

NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR

Cachar, Assam

B.Tech. VIth Sem

Subject Code: CS-316

Subject Name: Compiler Design Lab

Submitted By:

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Branch : CSE – B

1. Write a yacc program to evaluate an arithmetic expression involving +, -, ×, ÷.

→ CODE:

LEX (lab5_1.l)

```
%{
    #include "lab5_1.tab.h"
    extern int yyval;
}%

%%
[0-9]+ {
    yyval = atoi (yytext);
    return NUM;
}
[a-zA-Z]+ {return ID;}
[+] {return '+';}
[-] {return '-'};
[*] {return '*'};
[/] { return '/'};
[ \t]+ {};
\n {return 0;}
. {return yytext[0];}
%%

int yywrap(){
    return 1;
}
```

YACC (lab5_1.y)

```
%{
    #include <stdio.h>
    int flag = 0;
}%

%token NUM ID
%left '-' '+'
%right '*' '/'

%%
start: exp {
    if (!flag)
        printf ("RESULT = %d\n", $$);
    return 0;
}
exp: exp '+' exp {$$ = $1 + $3;}
| exp '-' exp {$$ = $1 - $3;}
```

```

|exp '*' exp {$$ = $1 * $3;}
|exp '/' exp {
    if ($3 == 0)
        yyerror ("DENOMENATOR ZERO: MATH ERROR!");
    else
        $$ = $1 / $3;
}
| '-' NUM {$$ = -$2;}
| '-' ID {$$ = -$2;}
| '(' exp ')' {$$ = $2;}
| NUM {$$ = $1;}
| ID {$$ = $1;}
%%

int main () {
    printf ("WRITE YOUR EXPRESSION:\n");
    yyparse ();
    if (flag == 0)
        printf ("VALID ARITHMETIC EXPRESSION!");
    return 0;
}

int yyerror (char *str) {
    printf ("\nINVALID ARITHMETIC EXPRESSION\n%s", str);
    flag = 1;
    return 0;
}

```

OUTPUT:

```

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> yacc -d lab5_1.y
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> lex lab5_1.l
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> cc lex.yy.c lab5_1.tab.c
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> ./a.exe
WRITE YOUR EXPRESSION:
5 + (3 - 2) / 1
RESULT = 6
VALID ARITHMETIC EXPRESSION!
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> ./a.exe
WRITE YOUR EXPRESSION:
3 / 0

INVALID ARITHMETIC EXPRESSION
DENOMENATOR ZERO: MATH ERROR!
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> ./a.exe
WRITE YOUR EXPRESSION:
5 * / 4

INVALID ARITHMETIC EXPRESSION
syntax error
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V>

```

2. Write a yacc program to recognise nested "IF" control statements, and display the number of levels of listing.

→ CODE:

LEX (lab5_2.l)

```
%{
    #include "lab5_2.tab.h"
}%

%%
"if" {return IF;}
[sS][0-9]* {return SS;}
"<"| ">"| "=="| "!="| "<="| ">=" {return RELOP;}
[0-9]+ {return NUMBER;}
[a-zA-Z][a-zA-Z0-9_]* {return ID;}
[ \t]+ {};
\n {return 0;}
. {return yytext[0];}
%%

int yywrap() {
    return 1;
}
```

YACC (lab5_2.y)

```
%{
    #include <stdio.h>
    #include <stdlib.h>
    int count = 0;
}%

%token IF RELOP SS NUMBER ID

%%
start: ifStatement {
    printf ("NUMBER OF NESTED \"IF\" STATEMENTS = %d\n", count);
    return 0;
}
ifStatement: IF '(' cond ')' '{' ifStatement '}' {++count;}
| SS {;}
cond: x RELOP x {;}
x: ID | NUMBER {;};
%%

int main () {
    printf ("ENTER THE STATEMENT:\n");
```

```

    yyparse ();
    return 0;
}

int yyerror (char *str) {
    printf ("INVALID EXPRESSION!");
    exit (0);
}

```

OUTPUT:

```

PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> yacc -d lab5_2.y
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> lex lab5_2.l
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> cc lex.yy.c lab5_2.tab.c
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> ./a.exe
ENTER THE STATEMENT:
if (a>b) {if (a>b) {s}}
NUMBER OF NESTED "IF" STATEMENTS = 2
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> ./a.exe
ENTER THE STATEMENT:
if (a < b) {s}
NUMBER OF NESTED "IF" STATEMENTS = 1
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> ./a.exe
ENTER THE STATEMENT:
if (a == b) {if (a != c) {if (a != d) {s}}
INVALID EXPRESSION!
PS D:\Documents\NITS\Semester VI\LAB) CS316 Compiler Design\LAB V> 

```