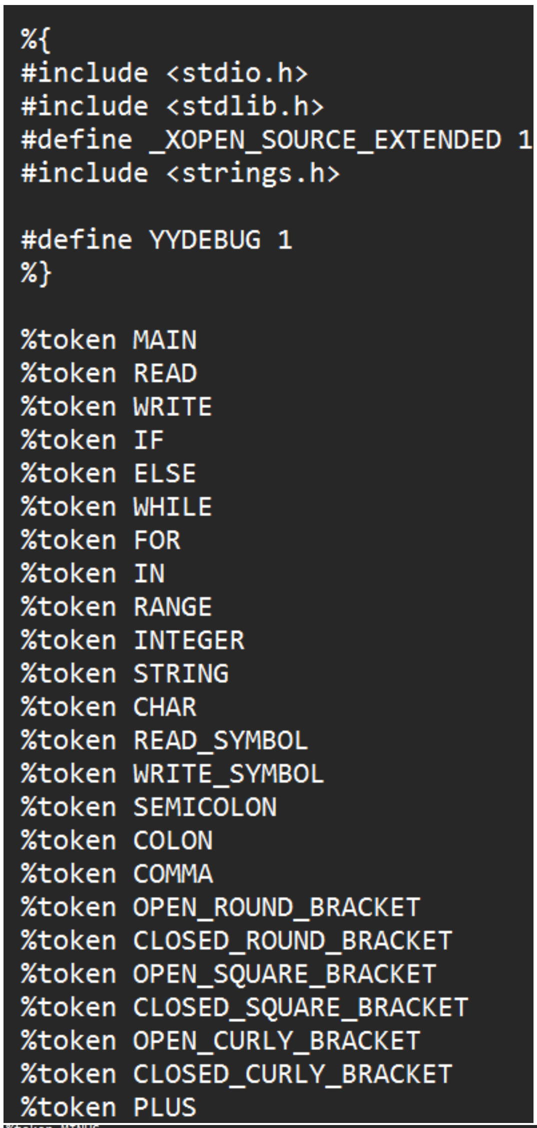
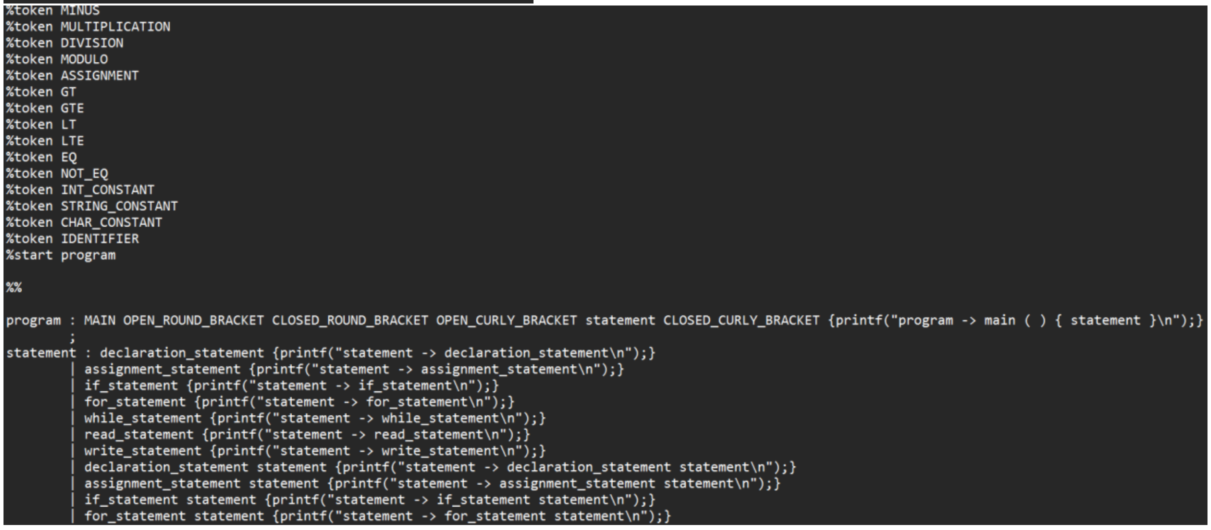
https://github.com/RazvanAndreiMoga/LFTC

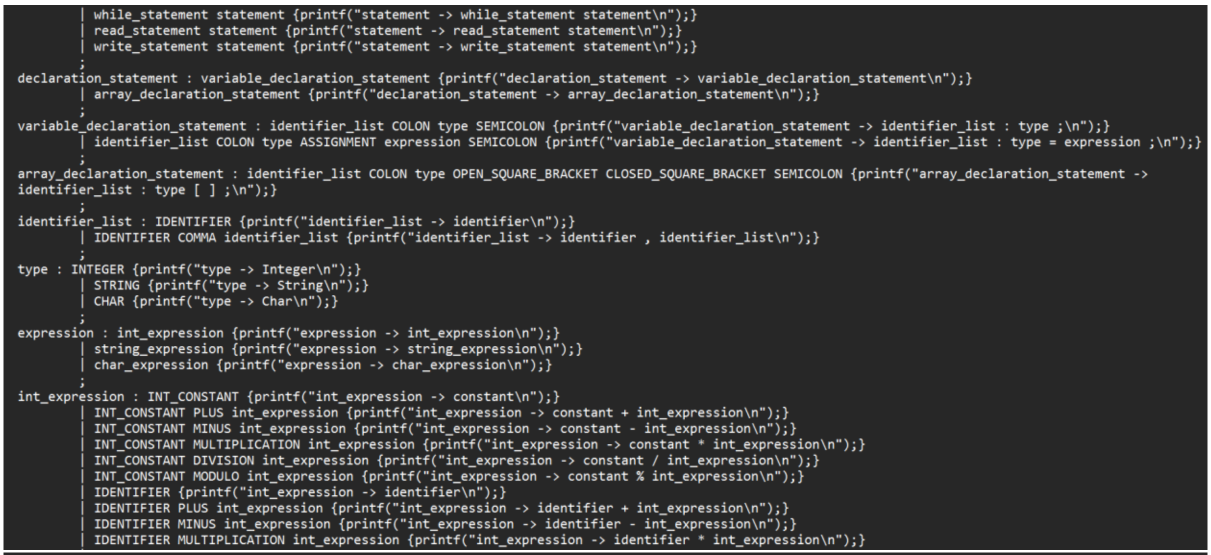
parser.y:



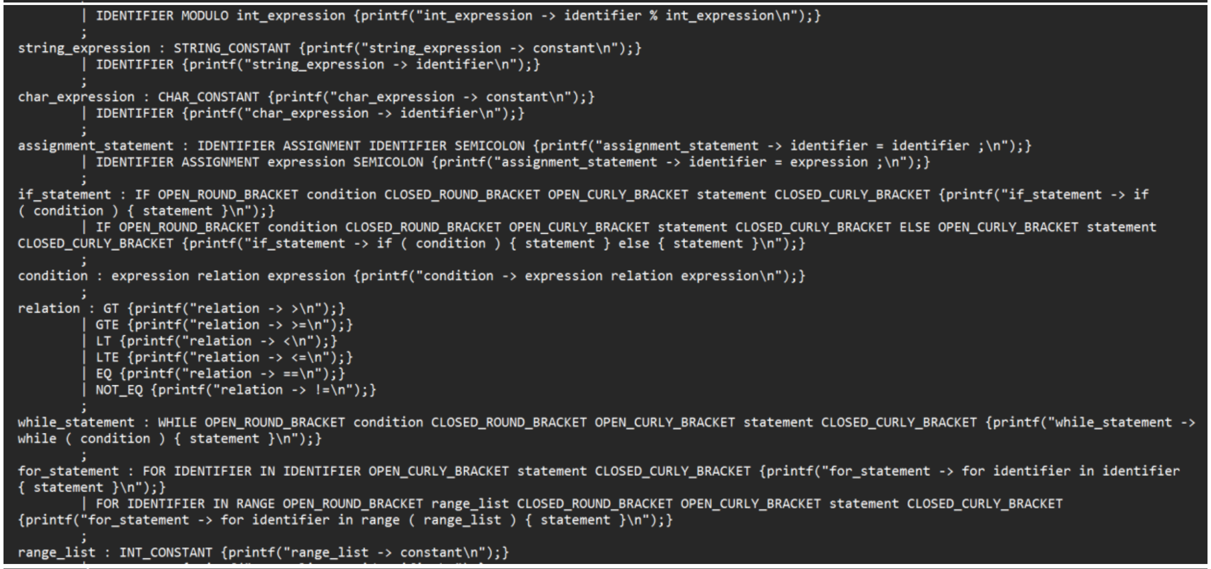
```
%{
#include <stdio.h>
#include <stdlib.h>
#define _XOPEN_SOURCE_EXTENDED 1
#include <strings.h>

#define YYDEBUG 1
%}

%token MAIN
%token READ
%token WRITE
%token IF
%token ELSE
%token WHILE
%token FOR
%token IN
%token RANGE
%token INTEGER
%token STRING
%token CHAR
%token READ_SYMBOL
%token WRITE_SYMBOL
%token SEMICOLON
%token COLON
%token COMMA
%token OPEN_ROUND_BRACKET
%token CLOSED_ROUND_BRACKET
%token OPEN_SQUARE_BRACKET
%token CLOSED_SQUARE_BRACKET
%token OPEN_CURLY_BRACKET
%token CLOSED_CURLY_BRACKET
%token PLUS
```



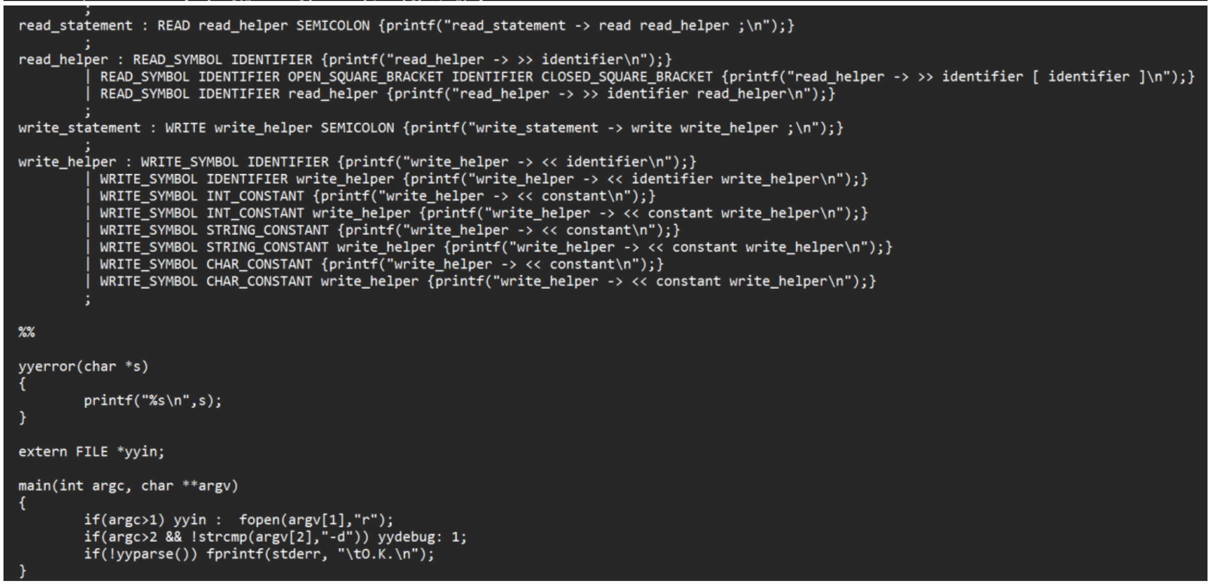
```
%token MINUS
%token MULTIPLICATION
%token DIVISION
%token MODULO
%token ASSIGNMENT
%token GT
%token GTE
%token LT
%token LTE
%token EQ
%token NOT_EQ
%token INT_CONSTANT
%token STRING_CONSTANT
%token CHAR_CONSTANT
%token IDENTIFIER
%start program

%%

program : MAIN OPEN_ROUND_BRACKET CLOSED_ROUND_BRACKET OPEN_CURLY_BRACKET statement CLOSED_CURLY_BRACKET {printf("program -> main ( ) { statement }\n");}
        ;
statement : declaration_statement {printf("statement -> declaration_statement\n");}
        | assignment_statement {printf("statement -> assignment_statement\n");}
        | if_statement {printf("statement -> if_statement\n");}
        | for_statement {printf("statement -> for_statement\n");}
        | while_statement {printf("statement -> while_statement\n");}
        | read_statement {printf("statement -> read_statement\n");}
        | write_statement {printf("statement -> write_statement\n");}
        | declaration_statement statement {printf("statement -> declaration_statement statement\n");}
        | assignment_statement statement {printf("statement -> assignment_statement statement\n");}
        | if_statement statement {printf("statement -> if_statement statement\n");}
        | for_statement statement {printf("statement -> for_statement statement\n");}
```



```
        | while_statement statement {printf("statement -> while_statement statement\n");}
        | read_statement statement {printf("statement -> read_statement statement\n");}
        | write_statement statement {printf("statement -> write_statement statement\n");}
        ;
declaration_statement : variable_declaration_statement {printf("declaration_statement -> variable_declaration_statement\n");}
        | array_declaration_statement {printf("declaration_statement -> array_declaration_statement\n");}
        ;
variable_declaration_statement : identifier_list COLON type SEMICOLON {printf("variable_declaration_statement -> identifier_list : type ;\n");}
        | identifier_list COLON type ASSIGNMENT expression SEMICOLON {printf("variable_declaration_statement -> identifier_list : type = expression ;\n");}
        ;
array_declaration_statement : identifier_list COLON type OPEN_SQUARE_BRACKET CLOSED_SQUARE_BRACKET SEMICOLON {printf("array_declaration_statement ->
identifier_list : type [ ] ;\n");}
        ;
identifier_list : IDENTIFIER {printf("identifier_list -> identifier\n");}
        | IDENTIFIER COMMA identifier_list {printf("identifier_list -> identifier , identifier_list\n");}
        ;
type : INTEGER {printf("type -> Integer\n");}
        | STRING {printf("type -> String\n");}
        | CHAR {printf("type -> Char\n");}
        ;
expression : int_expression {printf("expression -> int_expression\n");}
        | string_expression {printf("expression -> string_expression\n");}
        | char_expression {printf("expression -> char_expression\n");}
        ;
int_expression : INT_CONSTANT {printf("int_expression -> constant\n");}
        | INT_CONSTANT PLUS int_expression {printf("int_expression -> constant + int_expression\n");}
        | INT_CONSTANT MINUS int_expression {printf("int_expression -> constant - int_expression\n");}
        | INT_CONSTANT MULTIPLICATION int_expression {printf("int_expression -> constant * int_expression\n");}
        | INT_CONSTANT DIVISION int_expression {printf("int_expression -> constant / int_expression\n");}
        | INT_CONSTANT MODULO int_expression {printf("int_expression -> constant % int_expression\n");}
        | IDENTIFIER {printf("int_expression -> identifier\n");}
        | IDENTIFIER PLUS int_expression {printf("int_expression -> identifier + int_expression\n");}
        | IDENTIFIER MINUS int_expression {printf("int_expression -> identifier - int_expression\n");}
        | IDENTIFIER MULTIPLICATION int_expression {printf("int_expression -> identifier * int_expression\n");}
```

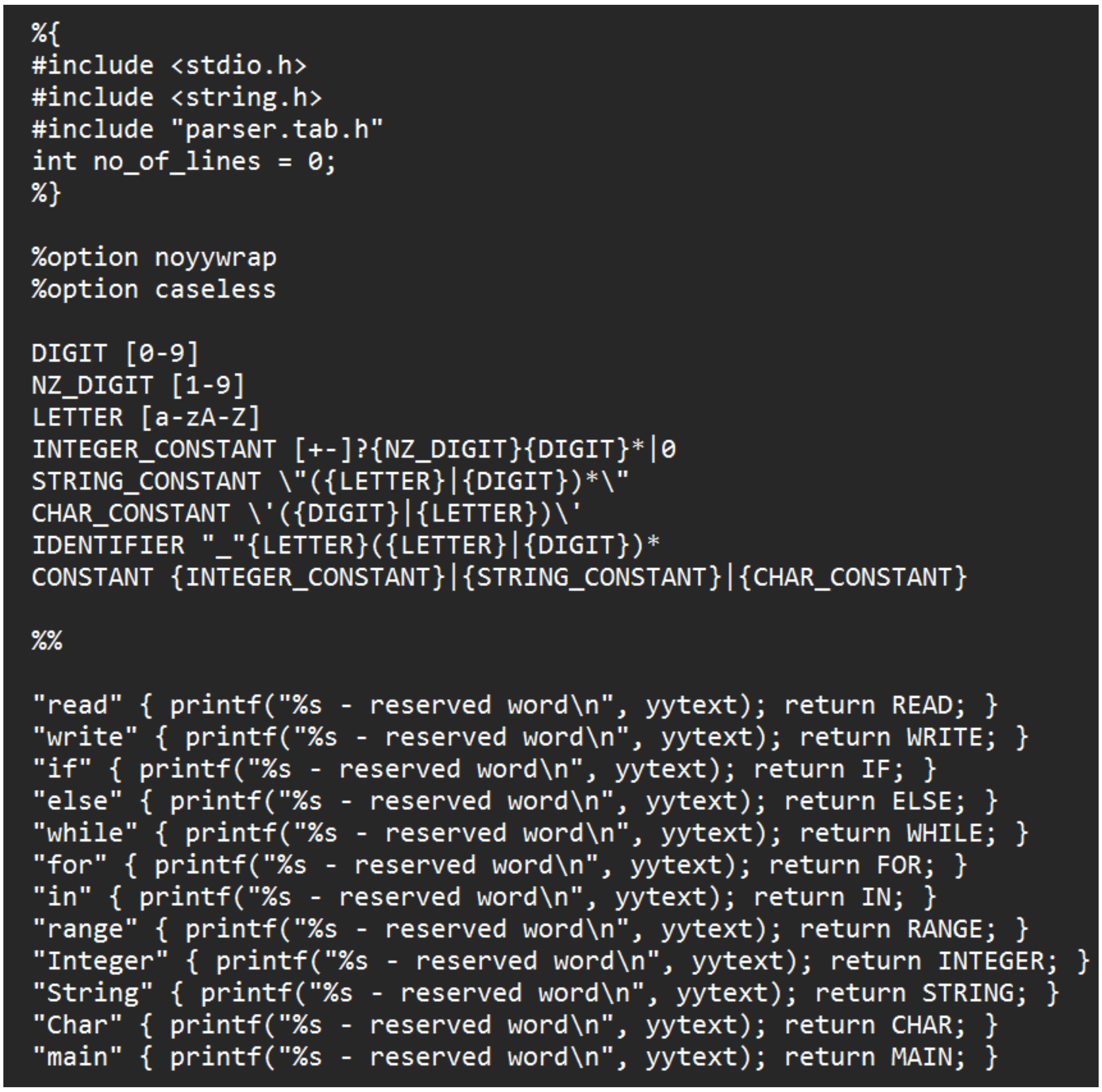


```
        | IDENTIFIER MODULO int_expression {printf("int_expression -> identifier % int_expression\n");}
        ;
string_expression : STRING_CONSTANT {printf("string_expression -> constant\n");}
        | IDENTIFIER {printf("string_expression -> identifier\n");}
        ;
char_expression : CHAR_CONSTANT {printf("char_expression -> constant\n");}
        | IDENTIFIER {printf("char_expression -> identifier\n");}
        ;
assignment_statement : IDENTIFIER ASSIGNMENT IDENTIFIER SEMICOLON {printf("assignment_statement -> identifier = identifier ;\n");}
        | IDENTIFIER ASSIGNMENT expression SEMICOLON {printf("assignment_statement -> identifier = expression ;\n");}
        ;
if_statement : IF OPEN_ROUND_BRACKET condition CLOSED_ROUND_BRACKET OPEN_CURLY_BRACKET statement CLOSED_CURLY_BRACKET {printf("if_statement -> if
( condition ) { statement }\n");}
        | IF OPEN_ROUND_BRACKET condition CLOSED_ROUND_BRACKET OPEN_CURLY_BRACKET statement CLOSED_CURLY_BRACKET ELSE OPEN_CURLY_BRACKET statement
CLOSED_CURLY_BRACKET {printf("if_statement -> if ( condition ) { statement } else { statement }\n");}
        ;
condition : expression relation expression {printf("condition -> expression relation expression\n");}
        ;
relation : GT {printf("relation -> >\n");}
        | GTE {printf("relation -> >=\n");}
        | LT {printf("relation -> <\n");}
        | LTE {printf("relation -> <=\n");}
        | EQ {printf("relation -> ==\n");}
        | NOT_EQ {printf("relation -> !=\n");}
        ;
while_statement : WHILE OPEN_ROUND_BRACKET condition CLOSED_ROUND_BRACKET OPEN_CURLY_BRACKET statement CLOSED_CURLY_BRACKET {printf("while_statement ->
while ( condition ) { statement }\n");}
        ;
for_statement : FOR IDENTIFIER IN IDENTIFIER OPEN_CURLY_BRACKET statement CLOSED_CURLY_BRACKET {printf("for_statement -> for identifier in identifier
{ statement }\n");}
        | FOR IDENTIFIER IN RANGE OPEN_ROUND_BRACKET range_list CLOSED_ROUND_BRACKET OPEN_CURLY_BRACKET statement CLOSED_CURLY_BRACKET
{printf("for_statement -> for identifier in range ( range_list ) { statement }\n");}
        ;
range_list : INT_CONSTANT {printf("range_list -> constant\n");}
```

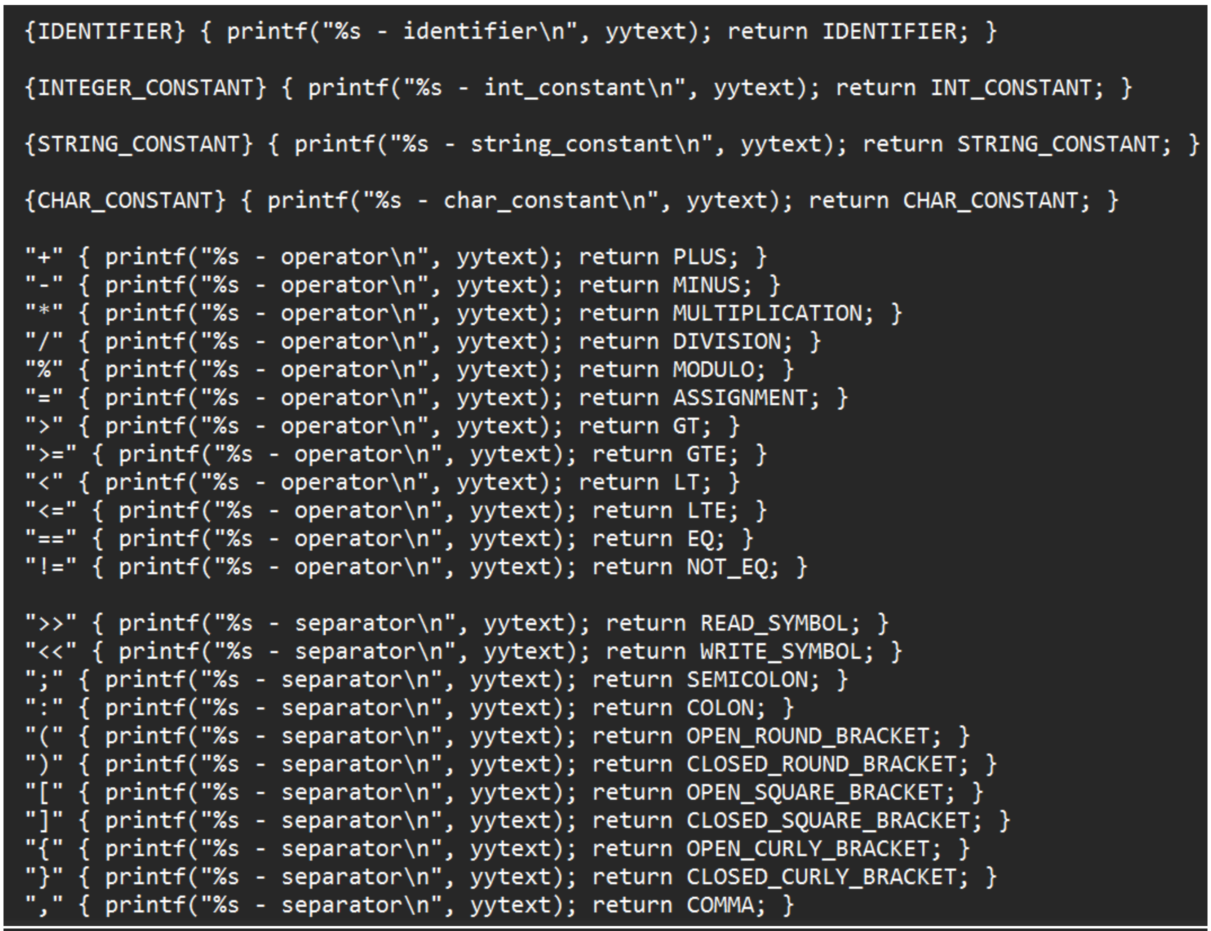


```
        ;
read_statement : READ read_helper SEMICOLON {printf("read_statement -> read read_helper ;\n");}
        ;
read_helper : READ_SYMBOL IDENTIFIER {printf("read_helper -> >> identifier\n");}
        | READ_SYMBOL IDENTIFIER OPEN_SQUARE_BRACKET IDENTIFIER CLOSED_SQUARE_BRACKET {printf("read_helper -> >> identifier [ identifier ]\n");}
        | READ_SYMBOL IDENTIFIER read_helper {printf("read_helper -> >> identifier read_helper\n");}
        ;
write_statement : WRITE write_helper SEMICOLON {printf("write_statement -> write write_helper ;\n");}
        ;
write_helper : WRITE_SYMBOL IDENTIFIER {printf("write_helper -> << identifier\n");}
        | WRITE_SYMBOL IDENTIFIER write_helper {printf("write_helper -> << identifier write_helper\n");}
        | WRITE_SYMBOL INT_CONSTANT {printf("write_helper -> << constant\n");}
        | WRITE_SYMBOL INT_CONSTANT write_helper {printf("write_helper -> << constant write_helper\n");}
        | WRITE_SYMBOL STRING_CONSTANT {printf("write_helper -> << constant\n");}
        | WRITE_SYMBOL STRING_CONSTANT write_helper {printf("write_helper -> << constant write_helper\n");}
        | WRITE_SYMBOL CHAR_CONSTANT {printf("write_helper -> << constant\n");}
        | WRITE_SYMBOL CHAR_CONSTANT write_helper {printf("write_helper -> << constant write_helper\n");}
        ;


%%

yyerror(char *s)
{
        printf("%s\n",s);
}

extern FILE *yyin;

main(int argc, char **argv)
{
        if(argc>1) yyin :  fopen(argv[1],"r");
        if(argc>2 && !strcmp(argv[2],"-d")) yydebug: 1;
        if(!yyparse()) fprintf(stderr, "\tO.K.\n");
}
```

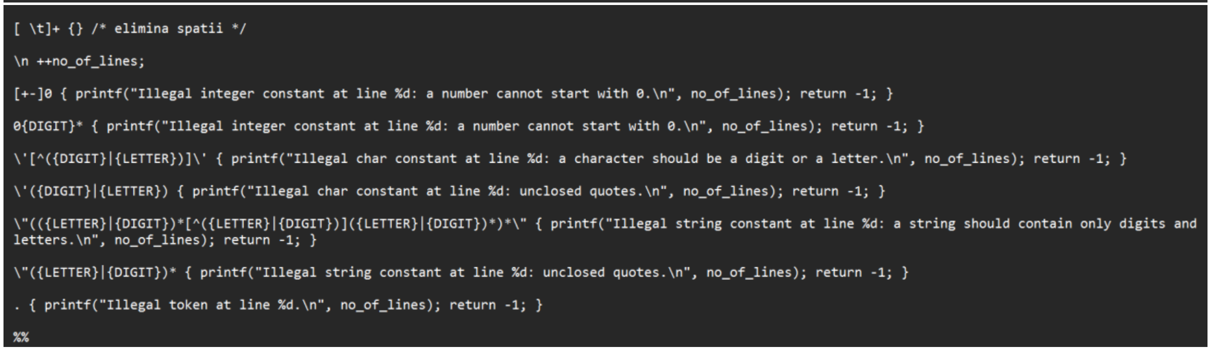
scanner.lxi:



```
%{
#include <stdio.h>
#include <string.h>
#include "parser.tab.h"
int no_of_lines = 0;
%}

%option noyywrap
%option caseless

DIGIT [0-9]
NZ_DIGIT [1-9]
LETTER [a-zA-Z]
INTEGER_CONSTANT [+-]?{NZ_DIGIT}{DIGIT}*|0
STRING_CONSTANT \"({LETTER}|{DIGIT})*\"
CHAR_CONSTANT \'({DIGIT}|{LETTER})\'
IDENTIFIER "_"{LETTER}({LETTER}|{DIGIT})*
CONSTANT {INTEGER_CONSTANT}|{STRING_CONSTANT}|{CHAR_CONSTANT}

%%

"read" { printf("%s - reserved word\n", yytext); return READ; }
"write" { printf("%s - reserved word\n", yytext); return WRITE; }
"if" { printf("%s - reserved word\n", yytext); return IF; }
"else" { printf("%s - reserved word\n", yytext); return ELSE; }
"while" { printf("%s - reserved word\n", yytext); return WHILE; }
"for" { printf("%s - reserved word\n", yytext); return FOR; }
"in" { printf("%s - reserved word\n", yytext); return IN; }
"range" { printf("%s - reserved word\n", yytext); return RANGE; }
"Integer" { printf("%s - reserved word\n", yytext); return INTEGER; }
"String" { printf("%s - reserved word\n", yytext); return STRING; }
"Char" { printf("%s - reserved word\n", yytext); return CHAR; }
"main" { printf("%s - reserved word\n", yytext); return MAIN; }
```



```
{IDENTIFIER} { printf("%s - identifier\n", yytext); return IDENTIFIER; }

{INTEGER_CONSTANT} { printf("%s - int_constant\n", yytext); return INT_CONSTANT; }

{STRING_CONSTANT} { printf("%s - string_constant\n", yytext); return STRING_CONSTANT; }

{CHAR_CONSTANT} { printf("%s - char_constant\n", yytext); return CHAR_CONSTANT; }

"+" { printf("%s - operator\n", yytext); return PLUS; }
"-" { printf("%s - operator\n", yytext); return MINUS; }
"*" { printf("%s - operator\n", yytext); return MULTIPLICATION; }
"/" { printf("%s - operator\n", yytext); return DIVISION; }
"%" { printf("%s - operator\n", yytext); return MODULO; }
"=" { printf("%s - operator\n", yytext); return ASSIGNMENT; }
">" { printf("%s - operator\n", yytext); return GT; }
">=" { printf("%s - operator\n", yytext); return GTE; }
"<" { printf("%s - operator\n", yytext); return LT; }
"<=" { printf("%s - operator\n", yytext); return LTE; }
"==" { printf("%s - operator\n", yytext); return EQ; }
"!=" { printf("%s - operator\n", yytext); return NOT_EQ; }

">>" { printf("%s - separator\n", yytext); return READ_SYMBOL; }
"<<" { printf("%s - separator\n", yytext); return WRITE_SYMBOL; }
";" { printf("%s - separator\n", yytext); return SEMICOLON; }
":" { printf("%s - separator\n", yytext); return COLON; }
"(" { printf("%s - separator\n", yytext); return OPEN_ROUND_BRACKET; }
")" { printf("%s - separator\n", yytext); return CLOSED_ROUND_BRACKET; }
"[" { printf("%s - separator\n", yytext); return OPEN_SQUARE_BRACKET; }
"]" { printf("%s - separator\n", yytext); return CLOSED_SQUARE_BRACKET; }
"{" { printf("%s - separator\n", yytext); return OPEN_CURLY_BRACKET; }
"}" { printf("%s - separator\n", yytext); return CLOSED_CURLY_BRACKET; }
"," { printf("%s - separator\n", yytext); return COMMA; }
```



```
[ \t]+ {} /* elimina spatii */

\n ++no_of_lines;

[+-]0 { printf("Illegal integer constant at line %d: a number cannot start with 0.\n", no_of_lines); return -1; }

0{DIGIT}* { printf("Illegal integer constant at line %d: a number cannot start with 0.\n", no_of_lines); return -1; }

\'[^({DIGIT}|{LETTER})]\' { printf("Illegal char constant at line %d: a character should be a digit or a letter.\n", no_of_lines); return -1; }

\'({DIGIT}|{LETTER}) { printf("Illegal char constant at line %d: unclosed quotes.\n", no_of_lines); return -1; }

\"(({LETTER}|{DIGIT})*[^({LETTER}|{DIGIT})]({LETTER}|{DIGIT})*)*\" { printf("Illegal string constant at line %d: a string should contain only digits and
letters.\n", no_of_lines); return -1; }

\"({LETTER}|{DIGIT})* { printf("Illegal string constant at line %d: unclosed quotes.\n", no_of_lines); return -1; }

. { printf("Illegal token at line %d.\n", no_of_lines); return -1; }

%%
```