Conditional constructs
 - If (if *test* then-part), (if *test* then-part else-part)
- Implement the general form of the following *Scheme* statements:
 - (let ((var1 expr1) (var2 expr2) ...) body)
 - (let ((lista '(a b c d)) (listb '(1 2 3 4))) (append lista listb))
 - (list 1 2 3 4)
 - (null? '()), (null? '(1 2 4)), (null? 5)
 - (equal? lista listb), (equal? 5 1)
 - (car lista)
 - (cdr lista)
 - (cons (car lista) listb)
 - (append '(1 2) '(3 4))
 - (length '(a b c d e))
 - (member 2 '(1 2 3 4)), (member 2 '(1 3 4 5))
 - (display "This is a Scheme-Lite output")
- Note that any number of the above statements can be combined in an expression.

Your program should read an expression written in *Scheme-Lite*, recognize the syntax and semantic of the expression, and then execute it assuming that it is syntactically correct.

Important Rules:

- 1- Your interpreter must read a *Scheme-Lite* program from the screen.
- 2- Your *Scheme-Lite* program writes program results into the screen..
- 3- The interpreter source file *SchemeLite.ext* must include the following:
 - your name, ID number
 - Course title, number, and section number
 - the statement of the problem
 - a brief summary of your interpreter implementation method
 - a dictionary of all global variables (name, type, and usage)
 - for each method or procedure or function must include the following:
 - Usage of the procedure or function
 - Meanings of the input variables
 - Meanings of the output variables
- 4- No assignment will be accepted after the due date.
- 5- Hand out a print out and a softcopy of all files in class in the due date.
- 6- Electronically submit a softcopy of all files to the Teaching Assistant through the WebCT in the due date.