

EXP NO -7

**RECOGNIZE A VALID CONTROL STRUCTURES SYNTAX OF C LANGUAGE  
(FOR LOOP, WHILE LOOP, IF-ELSE, IF-ELSE-IF, SWITCH CASE, ETC.,)**

**AIM:**

To design and implement a LEX and YACC program that recognizes the syntax of common control structures in C programming.

**PROGRAM**

**LEX CODE:** cs.l

```
%{
#include "y.tab.h"
%}

%option noyywrap

%%

"if"      { return IF; }
"else"    { return ELSE; }
"for"     { return FOR; }
"while"   { return WHILE; }
"switch"  { return SWITCH; }
"case"    { return CASE; }
"default" { return DEFAULT; }

[0-9]+    { return NUMBER; }
[a-zA-Z_][a-zA-Z0-9_]* { return IDENTIFIER; }

"=="|"!="| "<="| ">="| "<"| ">" { return REL_OP; }
"+"|"-"|"*"|"/" { return ARITH_OP; }

"="       { return ASSIGN_OP; } // Handle assignment operator

"("       { return LPAREN; }
")"       { return RPAREN; }
"{"       { return LBRACE; }
"}"       { return RBRACE; }
";"       { return SEMICOLON; }
":"       { return COLON; }
\n        { return '\n'; }

[ \t]     ; // Ignore whitespace

.         { printf("Invalid character: %s\n", yytext); }

%%
```

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## YACC CODE: cs.y

```
%{
#include <stdio.h>
#include <stdlib.h>
void yyerror(const char *s);
int yylex(void);
%}

%token IF ELSE FOR WHILE SWITCH CASE DEFAULT IDENTIFIER REL_OP ARITH_OP ASSIGN_OP
%token LPAREN RPAREN LBRACE RBRACE SEMICOLON COLON NUMBER

%start program

%%

program:
    statements '\n'
    ;

statements:
    statement
    | statements statement
    ;

statement:
    if_statement
    | for_loop
    | while_loop
    | switch_case
    | assignment SEMICOLON
    ;

if_statement:
    IF LPAREN condition RPAREN LBRACE statements RBRACE
    | IF LPAREN condition RPAREN LBRACE statements RBRACE ELSE LBRACE statements RBRACE
    ;

for_loop:
    FOR LPAREN assignment SEMICOLON condition SEMICOLON assignment RPAREN LBRACE statements RBRACE
    ;

while_loop:
    WHILE LPAREN condition RPAREN LBRACE statements RBRACE
    ;

switch_case:
    SWITCH LPAREN expression RPAREN LBRACE case_statements RBRACE
    ;

case_statements:
```

```

CASE expression COLON statements
| case_statements CASE expression COLON statements
| case_statements DEFAULT COLON statements
;

condition:
    IDENTIFIER REL_OP IDENTIFIER
| IDENTIFIER REL_OP NUMBER
| NUMBER REL_OP IDENTIFIER
| NUMBER REL_OP NUMBER
;

assignment:
    IDENTIFIER ASSIGN_OP expression
;

expression:
    IDENTIFIER
| NUMBER
| expression ARITH_OP expression
;

%%

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

int main() {
    printf("Enter C control structures for validation (end with Enter):\n");
    yyparse();
    return 0;
}

```

## OUTPUT

```

Enter C control structures for validation (end with Enter):
if (x<0) { y=x+1; }

```

## RESULT:

Thus the above program to recognize a valid control structures syntax of c language (for loop, while loop, if-else, if-else-if, switch case as been implemented and executed successfully with LEX and YACC.

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