

SS ASSIGNMENT – 10

1. Write a program for implementing a calculator for computing the given expression using semantic rules of the YACC tool and LEX.

lex q1.l file:

```
%{
    /* Definition section */
    #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 q1.y file:

```
%{
    #include<stdio.h>
    int flag=0;
}%

%token NUMBER
%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;}

| NUMBER {$$=$1;}
;
%%

//driver code
void main(){
    printf("\nEnter Any 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;
}

```

```

sakshi@sakshi: ~/Desktop/SS/ass10/q1
sakshi@sakshi:~/Desktop/SS/ass10/q1$ lex q1.l && yacc -d q1.y && gcc lex.yy.c y.tab.c -w
sakshi@sakshi:~/Desktop/SS/ass10/q1$ ./a.out

Enter Any Arithmetic Expression: 4*12

Result = 48

Entered arithmetic expression is Valid

sakshi@sakshi:~/Desktop/SS/ass10/q1$

```

2. Write a Yacc program to recognize validity of a nested 'IF' control statement and display levels of nesting in the nested if.

lex q2.l file:

```

%{
    #include "y.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 q2.y file:

```

%{
    #include<stdio.h>
    #include<stdlib.h>
    int count=0;
%}

%token IF RELOP S NUMBER ID NL

%%
stmt: if_stmt NL {printf("No. of nested if statements = %d\n",count);exit(0);}
;

if_stmt : IF('cond') '{'if_stmt'}' {count++;}
        | S
;

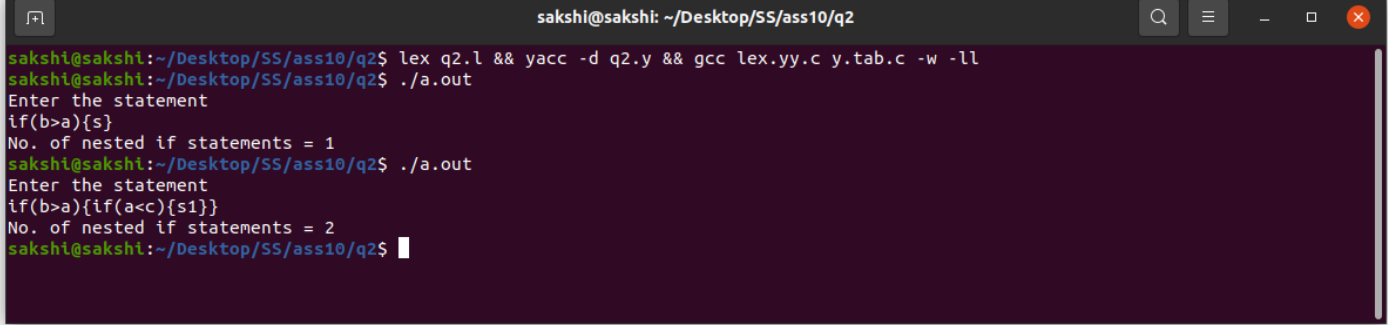
cond: x RELOP x
;

x:ID | NUMBER
;
%%

int yyerror(char *msg)
{
    printf("The statement is invalid\n");
    exit(0);
}

```

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



A terminal window titled "sakshi@sakshi: ~/Desktop/SS/ass10/q2" with search, menu, and window control icons. It shows the compilation and execution of a C program. The program prompts the user to "Enter the statement". In the first run, the user enters "if(b>a){s}", and the program outputs "No. of nested if statements = 1". In the second run, the user enters "if(b>a){if(a<c){s1}}", and the program outputs "No. of nested if statements = 2".

```
sakshi@sakshi:~/Desktop/SS/ass10/q2$ lex q2.l && yacc -d q2.y && gcc lex.yy.c y.tab.c -w -ll  
sakshi@sakshi:~/Desktop/SS/ass10/q2$ ./a.out  
Enter the statement  
if(b>a){s}  
No. of nested if statements = 1  
sakshi@sakshi:~/Desktop/SS/ass10/q2$ ./a.out  
Enter the statement  
if(b>a){if(a<c){s1}}  
No. of nested if statements = 2  
sakshi@sakshi:~/Desktop/SS/ass10/q2$
```