EXP NO: 3 **DATE: 26.02.25**

DEVELOP A LEXICAL ANALYZER TO RECOGNIZE A FEW PATTERNS IN C. (EX.IDENTIFIERS, CONSTANTS, COMMENTS, AND OPERATORS , ETC.) USING LEX TOOL.

AIM:

To develop a Lexical Analyzer using the LEX tool that recognizes different tokens in a given C program snippet, including Identifier, Constants, Comments, Operators, Keywords, Special Symbols.

ALGORITHM:

- **Start**
- Define token patterns in **LEX** for:
  - **Keywords** (e.g., int, float, if, else)
  - **Identifiers** (variable/function names)
  - **Constants** (integer and floating-point numbers)
  - **Operators** (+, -, =, ==, !=, *, /)
  - **Comments** (// single-line, /* multi-line */)
  - **Special Symbols** ({, }, (,), ;, ,)
- Read input source code.
- Match the code tokens using LEX rules.
- Print each recognized token with its type.
- **End**

PROGRAM:

```
%{
#include <stdio.h>
%}
%option noyywrap
%%
// Keywords
"int"|"float"|"char"|"double"|"if"|"else"|"return"|"for"|"while"|"do" {
   printf("Keyword: %s\n", yytext);
}
// Identifiers (starting with a letter or underscore, followed by letters, digits, or underscores)
[a-zA-Z_][a-zA-Z0-9_]* {
   printf("Identifier: %s\n", yytext);
}
// Constants (integer and floating-point numbers)
[0-9]+(\.[0-9]+)? {
   printf("Constant: %s\n", yytext);
}
// Operators
"+"|"-"|"*"|"/"|"="|"=="|"!="|"<"|">"|"&&"|"||"|"++"|"--" {
   printf("Operator: %s\n", yytext);
```

```
}
// Single-line comments
"//".* {
    printf("Comment: %s\n", yytext);
}
// Multi-line comments
"/*"([^*]|\*+[^*/])*\*+"/" {
    printf("Multi-line Comment: %s\n", yytext);
}
// Special symbols
";"|","|"("|")"|"{"|"}"|"["|"]" {
    printf("Special Symbol: %s\n", yytext);
}
// Ignore whitespaces and newlines
[ \t\n] ;

%%
int main() {
    printf("Enter a C code snippet:\n");
    yylex();
    return 0;
}
```

OUTPUT:

```
lex lexer.l

cc lex.yy.c -o lexer

./a.out
```

Sample Input

```
int main() {
    int a = 10;
    float b = 20.5;
    /* This is a multi-line comment */
    if (a > b) {
        a = a + b;
    }
    return 0;
}
```

```
Keyword: int
Identifier: main
Special Symbol: (
Special Symbol: )
Special Symbol: {
Keyword: int
Identifier: a
Operator: =
Constant: 10
Special Symbol: ;
Keyword: float
Identifier: b
Operator: =
Constant: 20.5
Special Symbol: ;
Multi-line Comment: /* This is a multi-line comment */
Keyword: if
Special Symbol: (
Identifier: a
Operator: >
Identifier: b
Special Symbol: )
Special Symbol: {
Identifier: a
```

RESULT:

Thus the above program reads a C code snippet, tokenizes it using LEX rules, recognizes and categorizes keywords, identifiers, constants, operators, comments, and special symbols, and then displays each token along with its type.