SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1602 - Compiler Design

EX - 5 : Implementation of Desk Calculator using Yacc Tool

NAME : Gayathri M
REG NO: 185001050
DATE : 13/03/2021

Program Code:

lexx.l

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

%%
[ \t]+ ;
[0-9]+ {yylval = atoi(yytext);
return INTEGER;}
[-+*/^] {return *yytext;}
"<<" {return LSHIFT;}
">>" {return RSHIFT;}
"&&" {return *yytext;}
"||" {return *yytext;}
"!" {return *yytext;}
"(" { return *yytext;}
")" {return *yytext;}
\n {return *yytext;}
. {char msg[25];
sprintf(msg, "%s<%s>","Invalid Character",yytext);
yyerror(msg);}
%%
```

calc.y

```
%{
  #include<stdio.h>
  #include<stdlib.h>
  #include<math.h>
  #include"y.tab.h"
  int yylex(void);
  void yyerror(char *);
  int flag=0;

%}

%token INTEGER LSHIFT RSHIFT

%%

prg : line prg
    | line

line : expr '\n' {printf("%d\n",$1);
}
expr : expr LSHIFT expr { $$ = $1 << $3; }
     | expr RSHIFT expr { $$ = $1 >> $3; }

expr : expr '||' andex {$$ = $1 || $3;}
     | andex {$$ = $1;}

andex : andex '&&' notex {$$ = $1 && $3;}
      | notex {$$=$1;}

notex : '!' addex {$$ = !$1;}
      | addex {$$=$1;}

addex : addex '+' mulex { $$ = $1 + $3;}
      | addex '-' mulex { $$ = $1 - $3;}
      | mulex {$$ = $1;}

mulex : mulex '*' powex { $$ = $1 * $3;}
      | mulex '/' powex { $$ = $1 / $3;}
      | mulex '%' powex { $$ = $1 % $3;}
      | powex { $$ = $1;}
```

```
powex : powex '^' term {$$ = pow($1, $3);}
       | term {$$=$1;}


term : '(' expr ')' {$$=$2;}
       | INTEGER {$$=$1;}


%%

//driver code
int main()
{
    yyparse();
    if(flag==0)
    printf("\nEntered arithmetic expression is Valid\n\n");
    return 0;
}
void yyerror(char *s)
{
    fprintf(stderr,"%s\n",s);
    flag=1;
    return;
}
int yywrap(){
    return 1;
}
```

ip.txt

```
3+9
3+9*6
(3+4)*7
(3-4)+(7*6)
5/7+2
4^2^1
(2^3)^2
1&&0
1||0
!0
5>>1
7<<1
(4>>1)&&(1>>1||1<<1)
```

OUTPUT :

```
[msml@MSMLs-MacBook-Pro ex5 % lex lexx.l
[msml@MSMLs-MacBook-Pro ex5 % yacc -d calc.y
conflicts: 6 shift/reduce
[msml@MSMLs-MacBook-Pro ex5 % gcc y.tab.c lex.yy.c
[msml@MSMLs-MacBook-Pro ex5 % ./a.out < ip.txt
12
57
49
41
2
16
64
0
1
1
2
14
0

Entered arithmetic expression is Valid

msml@MSMLs-MacBook-Pro ex5 %
```

Learning Outcomes :

- I learnt to install and use yacc tool
- I learnt to implement a desk calculator using yacc and lex tool
- I learnt how to create and add rules to perform arithmetic operations, bitwise shift and boolean operations.