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# Compiler Construction Lab 7

## Code

< calc.l >

```
%{
#include "calculator.tab.h"
%}

%%

[0-9]+ { yylval.i = atoi(yytext); return T_int;}
[0-9]+[.][0-9]+ {yylval.f = atof(yytext); return T_float;}
[-+*/^()\n] { return yytext[0];}
[l][o][g] { return func_log;}
[e][x][p] { return func_exp;}
. { /* ignore everything else */ }

%%
```

< calculator.y >

```
%{
#include <stdio.h>
#include <math.h>
#define YYDEBUG 1

void Push(double data);
double Pop();
double Top();

%}

%union {
int i;
float f;
};
```

```

%token T float
%token T int

%token func exp
%token func log

%%

S : S E '\n' { printf(" = %.3lf\n", Top()); }
|
;

E : E '+' T { Push(Pop() + Pop()); }
| E '-' T { double op2 = Pop(); Push(Pop() - op2); }
| T;

T : T '*' F { Push(Pop() * Pop()); }
| T '/' F { double op2 = Pop(); Push(Pop() / op2); }
| B;

B : B '^' F { int power = Pop(); double x = Pop(); double res = 1; for(int i =0; i<power ; i++){ res *=x;} Push(res);
res = 1;}
| func exp '(' B ')' { Push(exp(Pop()));}
| func log '(' B ')' { Push(log(Pop()));}
| F

F : '(' E ')'
| id ;

id : T int {Push(yylval.i);}
| T float {Push(yylval.f);}

%%

const int MAXSIZE = 40;
static double stack[40];

void Push(double data){
for (int i = MAXSIZE-1; i>0;i--){
stack[i]=stack[i-1];
}
stack[0] = data;
}

double Pop(){
double data = stack[0];
for (int i = 0; i<MAXSIZE;i++){
stack[i]=stack[i+1];
}
return data;
}

```

```
double Top(){
return stack[0];
}

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

## Output

```
scolopendra@scolopendra-bytes: ~/Local Disk Egg/University/D...
scolopendra@scolopendra-bytes:~/Local Disk Egg/University/Debian Semester 7/Compiler Construction/Labs/Lab 7/Code$ bison -d calculator.y
scolopendra@scolopendra-bytes:~/Local Disk Egg/University/Debian Semester 7/Compiler Construction/Labs/Lab 7/Code$ gcc -c calculator.tab.c
calculator.tab.c: In function 'yyparse':
calculator.tab.c:1248:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
1248 |         yychar = yylex ();
      |                     ^~~~~~
calculator.tab.c:1435:7: warning: implicit declaration of function 'yyerror'; did you mean 'yyerrok'? [-Wimplicit-function-declaration]
1435 |         yyerror (YY_("syntax error"));
      |         ^~~~~~
      |         yyerrok
scolopendra@scolopendra-bytes:~/Local Disk Egg/University/Debian Semester 7/Compiler Construction/Labs/Lab 7/Code$ flex calc.l
scolopendra@scolopendra-bytes:~/Local Disk Egg/University/Debian Semester 7/Compiler Construction/Labs/Lab 7/Code$ gcc -c lex.yy.c
scolopendra@scolopendra-bytes:~/Local Disk Egg/University/Debian Semester 7/Compiler Construction/Labs/Lab 7/Code$ gcc lex.yy.o calculator.tab.o -ly -ll -lm -o parserLab7
scolopendra@scolopendra-bytes:~/Local Disk Egg/University/Debian Semester 7/Compiler Construction/Labs/Lab 7/Code$ ./parserLab7
2+3*(4-1)
= 11.000
log(2)
= 0.693
exp(0.693)
= 2.000
3^5+2
= 245.000

```