

Practical 7
Compiler Construction
2CS701

Mistry Unnat
20BCE515



Department of Computer Science and Engineering
Institute of Technology
Nirma University
Ahmedabad

Aim :

To implement grammar rules for control statements, and Loop control.

lab_7.y

```
%{
#include<stdio.h>
int yylex();
void yyerror(char *msg);
void yywrap();
int count_for=0,count_if=0,count_while=0,count_switch=0,count_do_while=0;
extern int line;
%}
%token FOR IF ELSE WHILE DO SWITCH CASE DEFAULT BREAK REOP DT AROP1 ID INT_CONST
BOOL_CONST CHAR_CONST STR_CONST
%%
SS : SS S
    | S
    ;
S : FOR_STMT
    | IF_STMT
    | WHILE_STMT
    | DO_WHILE_STMT
    | SWITCH_STMT
    | BLOCK
    | ';'
    ;
FOR_STMT : FOR '(' ASMT ';' COND ';' INCR ')' S {count_for++;} ;
WHILE_STMT : WHILE '(' COND ')' S {count_while++;} ;
DO_WHILE_STMT : DO '{' S '}' WHILE '(' COND ')' ';' {count_do_while++;} ;
IF_STMT : IF '(' COND ')' S {count_if++;}
        | IF '(' COND ')' S ELSE S {count_if++;}
        ;
SWITCH_STMT : SWITCH '(' ID ')' '{' CASE_STMTS DEFAULT_STMT '}' {count_switch++;}
            ;
CASE_STMTS : CASE_STMT CASE_STMTS
            | CASE_STMT
            ;
CASE_STMT : CASE CONST ':' SS BREAK ';'
          ;
DEFAULT_STMT : DEFAULT ':' SS
            ;
BLOCK : '{' SS '}'
      ;
ASMT : DT ID '=' INT_CONST
```

```

        | DT ID '=' ID
        | ID '=' INT_CONST
    ;
COND  : ID REOP ID
        | ID REOP CONST
        | CONST REOP ID
        | CONST REOP CONST
    ;
INCR  : ID AROP1
    ;

```

```

CONST : INT_CONST
        | CHAR_CONST
        | BOOL_CONST
        | STR_CONST
    ;

```

```
%%
```

```

int main()
{
    yypars
    e();
    return
    0;
}
void yyerror(char *msg)
{
    printf("\nError Message :- %s.... statements are not following grammer rules at %d",msg,line);
}
void yywrap()
{
    printf("\nNumber of for loop is %d",count_for);
    printf("\nNumber of while loop is %d",count_while);
    printf("\nNumber of do while loop is %d",count_do_while);
    printf("\nNumber of if statements is %d",count_if);
    printf("\nNumber of switch statements is %d",count_switch);
}

```

lab_7.1

```
%{
#include "y.tab.h"
int line=1;
}%

%%
"\n" {printf("");line++;}
"\t"|" " {printf("");}
"++"|"--" {return AROP1;}
"int"|"float"|"double"|"char" {return DT;}
"=="|"!="|"<"|">"|<="|>=" {return REOP;}
[(){}:=] {return yytext[0];}
[0-9]+ {return
INT_CONST;}
['.['] {return
CHAR_CONST;}
"true"|"false" {return BOOL_CONST;}
[".*["] {return STR_CONST;}
"for" {return FOR;}
"if" {return IF;}
"else" {return
ELSE;}
"while" {return WHILE;}
"do" {return DO;}
"switch" {return
SWITCH;} "case" {return
CASE;}
"default" {return
DEFAULT;} "break" {return
BREAK;}
([_a-zA-Z](0-9)*)+ {return ID;}
%%
```

Screenshots



```
input_7 - Notepad
File Edit Format View Help
for(int i=0;i<c;i++)
{
    if(c<d)
    {
        for(int i=0;i<c;i++)
        {
            if(c<d)
            {
                while(a==b)
                {
                    if(c!=d)
                    {;}
                }
            }
        }
    }
}
if(c<d)
{
    while(a!=c)
    {
        do
        {
            switch(ch)
            {
                case 'a':
                {;}
                break;
                default:
                {;}
            }
        }while(c<d);
    }
}
;
```

Microsoft Windows [Version 10.0.22000.318]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd C:\CC\Practical 7

C:\CC\Practical 7>bison -dy lab_7.y
conflicts: 1 shift/reduce

C:\CC\Practical 7>flex lab_7.l

C:\CC\Practical 7>gcc lex.yy.c y.tab.c

C:\CC\Practical 7>a.exe < input_7.txt

Number of for loop is 2

Number of while loop is 2

Number of do while loop is 1

Number of if statements is 4

Number of switch statements is 1

C:\CC\Practical 7>_

```
input_7 - Notepad
File Edit Format View Help
for(int i=0;i<c;i++)
{
    if(c<d)
    {
        for(int i=0;i<c;i++)
        {
            if(c<d)
            {
                while(a==b)
                {
                    if(c!=d)
                    {;}
                }
            }
        }
    }
}
if(c<d)
{
    while(a!=c)
    {
        do
        {
            switch(ch)
            {
                case 'a':
                {;}
                break;
                default:
                {;}
            }
        }while(c<d)
    }
}
;
```

```
C:\CC\Practical 7>a.exe < input_7.txt
Error Message :- syntax error.....statements are not following grammer rules at 33
C:\CC\Practical 7>
```

END
