IIIT Kalyani, West Bengal

Compilers Design Assignment - 6 (CS 511)

In this assignment you need to augment the language of Assignment 4, and write its interpreter with the following features.

1. An identifier (id) is a single letter of English alphabet [A-Za-qs-z]. Note that we have excluded ‘r’ as it is a keyword to read a data from the stdin.
2. Two new operators, ‘=’ (assignment) and ‘,’ (comma).

The new definition of a fully parenthesized expression is as follows:

1. Every non-negative integer (32-bit) is an expression.
2. An identifier (id) is an expression whose value is the value assigned to it.
3. r is an expression. Its value is the integer read from the stdin.
4. If e is an expression and id is an identifier, then (id = e) is an expression. Its value is the value of expression e. The value of the identifier (id) is also same, and can be used afterwards.
5. If e1 and e2 are expressions, then so are (e1 + e2) and (e1 ∗ e2) with their usual meaning. (e1, e2) is also an expression whose value is the value of e2. In all three cases inorder evaluation is performed.
6. Nothing else is an expression.

You need to enhance your C program (the scanner, parser and the interpreter) to incorporate these features. In the modified version, the input-output looks as follows:

$ a.out

a

Value of ’a’ not defined

$ a.out

((a = (2 + r)), (b = (5 \* a)))

:7

Value: 45

$ a.out

((b = (5 \* a)), (a = (2 + r)))

Value of ’a’ not defined

In the scanner there is a new token corresponding to an identifier (ID). The value of the token (val) may be the ASCII code of the letter (identifier).

#include <stdio.h>

#define END 256

#define NUM 257

#define ID 258

typedef struct { int tokenClass; int val; } token\_t;

typedef struct {int def; int val;} idstruct;

extern token\_t token;

extern void getNextToken(void);

You may have to use an array of structures of size 50. The def field is zero (0) when the corresponding identifier is undefined and one (1) when it is defined. The Makefile looks same. Prepare a .zip file as <reg no>.6.zip with all the files you have and submit the zip file.