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Compiler Project - Subset of a SCSS compiler

Project explanation

The project considers a subset of the *SCSS* language, an extension of *CSS* which allows the use of variables and nested structures of declarations which are not originally present in *CSS*. The compiler, generated using the lex and yacc files, acts like a linter and is able to find errors in code related not only to the syntax of the language (as for example missing ";" or missing "{") but also to the semantic (i.e. sum between different unit measures "px" and "em" not allowed). Declared variables are saved in symbol tables, since blocks might be nested (i.e. a structure of nested curly brackets), symbol tables are related in a tree-like fashion where each child block inherits all the declarations (attributes and variables) of the parent block and each block has its own symbol table. Each symbol table is implemented as a linked list where each record contains a pointer to the next record.

Installation instructions

To run the compiler, *cd* in the "*SCSS_Compiler*" folder, then there are two possible ways to interact with the compiler, the first is by writing directly into the terminal the possible strings of the language, the other is by giving an input file (example: test.in):

1- *make; make run*
2- *make; cd build; ./flc ../test.in* **OR** *make; cat test.in | make run*

Input descriptions

Input should be similar to normal CSS code with the addition of variables and nested blocks. Here an example:

```
$x : 20px;
$y: (20%)-2%;
/* comment */
.code {
        color: green;
        a {
            width: $y;
             li {
               $z : $x * 2; } } }
```

To see the symbol table enter "ST" as input.

Grammar

Scope : *S*

List of terminals/tokens:
{ID, NUM, UNIT, VAR, T_SEMICOLON, T_COLON, T_DOT, T_COMMA, T_HASH, T_PL, T_PR, T_BL, T_BR, T_PLUS, T_MINUS, T_STAR, T_DIV, T_GT}

List of non-terminals:
{EPS, S, ST, VARDECL, EXPR, SCALAR, FNCALL, P, PARAMS, CSSRULE, SELECTORS, SELECTOR, DECLS, DECL, }

Productions:
S → ST S | EPS

EPS → ε

ST → VARDECL | CSSRULE

VARDECL → VAR T_COLON EXPR T_SEMICOLON

EXPR → VAR | SCALAR | ID | FNCALL | T_PL EXPR T_PR | EXPR T_PLUS EXPR | EXPR T_MINUS EXPR | EXPR T_STAR EXPR | EXPR T_DIV EXPR

SCALAR → NUM UNIT | NUM

FNCALL → ID T_PL P T_PR

P → EXPR PARAMS | EPS

PARAMS → T_COMMA EXPR PARAMS | EPS

CSSRULE → SELECTORS T_BL DECLS T_BR

SELECTORS → SELECTOR PSEUDOCLASS RELATIONSHIP

SELECTOR → ID | T_HASH ID | T_DOT ID

PSEUDOCLASS → T_COLON ID | EPS

RELATIONSHIP → T_COMMA SELECTORS | T_GT SELECTORS | SELECTORS | EPS

DECLS → DECL DECLS | EPS

DECL → ID T_COLON EXPR T_SEMICOLON | CSSRULE | VARDECL