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;
         }
```

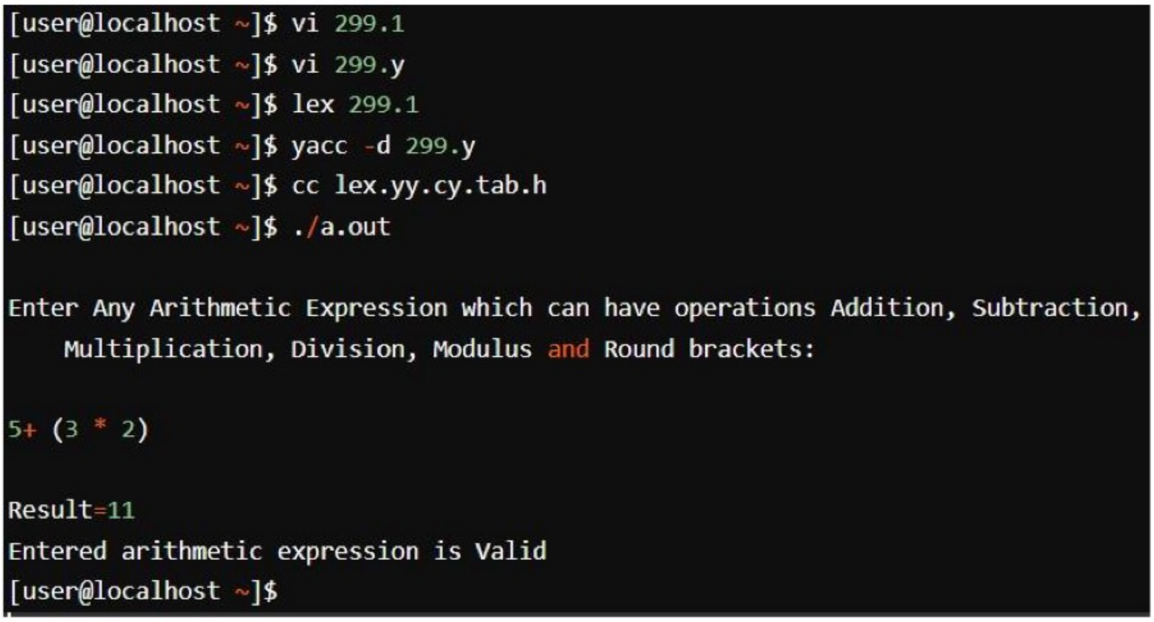
```
          E:E'+'E {$$=$1+$3;}   |E'-
          'E {$$=$1-$3;}   |E'*'E
          {$$=$1*$3;}  |E'/'E
          {$$=$1/$3;}
 |E'%'E {$$=$1%$3;}
 |'('E')' {$$=$2;}
 | NUMBER {$$=$1;}
;
%%


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:



```
[user@localhost ~]$ vi 299.1
[user@localhost ~]$ vi 299.y
[user@localhost ~]$ lex 299.1
[user@localhost ~]$ yacc -d 299.y
[user@localhost ~]$ cc lex.yy.cy.tab.h
[user@localhost ~]$ ./a.out

Enter Any Arithmetic Expression which can have operations Addition, Subtraction,
    Multiplication, Division, Modulus and Round brackets:

5+ (3 * 2)

Result=11
Entered arithmetic expression is Valid
[user@localhost ~]$
```

RESULT: