Compiler Design Lab

Assignment-5
Implementation of Desk Calculator using Yacc Tool

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Code:

calculator.l

```
%{
#include<stdio.h>
#include<stdlib.h>
#include"y.tab.h"
void yyerror(char*);
extern int yylval;

%}


%%
[0-9]+ {
    yylval=atoi(yytext);
    return NUMBER;
}

[a-zA-Z]+ {yylval=*yytext;
      return ID;}

[-+*/^()=&|] {return *yytext;}

"<"|">" {return *yytext;}

">=" {return GTE;}

"<=" {return LTE;}

"!=" {return NE;}

"==" {return EQ;}

"&&" {return AND;}

"||" {return OR;}

"!"  {return NOT;}

[\t] ;

[\n] return 0;

. {yyerror("invalid case");}
%%

int yywrap(void)
```

```
{
    return 1;
}
```

calculator.y

```
%{
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
#include"y.tab.h"
int yylex(void);
void yyerror(char *str);

%}


%token NUMBER ID

%right '='

%token AND OR NOT

%left '&' '|'

%token GTE LTE NE EQ

%left '<' '>'

%left '+' '-'

%left '*' '/'

%left '^'

%left '(' ')'


%%

Assign: A{
    return 0;
    };

A:Expression
|ID '=' Expression {$1=$3;}
;

Expression: 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 {$$=pow($1,$3);}

|'('E')' {$$=$2;}

|E'<'E {if($1<$3)
        $$=1;
    else
        $$=0;}

|E'>'E {if($1>$3)
        $$=1;
    else
        $$=0;}

|E'&'E {$$=$1&$3;}

|E'|'E {$$=$1|$3;}

|NUMBER {$$=$1;}

|NUMBER GTE NUMBER {if($1>=$3)
        $$=1;
    else
        $$=0;}

|NUMBER LTE NUMBER {if($1<=$3)
        $$=1;
    else
        $$=0;}

|NUMBER EQ NUMBER {if($1==$3)
        $$=1;
    else
        $$=0;}

|NUMBER NE NUMBER {if($1!=$3)
        $$=1;
    else
        $$=0;}

|NUMBER AND NUMBER {if($1&&$3)
        $$=1;
    else
        $$=0;}

|NUMBER OR NUMBER {if($1||$3)
        $$=1;
    else
        $$=0;}

|NOT NUMBER {if(!$2)
        $$=1;
    else
        $$=0;}
;

%%


void yyerror(char *str)
```

```
{
    fprintf(stderr,"%s\n",str);
}


void main()
{
    yyparse();
}
```

Output:

```
viki@viki:~/Desktop/CD Lab/Ex5/2$ lex calculator.l
viki@viki:~/Desktop/CD Lab/Ex5/2$ yacc -d calculator.y
viki@viki:~/Desktop/CD Lab/Ex5/2$ gcc lex.yy.c y.tab.c -lm
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
3+9

Result=12
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
3+9*6

Result=57
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
(3+4)*7

Result=49
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
(3-4)+(7*6)

Result=41
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
5/7+2

Result=2
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
4^2^1

Result=16
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
(2^3)^2

Result=64
viki@viki:~/Desktop/CD Lab/Ex5/2$
```

```
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
2>3

Result=0
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
3<=3

Result=1
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
1==2

Result=0
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
5&9

Result=1
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
5|9

Result=13
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
!0

Result=1
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
0&&1

Result=0
viki@viki:~/Desktop/CD Lab/Ex5/2$ ./a.out
0||1

Result=1
viki@viki:~/Desktop/CD Lab/Ex5/2$
```