**Ex No: 7**

**Date:2/4/24**
   **EVALUATE EXPRESSION THAT TAKES DIGITS, *, + USING LEX AND YACC**

**AIM:**

   Toperformarithmeticoperations that takes digits,*, + usinglexandyacc.

**ALGORITHM:**

- Define rules in evaluate.l to recognize digits and ignore whitespace, returning tokens for numbers. Utilize yylval to pass token values to parser.

- Break down input into tokens (numbers) in evaluate.l, associating each with its respective value.

- Use parser (evaluate.y) to implement grammar rules for arithmetic expressions, considering precedence and associativity of operators. Generate a result for each expression.

- Implement error handling in evaluate.y to detect invalid expressions. Set a flag if errors occur during parsing.

- After parsing, check if the flag remains unset. If so, indicate that the arithmetic expression is valid; otherwise, display an error message.

**PROGRAM:**

**evaluate.l:**

```
%{
#include<stdio.h>
#include "y.tab.h"
externintyylval;
%}

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

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**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");

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

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**OUTPUT:**

```
thirueswaran@thirueswaran-Inspiron-3443:~$ touch 290_ex7.l
thirueswaran@thirueswaran-Inspiron-3443:~$ touch 290_ex7.y
thirueswaran@thirueswaran-Inspiron-3443:~$ lex 290_ex7.l
thirueswaran@thirueswaran-Inspiron-3443:~$ yacc -d 290_ex7.y
```

```
thirueswaran@thirueswaran-Inspiron-3443:~$ yacc -d 290_ex7.y
thirueswaran@thirueswaran-Inspiron-3443:~$ cc lex.yy.c y.tab.c
```

```
thirueswaran@thirueswaran-Inspiron-3443:~$ ./a.out

Enter Any Arithmetic Expression which can have operations Addition,Subtraction, Multiplication, Divison, Modulus and Round brack
ets:
2+3

Result=5

Entered arithmetic expression is Valid
thirueswaran@thirueswaran-Inspiron-3443:~$ ./a.out

Enter Any Arithmetic Expression which can have operations Addition,Subtraction, Multiplication, Divison, Modulus and Round brack
ets:
4+5

Result=9

Entered arithmetic expression is Valid
```

**RESULT:**

Thus to evaluate expression that takes digits,*, + using lex and yacc tool has been executed successfully.

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