

LEX

```
%{
#include <stdio.h>

int line_number = 1;

void print_token(const char* token_type, const char* yytext) {
    printf("%d: %s '%s'\n", line_number, token_type, yytext);
}
%}

%%

/* Identifiers (Variables and Constants) */
[a-zA-Z0-9]* { print_token("VARIABLE", yytext); }
[A-Z][A-Z0-9]* { print_token("CONSTANT", yytext); }

/* Numbers (Integers and Floats) */
[0-9]+\.[0-9]+ { print_token("FLOAT", yytext); }
[0-9]+ { print_token("INTEGER", yytext); }

/* Keywords */
if|else|while|return|int|float { print_token("KEYWORD", yytext); }

/* Operators */
"=="|"!="|"<="|">="|"&&"|"||" { print_token("OPERATOR", yytext); }
[+\-*/] { print_token("SIMPLE OPERATOR", yytext); }

/* String Literals */
\"([^\"]|\\\"|\\\\)*\" { print_token("STRING LITERAL", yytext); }

/* Comments */
\"/\"^[^\n]* { /* Skip single-line comment */ }
\"/*\"([^\n]|\"/\"|\"/*\")*\"/\" { /* Skip multi-line comment */ }

/* Whitespace and Newlines */
[ \t]+ { /* Skip whitespace */ }
\n { ++line_number; }

%%

int main(int argc, char **argv) {
    yylex();
    return 0;
}
```

## YACC / Bison

```
%{
#include <stdio.h>
#include <stdlib.h>

void yyerror(const char *s);
int yylex(void);
%}

%token NUMBER IDENTIFIER
%token PLUS MINUS MULTIPLY DIVIDE ASSIGN
%token LPAREN RPAREN LBRACE RBRACE
%token IF ELSE WHILE

%%
/* Production rules */
program:
    | program statement
    ;

statement:
    assignment
    | conditional
    | loop
    | '{ program }'
    ;

assignment:
    IDENTIFIER ASSIGN expression ';'
    ;

conditional:
    IF '(' expression ')' statement
    | IF '(' expression ')' statement ELSE statement
    ;

loop:
    WHILE '(' expression ')' statement
    ;

expression:
    expression PLUS term
    | expression MINUS term
    | term
    ;
```

term:

```
    term MULTIPLY factor
  | term DIVIDE factor
  | factor
  ;
```

factor:

```
    NUMBER
  | IDENTIFIER
  | LPAREN expression RPAREN
  ;
```

%%

/\* Auxiliary functions \*/

```
void yyerror(const char *s) {
    fprintf(stderr, "Error: %s\n", s);
}
```

```
int main(void) {
    printf("Enter your code:\n");
    yyparse();
    return 0;
}
```