

SPCC LAB 7

SIMPLE CALCULATOR

Calc.l

```
%{  
  
    #include<stdio.h>  
    #include "y.tab.h"  
    extern int yyval;  
}%  
  
/* Rule Section */  
%%  
[0-9]+ {  
    yyval=atoi(yytext);  
    return NUMBER;  
  
}  
[\t];  
  
[\n] return 0;  
  
. return yytext[0];  
  
%%  
  
int yywrap()  
{  
    return 1;  
}
```

Calc.y

```
%{  
    /* Definition section */  
    #include<stdio.h>  
    int flag=0;  
}%  
  
%token NUMBER  
  
%left '+' '-'  
  
%left '*' '/' '%'  
  
%left '(' ')'  
  
/* Rule Section */  
%%
```

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;}
```

```
;
```

```
%%
```

```
//driver code
```

```
void main()
```

```
{
```

```
    printf("\nEnter Any Arithmetic Expression which can have operations Addition, Subtraction,  
Multiplication, Division, Modulus and Round brackets:\n");
```

```
    yyparse();
```

```
    if(flag==0)
```

```
        printf("\nEnter arithmetic expression is Valid\n\n");
```

```
}
```

```
void yyerror()
```

```
{
```

```
    printf("\nEnter arithmetic expression is Invalid\n\n");
```

```
    flag=1;
```

```
}
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22621.1413]
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C:\Users\admin\OneDrive\Desktop\sem 6 labs>flex calc.l

C:\Users\admin\OneDrive\Desktop\sem 6 labs>bison -d calc.y

C:\Users\admin\OneDrive\Desktop\sem 6 labs>gcc lex.yy.c calc.tab.c
calc.tab.c: In function 'yyparse':
calc.tab.c:588:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
  588 | # define YYLEX yylex ()
      |                ^~~~~~
calc.tab.c:1233:16: note: in expansion of macro 'YYLEX'
 1233 |     yychar = YYLEX;
      |                ^~~~~~
calc.tab.c:1406:7: warning: implicit declaration of function 'yyerror'; did you mean 'yyerrok'? [-Wimplicit-function-declaration]
 1406 |     yyerror (YY_("syntax error"));
      |     ^~~~~~
      |     yyerrok

C:\Users\admin\OneDrive\Desktop\sem 6 labs>a.exe

Enter Any Arithmetic Expression which can have operations Addition, Subtraction, Multiplication, Divison, Modulus and Round brackets:
1+20-(3*12)

Result=-15

Entered arithmetic expression is Valid

C:\Users\admin\OneDrive\Desktop\sem 6 labs>
```

NESTED IF-ELSE STATEMENTS USING LEX AND YACC

Lex:

```
%option noyywrap
%{
#include "if.tab.h"
%}

%%
"if" {return IF;}
[sS][0-9]* {return S;}
"<" | ">" | "==" | "<=" | ">=" | "!=" {return RELOP;}
[0-9]+ {return NUMBER;}
[a-z][a-zA-Z0-9_]* {return ID;}
\n {return NL;}
. {return yytext[0];}
%%
```

Yacc:

```
%{
#include<stdio.h>
#include<stdlib.h>
int count=0;
%}
%token IF RELOP S NUMBER ID NL
%%
stmt: if_stmt NL {printf("Number of nested if statements=%d\n",count);exit(0);}
;
if_stmt : IF('cond') '{if_stmt}' {count++;}
        | S
;
cond: x RELOP x
;
x:ID | NUMBER
;
%%
int yyerror(char *msg)
{
printf("The statement is invalid\n");
exit(0);
}

main()
{
printf("Enter the statement : \n");
yyparse();
}
```

```

C:\Windows\System32\cmd.exe
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C:\Users\admin\OneDrive\Desktop\sem 6 labs>flex if.l

C:\Users\admin\OneDrive\Desktop\sem 6 labs>bison -d if.y

C:\Users\admin\OneDrive\Desktop\sem 6 labs>gcc lex.yy if.tab.c
gcc: error: lex.yy: No such file or directory

C:\Users\admin\OneDrive\Desktop\sem 6 labs>gcc lex.yy.c if.tab.c
if.tab.c: In function 'yyparse':
if.tab.c:591:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
  591 | # define YYLEX yylex ()
      |                ^~~~~~
if.tab.c:1236:16: note: in expansion of macro 'YYLEX'
 1236 |     yychar = YYLEX;
      |                ^~~~~~
if.tab.c:1364:7: warning: implicit declaration of function 'yyerror'; did you mean 'yyerrok'? [-Wimplicit-function-declaration]
 1364 |     yyerror (YY_("syntax error"));
      |     ^~~~~~
      |     yyerrok
if.y: At top level:
if.y:24:1: warning: return type defaults to 'int' [-Wimplicit-int]
   24 | main()
      |     ^~~~~~

C:\Users\admin\OneDrive\Desktop\sem 6 labs>a.exe
Enter the statement :
if(a>b){if(a>c){s}}
Number of nested if statements=2

```

RECOGNISE VALID VARIABLES IN C LANGUAGE USING LEX AND YACC

Lex:

```
%option noyywrap
%{
#include "id.tab.h"
%}
%%
[a-zA-Z] {return LETTER;}
[0-9] {return DIGIT;}
[_] {return UND;}
[\n] {return NL;}
. {return yytext[0];}
%%
```

Yacc:

```
%{
#include <stdio.h>
#include <stdlib.h>
%}
%token DIGIT LETTER UND NL
%%
stmt: variable NL {printf("valid identifiers\n"); exit(0);}
;
variable: LETTER alphanumeric
;
alphanumeric: LETTER alphanumeric | DIGIT alphanumeric | UND alphanumeric | LETTER | DIGIT | UND
;
%%
int yyerror(char *msg)
{
printf("Invalid variable\n");
exit(0);
}
main()
{
printf("enter the variable: \n");
yyparse();
}
```

```

C:\Windows\System32\cmd.exe
C:\Users\admin\OneDrive\Desktop\sem 6 labs>flex id.l
C:\Users\admin\OneDrive\Desktop\sem 6 labs>bison -d id.y
C:\Users\admin\OneDrive\Desktop\sem 6 labs>gcc lex.yy.c id.tab.c
id.tab.c: In function 'yyparse':
id.tab.c:585:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
  585 | # define YYLEX yylex ()
      |                ^~~~~~
id.tab.c:1230:16: note: in expansion of macro 'YYLEX'
 1230 |     yychar = YYLEX;
      |                ^~~~~~
id.tab.c:1351:7: warning: implicit declaration of function 'yyerror'; did you mean 'yyerrok'? [-Wimplicit-function-declaration]
 1351 |     yyerror (YY_("syntax error"));
      |     ^~~~~~
      |     yyerrok
id.y: At top level:
id.y:19:1: warning: return type defaults to 'int' [-Wimplicit-int]
   19 | main()
      |     ^~~~~~

C:\Users\admin\OneDrive\Desktop\sem 6 labs>a.exe
enter the variable:
variableA
valid identifiers
C:\Users\admin\OneDrive\Desktop\sem 6 labs>

```

```

Microsoft Windows [Version 10.0.22621.1413]
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C:\Users\admin\OneDrive\Desktop\sem 6 labs>flex id.l
C:\Users\admin\OneDrive\Desktop\sem 6 labs>bison -d id.y
C:\Users\admin\OneDrive\Desktop\sem 6 labs>gcc lex.yy.c id.tab.c
id.tab.c: In function 'yyparse':
id.tab.c:585:16: warning: implicit declaration of function 'yylex' [-Wimplicit-function-declaration]
  585 | # define YYLEX yylex ()
      |                ^~~~~~
id.tab.c:1230:16: note: in expansion of macro 'YYLEX'
 1230 |     yychar = YYLEX;
      |                ^~~~~~
id.tab.c:1351:7: warning: implicit declaration of function 'yyerror'; did you mean 'yyerrok'? [-Wimplicit-function-declaration]
 1351 |     yyerror (YY_("syntax error"));
      |     ^~~~~~
      |     yyerrok
id.y: At top level:
id.y:19:1: warning: return type defaults to 'int' [-Wimplicit-int]
   19 | main()
      |     ^~~~~~

C:\Users\admin\OneDrive\Desktop\sem 6 labs>a.exe
enter the variable:
variable a
Invalid variable
C:\Users\admin\OneDrive\Desktop\sem 6 labs>

```