

**National Institute Of Technology Surathkal Mangalore Karnataka-575025**

**Department Of Information Technology**



**Lab Assignment :- 05**

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**Branch:- Information Technology (B.Tech)**

**Section :- S13**

**Course :- Automata And Compiler Design (IT250)**

**Submitted To:-**

**Anupama H C Mam**

## 1<sup>st</sup> Question

```
////////////////////////////////Calc.l////////////////////////////////
```

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

/* Rule Section */
%%
[0-9]+ {
    yylval=atoi(yytext);
    return NUMBER;

}
[\\t] ;//for all the remaining cases.

[\\n] return 0;

. return yytext[0];

%%

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

```
////////////////////////////////Calc.y////////////////////////////////
```

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

%token NUMBER

%left '+' '-'
%left '*' '/' '%'
%left '(' ')'

%%
```

```

ArithmeticExpression:/* Define the top-level production for parsing an
arithmetic expression */
    E {
        /* Print the result and return 0 */
        printf("\nResult=%d\n", $$);
        return 0;
    };

/* Define the recursive production for handling arithmetic expressions */
E:
    E '+' E {
        /* Evaluate the addition operation */
        $$ = $1 + $3;
    }
    |
    E '-' E {
        /* Evaluate the subtraction operation */
        $$ = $1 - $3;
    }
    |
    E '*' E {
        /* Evaluate the multiplication operation */
        $$ = $1 * $3;
    }
    |
    E '/' E {
        /* Evaluate the division operation */
        $$ = $1 / $3;
    }
    |
    E '%' E {
        /* Evaluate the modulo operation */
        $$ = $1 % $3;
    }
    |
    '(' E ')' {
        /* Evaluate the expression inside the parentheses */
        $$ = $2;
    }
    |
    NUMBER {
        /* Assign the numeric value to the result */
        $$ = $1;
    };

%%

```

```

/* Driver code */
void main()
{
    printf("\nEnter any arithmetic expression: ");

    /* Parse the input expression */
    yyparse();

    /* If the flag is 0, the expression is valid */
    if (flag == 0) {
        printf("\nValid\n\n");
    }
}

/* Error handling function */
void yyerror()
{
    printf("\nInvalid\n\n");
    flag = 1;
}

```

**Input:-**

**$(5 ^ 12 * 4 / 2486 + ( 578 - 124) / 4)$  Output: Invalid.**

**$4 * 3.142 * r * r$  Output: 12 (if we assume  $r=3$ ).**

**OutPut:-**

```

chinnu@LAPTOP-0S1VCA7E: / x + ~
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ lex calc.l
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ yacc -d calc.y
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ gcc lex.yy.c y.tab.c -w
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ ./a.out
Enter any arithmetic expression: (2+3)

Result=5
Valid
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ ./a.out
Enter any arithmetic expression: ((5+3)/4)*3

Result=6
Valid
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ ./a.out
Enter any arithmetic expression: (2 * 4) + (4 / 5) + 5 - 2 - 1 * 7 %

Invalid
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ ./a.out
Enter any arithmetic expression: (5*12*4/2486+(578-124)/4))

Invalid
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ ./a.out
Enter any arithmetic expression: 4*3.142*3*3

Result=12
Valid
chinnu@LAPTOP-0S1VCA7E:/mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/question 1$ |

```

## 2<sup>nd</sup> Question

```
//////////Calc.l//////////

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

int yywrap(){
    return 1;
}

//////////Calc.y//////////

%{
#include<stdio.h>
#include<string.h>
char postfix[100] = "";
}%

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

S:  E {
        printf("\nPostfix: %s\n", postfix);
        printf("Result=%d\n", $$);
        printf("Password: %s_e%d\n", postfix, $$);
    }
;

E:  E '+' E {printf("+");sprintf(postfix+strlen(postfix), "+");$$=$1+$3;}
    | E '*' E {printf("*");sprintf(postfix+strlen(postfix), "*");$$=$1*$3;}
    | E '-' E {printf("-");sprintf(postfix+strlen(postfix), "-");$$=$1-$3;}
    | E '/' E {printf("/");sprintf(postfix+strlen(postfix), "/");$$=$1/$3;}
    | '(' E ')' {$$=$2;}
    | '-' E %prec NEGATIVE {printf("-");sprintf(postfix+strlen(postfix), "-");$$=-$2;}

```

```

        |   NUM      {printf("%d", yylval);sprintf(postfix+strlen(postfix), "%d",
yylval);$$=$$1;}
        ;
%%

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

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

```

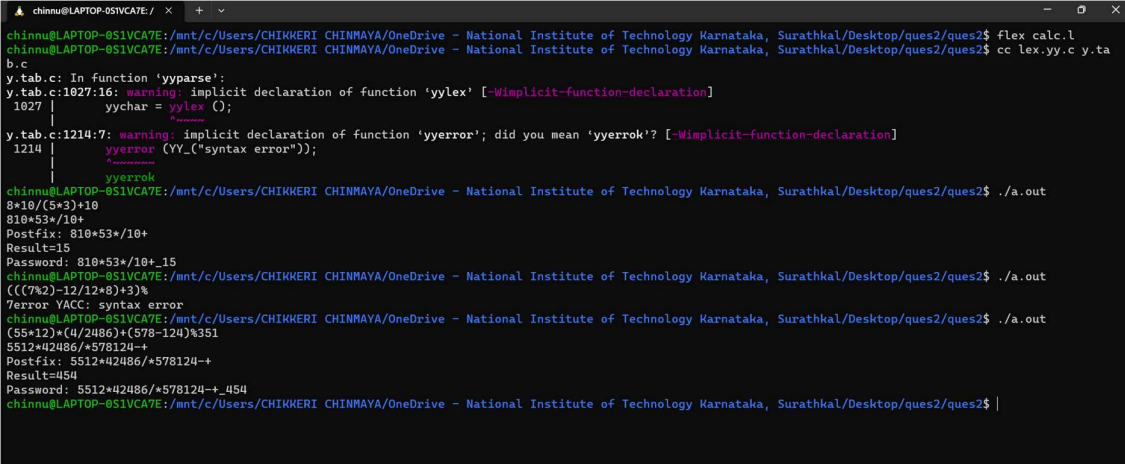
## Input:-

\* here i have assumed '^' to be '\*' as using it for power was causing integer overflow

(( (7 % 2) - 12 / 12 \* 8) + 3) % output: Syntax error

t: (55 \* 12 ) \* (4 / 2486) + ( 578 - 124) % 351

## Out Put:-



```

chinnu@LAPTOP-051VCA7E: /mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/ques2/ques2$ flex calc.l
chinnu@LAPTOP-051VCA7E: /mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/ques2/ques2$ cc lex.yy.c y.tab.c
y.tab.c: In function 'yyparse':
y.tab.c:1027:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
1027 |     yychar = yylex ();
      |              ^~~~~~
y.tab.c:1214:7: warning: implicit declaration of function 'yyerror'; did you mean 'yyerrok'? [-Wimplicit-function-declaration]
1214 |     yyerror (YY_("syntax error"));
      |     ^~~~~~
chinnu@LAPTOP-051VCA7E: /mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/ques2/ques2$ ./a.out
8*10/(5*3)+10
810*53*/10+
Postfix: 810*53*/10+
Result:15
Password: 810*53*/10+_15
chinnu@LAPTOP-051VCA7E: /mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/ques2/ques2$ ./a.out
(((7%2)-12/12*8)+3)%
?error YACC: syntax error
chinnu@LAPTOP-051VCA7E: /mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/ques2/ques2$ ./a.out
(55*12)*(4/2486)+(578-124)%351
5512*42486/+578124-+
Postfix: 5512*42486/+578124-+
Result:454
Password: 5512*42486/+578124-_454
chinnu@LAPTOP-051VCA7E: /mnt/c/Users/CHIKKERI CHINMAYA/OneDrive - National Institute of Technology Karnataka, Surathkal/Desktop/ques2/ques2$

```