<u>Expresiones Regulares:</u>

Palabras reservadas: func|end|mod|loop|cond

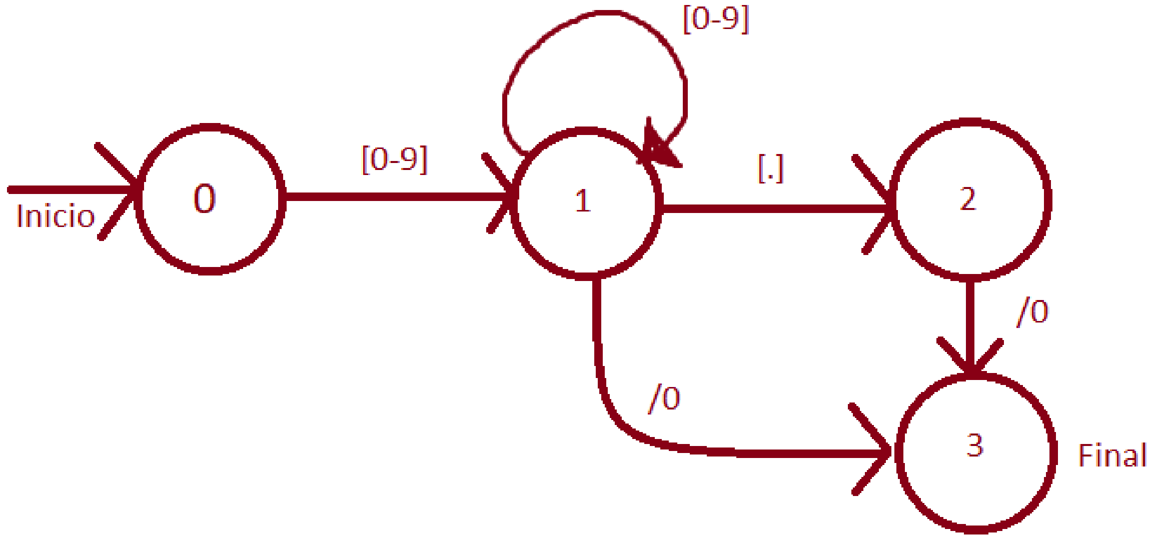
Operadores: [\+\-*\/\\^]

Identificadores: [a-zA-Z][a-zA-Z0-9]*

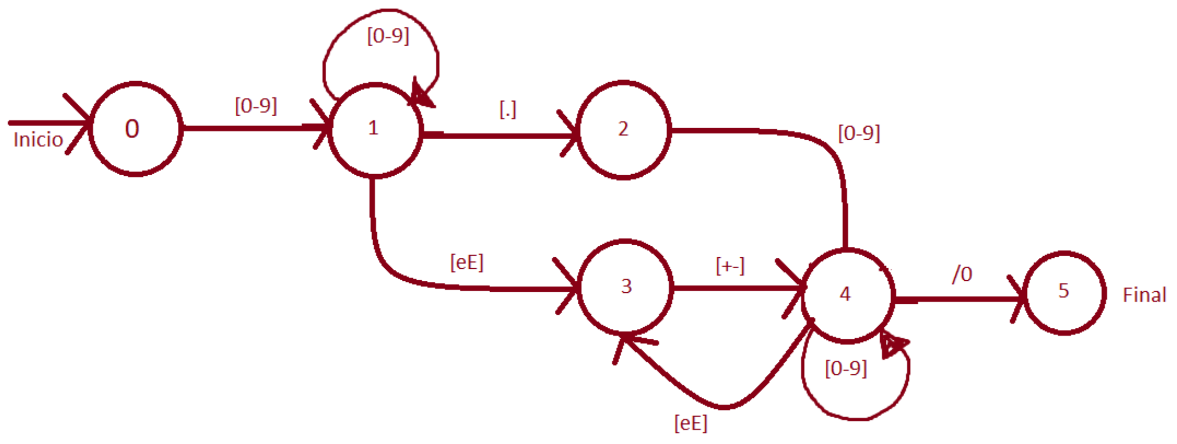
Enteros: [0-9]+L?

Reales: [-+]?([0-9]*[.][0-9]+|[0-9]+[.]?)([eE][-+]?[0-9]+)?

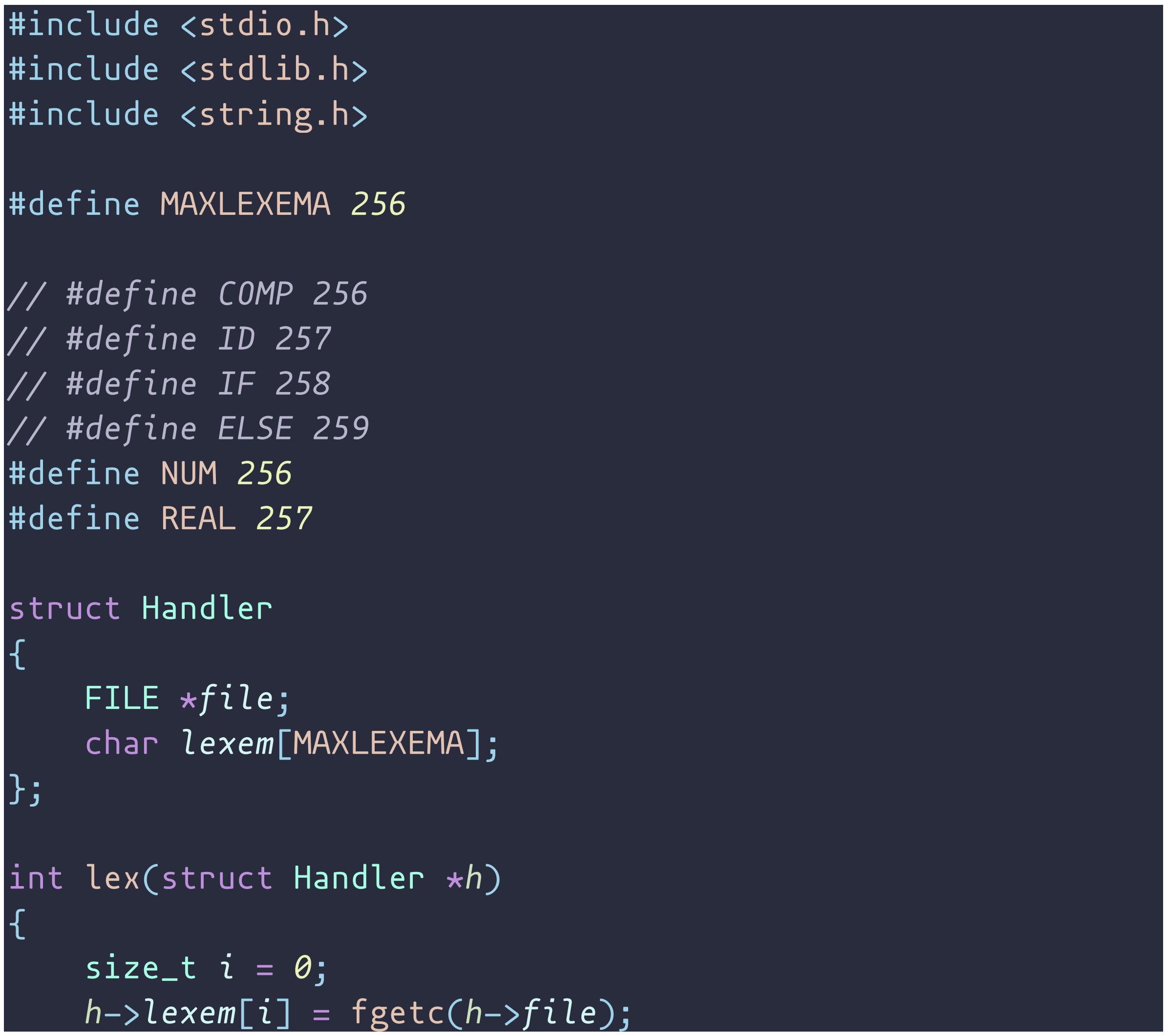
<u>Autómata Finito (Números enteros):</u>



<u>Autómata Finito (Numero reales):</u>



<u>Implementación desde 0 del Analizador léxico:</u>



```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#define MAXLEXEMA 256

// #define COMP 256
// #define ID 257
// #define IF 258
// #define ELSE 259
#define NUM 256
#define REAL 257

struct Handler
{
    FILE *file;
    char lexem[MAXLEXEMA];
};

int lex(struct Handler *h)
{
    size_t i = 0;
    h->lexem[i] = fgetc(h->file);
```

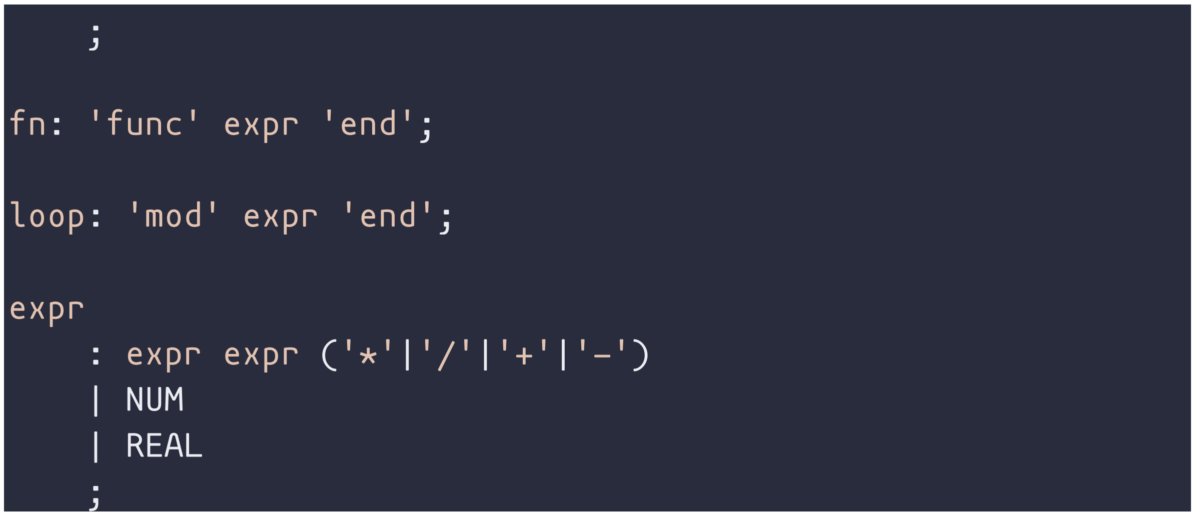
```c
    if (h->lexem[i] >= '0' && h->lexem[i] <= '9')
    {
        do
        {
            h->lexem[++i] = fgetc(h->file);
        } while (h->lexem[i] >= '0' && h->lexem[i] <= '9');
        if (h->lexem[i] == '.')
        {
            do
            {
                h->lexem[++i] = fgetc(h->file);
            } while (h->lexem[i] >= '0' && h->lexem[i] <=
'9');
            if (h->lexem[i] == 'e' || h->lexem[i] == 'E')
            {
                do
                {
                    h->lexem[++i] = fgetc(h->file);
                } while ((h->lexem[i] >= '0' && h->lexem[i]
<= '9') || (h->lexem[i] == '+' || h->lexem[i] == '-'));
                h->lexem[i] = '\0';
                ungetc(h->lexem[i], h->file);
                return REAL;
            }
            h->lexem[i] = '\0';
            ungetc(h->lexem[i], h->file);
            return REAL;
        }
        if (h->lexem[i] == 'e' || h->lexem[i] == 'E')
        {
            do
            {
                h->lexem[++i] = fgetc(h->file);
            } while ((h->lexem[i] >= '0' && h->lexem[i] <=
'9') || (h->lexem[i] == '+' || h->lexem[i] == '-'));
            h->lexem[i] = '\0';
            ungetc(h->lexem[i], h->file);
            return REAL;
        }

        h->lexem[i] = '\0';
        ungetc(h->lexem[i], h->file);
        return NUM;
    }

    return h->lexem[i] != EOF ? lex(h) : EOF;
}

int main(int argc, char *argv[])
{
    if (argc < 2)
    {
        printf("Usage: %s <sourcefile>\n", argv[0]);
        return -1;
    }
    struct Handler *handler = (struct Handler
*)malloc(sizeof(struct Handler));
    handler->file = fopen(argv[1], "r");

    int tok;
    while ((tok = lex(handler)) != EOF)
    {
        printf("Lexem (%d): %s\n", tok, handler->lexem);
    }
    fclose(handler->file);
    free(handler);
    return 0;
}
```

LEXER ANTLR:

```
lexer grammar ExprLexer;

PLUS : '+' ;
MINU : '-' ;
MULT : '*' ;
DIVI : '/' ;
BACK : '\\' ;
EXP  : '^' ;

FUNC: 'func';
END: 'end';
LOOP: 'mod';
COND: 'cond';

REAL : [-+]?([0-9]*[.][0-9]+|[0-9]+[.]?)([eE][-+]?[0-9]+)?;
NUM: [0-9]+[L]?;
ID: [a-zA-Z_][a-zA-Z_0-9]* ;
WS: [ \t\n\r\f]+ -> skip ;
```

PARSER ANTLR

```
parser grammar ExprParser;
options { tokenVocab=ExprLexer; }

program
    : lststat EOF
    ;
lststat
    : lststat stat
    |
    ;
stat
    : fn
    | loop
    | expr
```

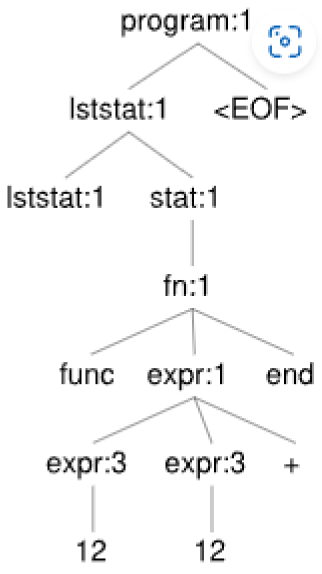


```
    ;

fn: 'func' expr 'end';

loop: 'mod' expr 'end';

expr
    : expr expr ('*'|'/'|'+'|'-')
    | NUM
    | REAL
    ;
```

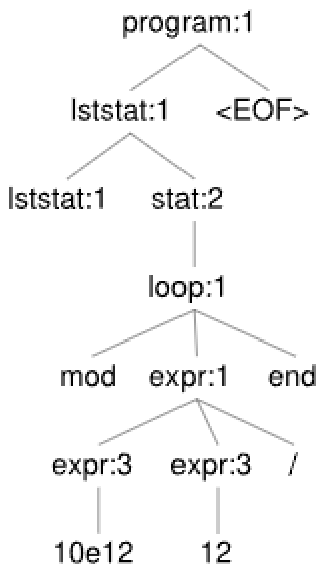
ARBOLES AST :

AST:

Ejemplo 1: Función (fn 12 12 +)



Ejemplo 2: Loop (mod 10e12 + 12 end)


program:1
lststat:1
<EOF>
lststat:1
stat:2
loop:1
mod
expr:1
end
expr:3
expr:3
/
10e12
12