S. B. JAIN INSTITUTE OF TECHNOLOGY, MANAGEMENT & RESEARCH, NAGPUR.

Practical No. 5

AIM: Construct a program to convert an Infix expression into Postfix expression using Lex and Yacc.

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AIM: Construct a program to convert an Infix expression into Postfix expression using Lex and Yacc.

OBJECTIVE / EXPECTED LEARNING OUTCOME:

The objectives and expected learning outcome of this practical are:

- To get acquainted with Syntax Directed Translation Scheme (SDTS).
- To demonstrate the of use Lex and Yacc for implementation of SDTS.

HARDWARE AND SOFTWARE REQUIRMENTS:

Hardware Requirement:

- Processor: Dual Core
- RAM: 1GB
- Hard Disk Drive: > 80 GB

THEORY:

1) Description about SDTS scheme

2) Semantic actions and its implementation in YACC

3) S-attributed and L-attributed Definitions

4) Top down and bottom-up evaluation of semantic actions

ALGORITHM / PROCEDURE:

CODE:

Lex Code:

```
%{
#include"y.tab.h"
extern int yylval;
%}
%%
[0-9]+    {yylval=atoi(yytext); return NUM;}
\n        return 0;
.         return *yytext;
%%

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

Yacc Code:

```
%{
#include <stdio.h>
int yylex();    // Declaration of yylex()
int yyerror(char *msg);   // Declaration of yyerror()
%}

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

%%
S:  E { printf("\n"); }
    ;

E:  E '+' E { printf("+"); }
    | E '*' E { printf("*"); }
    | E '-' E { printf("-"); }
    | E '/' E { printf("/"); }
    | '(' E ')'
    | '-' E %prec NEGATIVE { printf("-"); }
    | NUM { printf("%d", yylval); }
    ;

%%

int main() {
    yyparse();
    return 0;
}

int yyerror(char *msg) {
    printf("error YACC: %s\n", msg);
    return 1;
}
```

OUTPUT:

```
csc15@linux-p2-1272i1:~/CS22130$ vi Practical5.l
csc15@linux-p2-1272i1:~/CS22130$ vi Practical5.y
csc15@linux-p2-1272i1:~/CS22130$ yacc -d Practical5.y
csc15@linux-p2-1272i1:~/CS22130$ flex Practical5.l
csc15@linux-p2-1272i1:~/CS22130$ cc lex.yy.c y.tab.c
csc15@linux-p2-1272i1:~/CS22130$ ./a.out
2+6*2-5/3
262*+53/-
csc15@linux-p2-1272i1:~/CS22130$ ./a.out
2+6/7*6
267/6*+
csc15@linux-p2-1272i1:~/CS22130$
```

CONCLUSION:

DISCUSSION AND VIVA VOCE:

Q1: What is SDTS?

Q2: What do you mean by S-attributed definition and L-attributed definition?

Q3: How attributes are represented in Yacc?

Q4: Differentiate between synthesized attribute and inherited attribute?

REFERENCE:

- Book: Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers Principles, Techniques and Tools", Pearson Education, 2nd edition. 2010.
- Book: Compiler Design by O.G. Kakde, Laxmi Publications, 2006.
- Lab Manual of Compiler Design (Institute of Aeronautical Engineering, Dundigal, Hyderabad).