

Practical No. 11

* Title: LEX program to implement a simple calculator.

* Objective: Students will learn and implement

- i) Implementation of calculator through LEX.
- ii) Rules sections for such a scanner.

* Description:

- i) Create a LEX file first.
- ii) Create RE's for the digit and arithmetic expression operators.
- iii) In the rules section, write rules for different arithmetic operations.
- iv) You may use switch case and nest different arithmetic operations. When user enters specific arithmetic operations, the particular case may get called.
- v) Lastly, call main routine and invoke ~~scan~~ scanning through `yypfen()`.

Code for LEX:

```

DIGIT [0-9]+\.\.?|[0-9]*\.[0-9]+

%%

[ ]
{DIGIT}    {yylval=atof(yytext);return NUM;}
\n|.      {return yytext[0];}

```

Code for YACC:

```

%{
#include <stdio.h>
#include <stdlib.h>
#define YYSTYPE double
int yylex(void);
void yyerror(char*);
%}

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

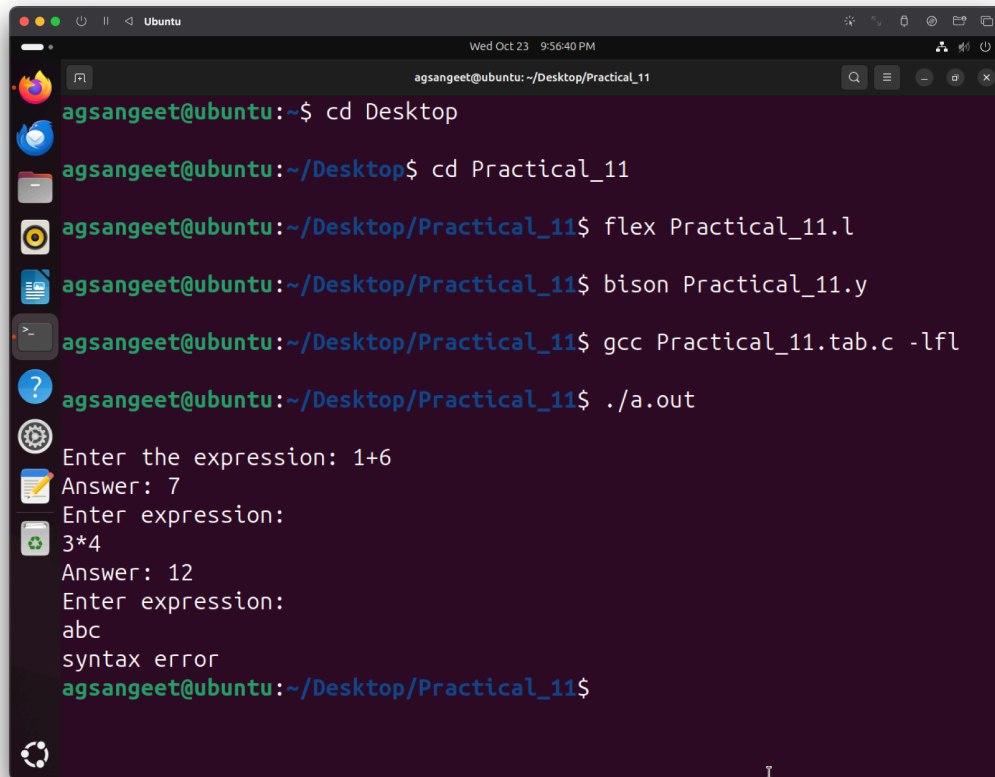
%%

S:
    S E '\n' { printf("Answer: %g\n", $2); printf("Enter expression:\n"); }
    | S '\n'
    |
    ;

E:
    E '+' E { $$ = $1 + $3; }
    | E '-' E { $$ = $1 - $3; }
    | E '*' E { $$ = $1 * $3; }
    | E '/' E { $$ = $1 / $3; }
    | '(' E ')' { $$ = $2; }
    | '-' E %prec UMINUS { $$ = -$2; }
    | NUM

```

```
;  
  
%%  
  
#include "lex.yy.c"  
int main(){  
    printf("Enter the expression: ");  
    yyparse();  
}  
void yyerror(char* errorText){  
    printf("%s\n",errorText);  
}
```

Output:

```
Wed Oct 23 9:56:40 PM  
agsangeet@ubuntu: ~/Desktop/Practical_11  
agsangeet@ubuntu:~$ cd Desktop  
agsangeet@ubuntu:~/Desktop$ cd Practical_11  
agsangeet@ubuntu:~/Desktop/Practical_11$ flex Practical_11.l  
agsangeet@ubuntu:~/Desktop/Practical_11$ bison Practical_11.y  
agsangeet@ubuntu:~/Desktop/Practical_11$ gcc Practical_11.tab.c -lfl  
agsangeet@ubuntu:~/Desktop/Practical_11$ ./a.out  
Enter the expression: 1+6  
Answer: 7  
Enter expression:  
3*4  
Answer: 12  
Enter expression:  
abc  
syntax error  
agsangeet@ubuntu:~/Desktop/Practical_11$
```

* Conclusion: Thus, we have implemented the calculator through the LEX.