Ex No: 7

Date:

EVALUATE EXPRESSION THAT TAKES DIGITS, *, + USING LEX AND YACC

AIM:

To perform arithmetic operations that takes digits,*, + using lex and yacc.

ALGORITHM:

- Using the flex tool, create lex and yacc files.
- In the definition section of the lex file, declare the required header files along with an external integer variable yylval.
- In the rule section, if the regex pertains to digit convert it into integer and store yylval. Return the number.
- In the user definition section, define the function yywrap()
- In the definition section of the yacc file, declare the required header files along with the flag variables set to zero. Then define a token as number along with left as '+' , '-'

, 'or' , '*' , '/' , '%' or '(' ')'

- In the rules section, create an arithmetic expression as E. Print the result and return zero.
- Define the following:
  - E: E '+' E (add)
  - E: E '-' E (sub)
  - E: E '*' E (mul)
  - E: E '/' E (div)

  If it is a single number, return the number.
- In driver code, get the input through yyparse(); which is also called as main function.
- Declare yyerror() to handle invalid expressions and exceptions.
- Build lex and yacc files and compile.

PROGRAM:

evaluate.l:

```
%{
#include<stdio.h>
#include "y.tab.h"
extern int yylval;
%}

%%
[0-9]+ {
        yylval=atoi(yytext);
        return NUMBER;
        }
[\t] ;
[\n] return 0;
. return yytext[0];
%%
int yywrap()
{
return 1;
}
```

evaluate.y:

```
%{
        #include<stdio.h>
        int flag=0;
%}
%token NUMBER
%left '+' '-'
%left '*' '/' '%'
%left '(' ')'
%%

ArithmeticExpression: E{
        printf("\nResult=%d\n",$$);
        return 0;
        }
E:E'+'E {$$=$1+$3;}
 |E'-'E {$$=$1-$3;}
 |E'*'E {$$=$1*$3;}
 |E'/'E {$$=$1/$3;}
```

```
 |E'%'E {$$=$1%$3;}
 |'('E')' {$$=$2;}
 | NUMBER {$$=$1;}
;
%%


void main()
{
   printf("\nEnter Any Arithmetic Expression which can have operations
Addition,        Subtraction, Multiplication, Divison, Modulus and Round
brackets:\n");
   yyparse();
  if(flag==0)
   printf("\nEntered arithmetic expression is Valid\n\n");

}

void yyerror()
{
   printf("\nEntered arithmetic expression is Invalid\n\n");
   flag=1;
}
```

OUTPUT:

```
thamizh@thamizh-HP-Pavilion-Laptop-15-eg2xxx:~/Desktop/CD_Record$ lex 286_exp4.l
thamizh@thamizh-HP-Pavilion-Laptop-15-eg2xxx:~/Desktop/CD_Record$ yacc -d 286_expp4.y
thamizh@thamizh-HP-Pavilion-Laptop-15-eg2xxx:~/Desktop/CD_Record$ cc lex.yy.c y.tab.c
y.tab.c: In function ‘yyparse’:
y.tab.c:1010:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
 1010 |       yychar = yylex ();
      |                ^~~~~
y.tab.c:1170:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
 1170 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
      |       yyerrok
thamizh@thamizh-HP-Pavilion-Laptop-15-eg2xxx:~/Desktop/CD_Record$ ./a.out

Enter any arithmetic expression with addition:
45+36

Result = 81
```

RESULT :