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Subject: Compiler Design Lab

Experiment: Implementation of Calculator with the help of LEX and YACC

Lex and YACC are powerful tools for creating parsers and compilers. Here is an implementation of a simple calculator using Lex and YACC that can perform basic arithmetic operations.

Algorithm:
1) Creating the Lex file
2) First, create a file named "calculator.l" that will contain the Lex code.
3) Creating the YACC file
4) Next, create a file named "calculator.y" that will contain the YACC code.
5) Compiling the code

CODE:

LEX FILE:

```
%{
#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;
}
```

YACC FILE:

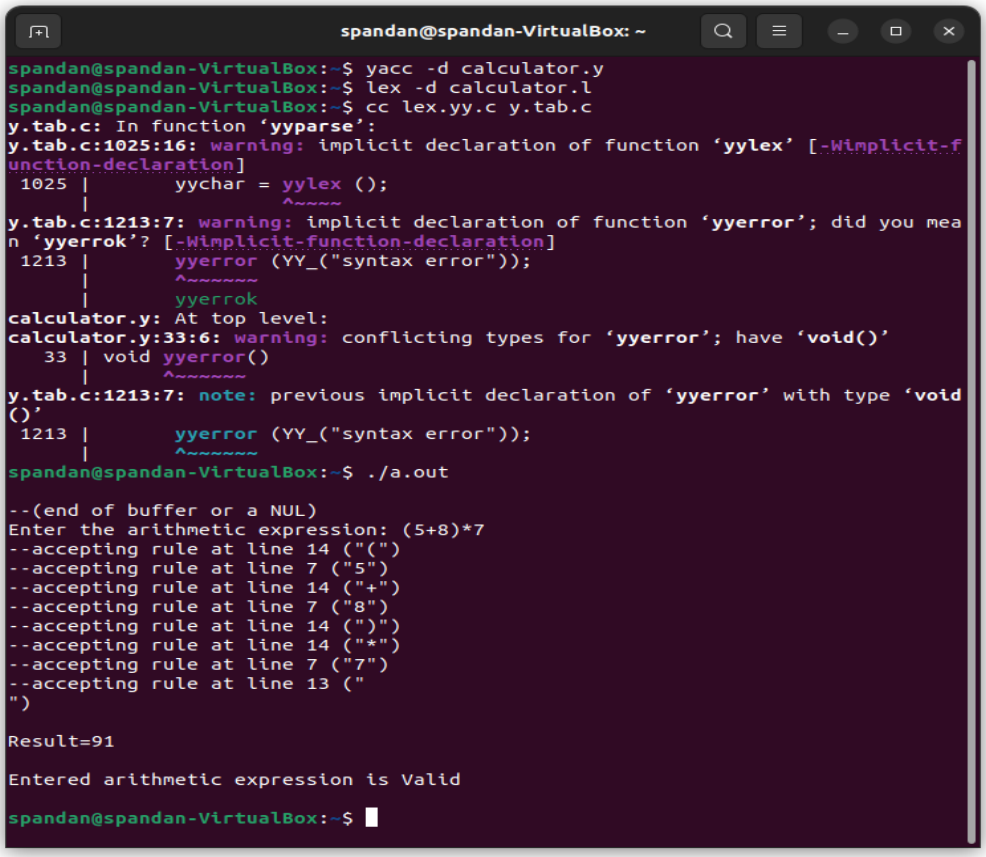
```
%{
#include<stdio.h>
int flag=0;
%}
%token NUMBER
%left '+' '-'
%left '*' '/' '%'
%left '(' ')'
%%
ArithmeticExpression: E{

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 the arithmetic expression: ");
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:


spandan@spandan-VirtualBox: ~
spandan@spandan-VirtualBox:~$ yacc -d calculator.y
spandan@spandan-VirtualBox:~$ lex -d calculator.l
spandan@spandan-VirtualBox:~$ cc lex.yy.c y.tab.c
y.tab.c: In function ‘yyparse’:
y.tab.c:1025:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
1025 | yychar = yylex ();
| ^~~~~
y.tab.c:1213:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
1213 | yyerror (YY_("syntax error"));
| ^~~~~~~
| yyerrok
calculator.y: At top level:
calculator.y:33:6: warning: conflicting types for ‘yyerror’; have ‘void()’
33 | void yyerror()
| ^~~~~~~
y.tab.c:1213:7: note: previous implicit declaration of ‘yyerror’ with type ‘void()’
1213 | yyerror (YY_("syntax error"));
| ^~~~~~~
spandan@spandan-VirtualBox:~$ ./a.out
--(end of buffer or a NUL)
Enter the arithmetic expression: (5+8)*7
--accepting rule at line 14 ("(")
--accepting rule at line 7 ("5")
--accepting rule at line 14 ("+")
--accepting rule at line 7 ("8")
--accepting rule at line 14 (")")
--accepting rule at line 14 ("*")
--accepting rule at line 7 ("7")
--accepting rule at line 13 ("
")
Result=91
Entered arithmetic expression is Valid
spandan@spandan-VirtualBox:~$