# PRACTICAL-1

**AIM:**

Implement a lexical analyzer for a subset of C using LEX Implementation should support Error handling.

**IMPLEMENTATION:**

- lex<filename with .l extension>
- gcc<newly created .c file> -o <file name for exe file>
- <filename of exe file>

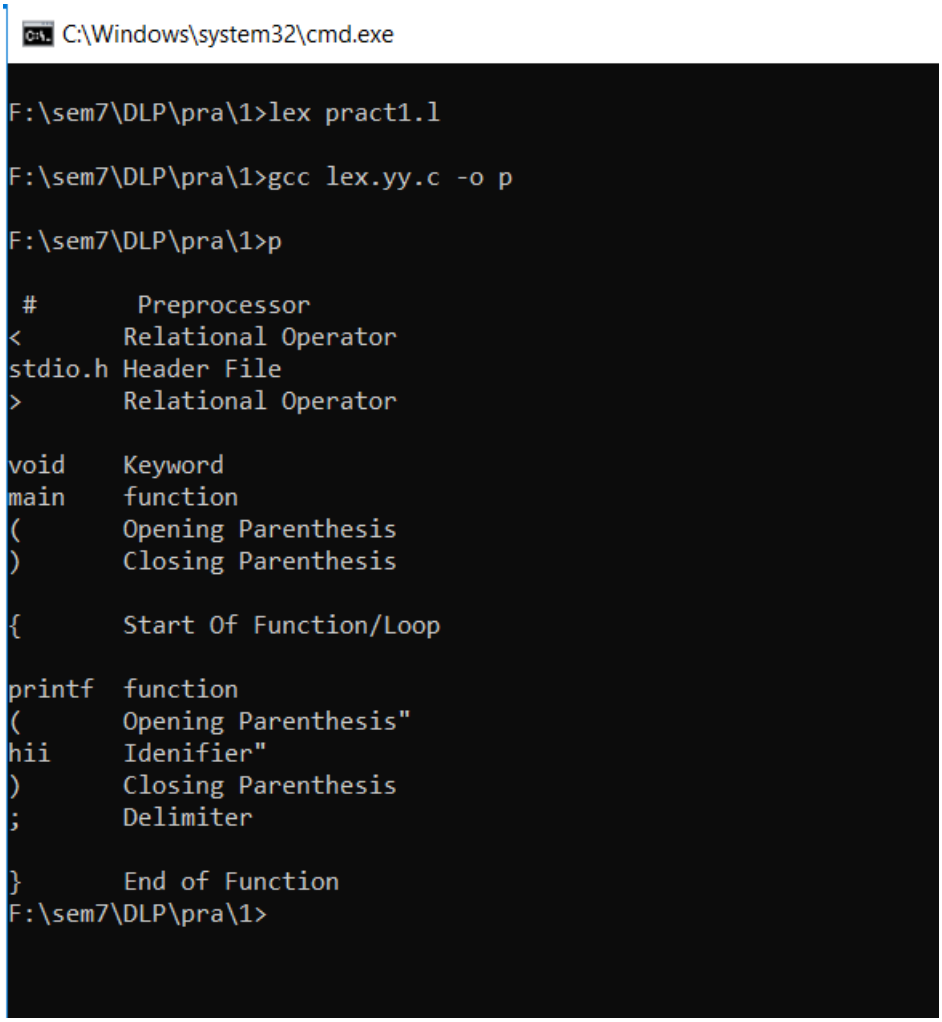
In this case, create an extra text file named abc.txt which will contain some C code to work as input for lexical analysis.

**CODE:**

```
%%

"#" {printf("\n %s \t Preprocessor",yytext);}

"main"|"printf"|"scanf" {printf("\n%s\tfunction",yytext);}

"if"|"else"|"int"|"unsigned"|"long"|"char"|"switch"|"case"|"struct"|"do"|"while"|"void"|"for"|"float"|"continue"|"break"|"include" { printf("\n%s\tKeyword",yytext); }

[_a-zA-Z][_a-zA-Z0-9]* {printf("\n%s\tIdenifier",yytext);}

"+"|"/"|"*"|"-" {printf("\n%s\tOperator",yytext);}

"="|"<"|">"|"!="|"=="|"<="|">=" {printf("\n%s\tRelational Operator",yytext);}

"%d"|"%s"|"%c"|"%f" {printf("\n%s\tTokenizer",yytext);}

"stdio.h"|"conio.h"|"math.h"|"string.h"|"graphics.h"|"dos.h" {printf("\n%s\tHeader File",yytext);}

";"|"," {printf("\n%s\tDelimiter",yytext);}

"("|")" {if(strcmp(yytext,"(")==0)
        {
                printf("\n%c\tOpening Parenthesis",yytext[0]);
        }
        else
        {
                printf("\n%c\tClosing Parenthesis",yytext[0]);
```

```
        }
        ;}
"{" {printf("\n%s\tStart Of Function/Loop",yytext);}
"}" {printf("\n%s\tEnd of Function",yytext);}
%%
intyywrap(void)
{
return 1;
}
int main()
{
int i;
FILE *fp;
fp=fopen("abc.txt","r");
        if(fp==NULL)
{
        printf("Unable To Open File");
}
else
{

        yyin=fp;
}
yylex();
return 0;
}
```

**OUTPUT:**




**CONCLUSION:**

In this practical, we learnt about lex files and implemented a program for lexical analysis.

# PRACTICAL-2

**AIM:**

Implement a lexical analyzer for identification of numbers.

**IMPLEMENTATION:**

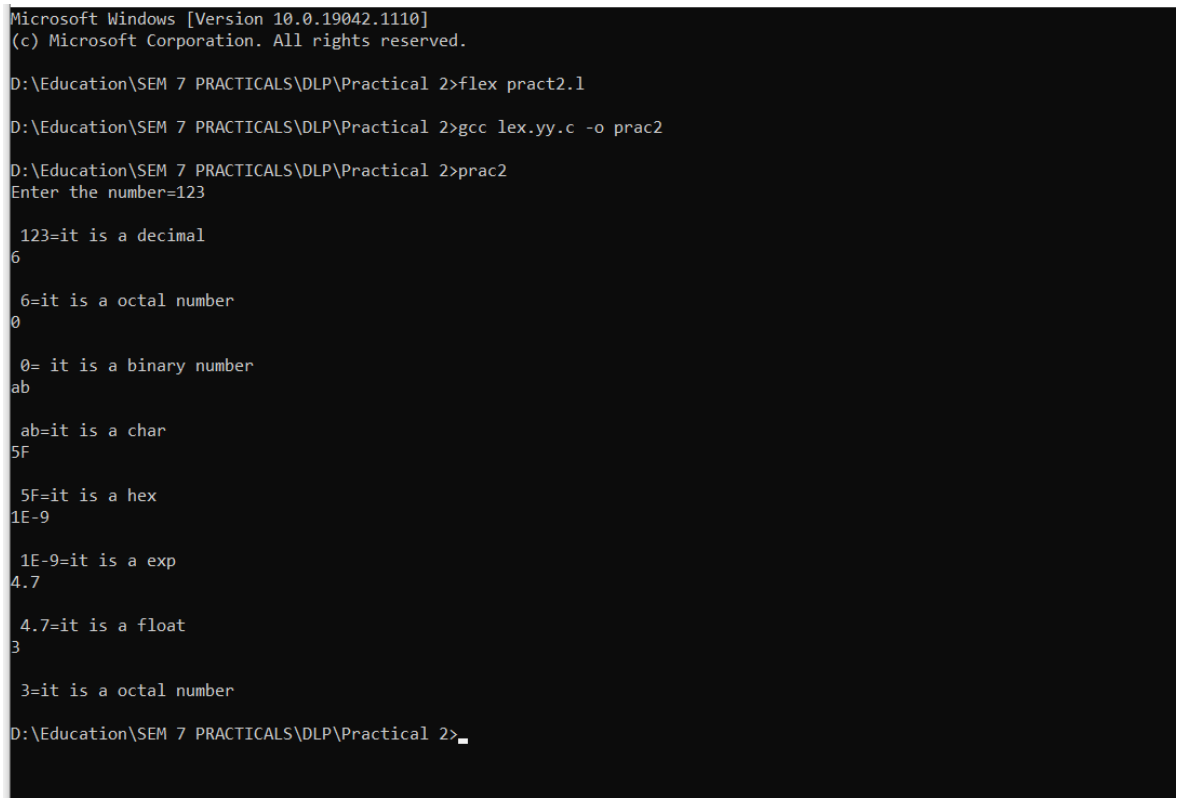
- lex<filename with .l extension>
- gcc<newly created .c file> -o <file name for exe file>
- <filename of exe file>

**CODE:**

```
bin (0|1)+
char [A-Za-z]+
digit [0-9]
oct [0-7]
dec [0-9]*
float {digit}+("."{digit}+)
exp {digit}+("."{digit}+)?("E"("+"|"-")?{digit}+)?
hex [0-9a-fA-F]+

%%
{bin} {printf("\n %s= it is a binary number",yytext);}
{char} {printf("\n %s=it is a char",yytext);}
{oct} {printf("\n %s=it is a octal number",yytext);}
{digit} {printf("\n %s=it is a digit",yytext);}
{dec} {printf("\n %s=it is a decimal",yytext);}
{float} {printf("\n %s=it is a float",yytext);}
{exp} {printf("\n %s=it is a exp",yytext);}
{hex} {printf("\n %s=it is a hex",yytext);}
%%
intyywrap()
{
```

```
return 1;
}
int main()
{
printf("Enter the number=");
yylex();
return 0;
}
```

**OUTPUT:**




**CONCLUSION:**

In this practical, we learnt about lexical analysis for numbers and characters.

# PRACTICAL-3

**AIM:**

Write an ambiguous CFG to recognize an infix expression and implement a parser that recognizes the infix expression using YACC.

**IMPLEMENTATION:**

- yacc<filename with .y extension>
- gcc<newly created .c file> -o <file name for exe file>
- <filename of exe file>

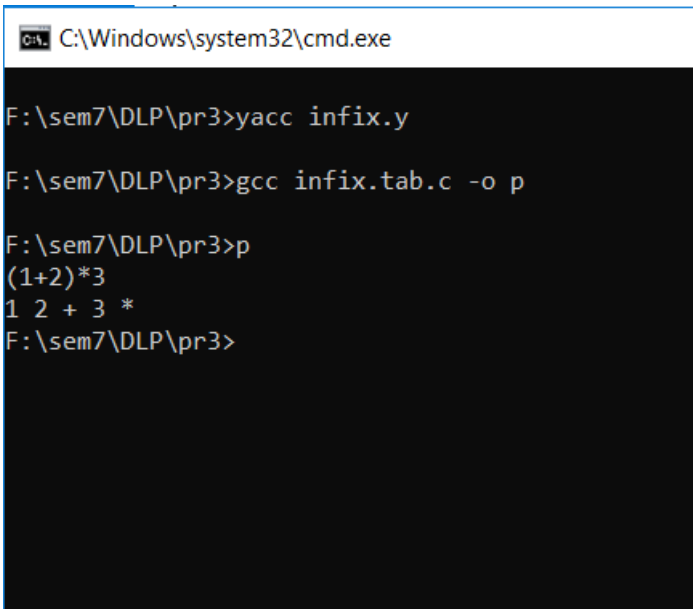
**CODE:**

```
%{
/*** Auxiliary declarations section ***/

#include<stdio.h>
#include<stdlib.h>
#include<string.h>

/* Custom function to print an operator*/
voidprint_operator(char op);

/* Variable to keep track of the position of the number in the input */
intpos=0;
char p;
%}

 /*** YACC Declarations section ***/
%token NUM
%left '+'
%left '*'
%%
```

```
/*** Rules Section ***/
start :expr '\n'              {exit(1);}
      ;

expr: expr '+' expr     {print_operator('+');}
    | expr '*' expr     {print_operator('*');}
    | '(' expr ')'
    | NUM             {printf("%c ",p);}
    ;

%%


/*** Auxiliary functions section ***/

voidprint_operator(char c){
switch(c){
case '+'  : printf("+ ");
break;
case '*'  : printf("* ");
break;
    }
return;
}

yyerror(char const *s)
{
printf("yyerror %s",s);
}
```

```
yylex(){
char c;
   c = getchar();
   p=c;
if(isdigit(c)){
pos++;
return NUM;
   }
else if(c == ' '){
yylex();        /*This is to ignore whitespaces in the input*/
   }
else {
return c;
   }
}

main()
{
        yyparse();
        return 1;
}
```

**OUTPUT:**




**CONCLUSION:**

In this practical, we learnt about yacc and performed infix to postfix conversion.

# PRACTICAL-4

**Aim:** Implement a Calculator using LEX and YACC.

## Code:

**Lex file:**

```
DIGIT [0-9]+
%option noyywrap

%%

{DIGIT} { yylval=atof(yytext); return NUM;}
\n|. {return yytext[0];}
```

**Yacc file:**

```
%{
#include<ctype.h>
#include<stdio.h>
#define YYSTYPE double
%}
%token NUM

%left '+' '-'
%left '*' '/'

%%

S : S E '\n' { printf("Answer: %g \nEnter:\n", $2); }
| S '\n'
|
| error '\n' { yyerror("Error: Enter once more…\n" );yyerrok; }
```

```
;

E : E '+' E { $$ = $1 + $3; }
| E'-'E { $$=$1-$3;}
| E'*'E {$$=$1*$3;}
| E'/'E {$$=$1/$3;}
| NUM
;

%%

#include "lex.yy.c"

int main()
{
printf("Enter the expression: ");
yyparse();
}
yyerror (char * s)
{
printf ("% s \n", s);
exit (1);
}
```

## Output:

```
C:\Sem 7\LP>lex c1.l

C:\Sem 7\LP>yacc c1.y

C:\Sem 7\LP>gcc c1.tab.c -o l

C:\Sem 7\LP>l
Enter the expression: 1+2
Answer: 3
Enter:
2*4
Answer: 8
Enter:
6/2
Answer: 3
Enter:
5-2
Answer: 3
```

**Conclusion:** Here we have learned about how to implement calculator using lex and yacc.

# PRACTICAL-5

**AIM:**

Implementation of Syntax Tree.

**IMPLEMENTATION:**

- gcc<newly created .c file> -o <file name for exe file>
- <filename of exe file>

In this case, create a syntax.txt file as input for the executable which will contain following statements.

t1=a+b

t2=c-d

t3=e+t2

t4=t1-t3

**CODE:**

```
#include<conio.h>
#include<stdio.h>
int main()
{
FILE *fp;
int i=0,j=0,k,l,row,col,s,x;
char a[10][10],ch,main[50],search;
//clrscr();
fp=fopen("syntax.txt","r+");
while((ch=fgetc(fp))!=EOF)
{
if(ch=='\n')
{
row=i;
col=j;
j=0;
```

```
i++;
}
else
{
a[i][j]=ch
; j++;
}
}
printf("\n");
for(k=0;k<row+1;k++)
{
for(l=0;l<col;l++)
{
printf("%c",a[k][l]);
}
printf("\n");
}
i=0;
s=0;
for(k=0;k<row+1;k++)
{
main[i]=a[k][1];
i++;
if(a[k][3]=='t')
{
search=a[k][4];
for(l=0;l<i;l++)
{
if(main[l]==search)
{
```

```
main[i]=main[l];
i++;
break;
}
}
main[i]=a[k][5];
s=5;
i++;
}
else
{
main[i]=a[k][3];
// printf("\n%c",main[i]);
i++;
main[i]=a[k][4];
// printf(",%c\n",main[i]);
s=4;
i++;
}
s++;
if(a[k][s]=='t')
{
s++;
search=a[k][s];
for(l=0;l<i;l++)
{
if(main[l]==search)
{
main[i]=main[l];
i++;
```

```
break;
}
}
}
else
{
main[i]=a[k][s];
i++;
}
}
for(x=i-1;x>=0;x=x-4)
{
printf("\ntt%c: root->%c ",main[x-3],main[x-1]);
if(main[x-2]>48 &&main[x-2]<59)
printf("lc->t%c ",main[x-2]);
else
printf("lc->%c ",main[x-2]);
if(main[x]>48 &&main[x]<59)
printf("rc->t%c ",main[x]);
else
printf("rc->%c ",main[x]);
}
getch();
}
```

**OUTPUT:**

```
D:\Education\SEM 7 PRACTICALS\DLP\Practical 5>gcc st.c -o prac5

D:\Education\SEM 7 PRACTICALS\DLP\Practical 5>prac5

t1=a+b
t2=c-d
t3=e+t2

tt3: root->+ lc->e rc->t2
tt2: root->- lc->c rc->d
tt1: root->+ lc->a rc->b
D:\Education\SEM 7 PRACTICALS\DLP\Practical 5>
```

**CONCLUSION:**

In this practical, we learnt about syntax tree and implemented the concept using C.

# PRACTICAL – 6

**AIM: Implementation of Context Free Grammar.**

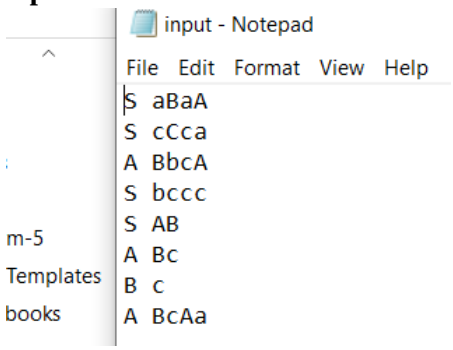
**CODE:**

```
#include<stdio.h>
#include<string.h>
int i,j,k,l,m,n=0,o,p,nv,z=0,t,x=0;
char str[10],temp[20],temp2[20],temp3[20];
struct prod
{
   char lhs[10],rhs[10][10];
   int n;
}pro[10];
void findter()
{
   for(k=0;k<n;k++)
   {
      if(temp[i]==pro[k].lhs[0])
      {
         for(t=0;t<pro[k].n;t++)
         {
            for(l=0;l<20;l++)
               temp2[l]='\0';
            for(l=i+1;l<strlen(temp);l++)
               temp2[l-i-1]=temp[l];
            for(l=i;l<20;l++)
               temp[l]='\0';
            for(l=0;l<strlen(pro[k].rhs[t]);l++)
               temp[i+l]=pro[k].rhs[t][l];
strcat(temp,temp2);
            if(str[i]==temp[i])
               return;
            else if(str[i]!=temp[i] && temp[i]>=65 && temp[i]<=90)
               break;
         }
         break;
      }
   }
   if(temp[i]>=65 && temp[i]<=90)
findter();
}
void main()
{
   FILE *f;
   for(i=0;i<10;i++)
```

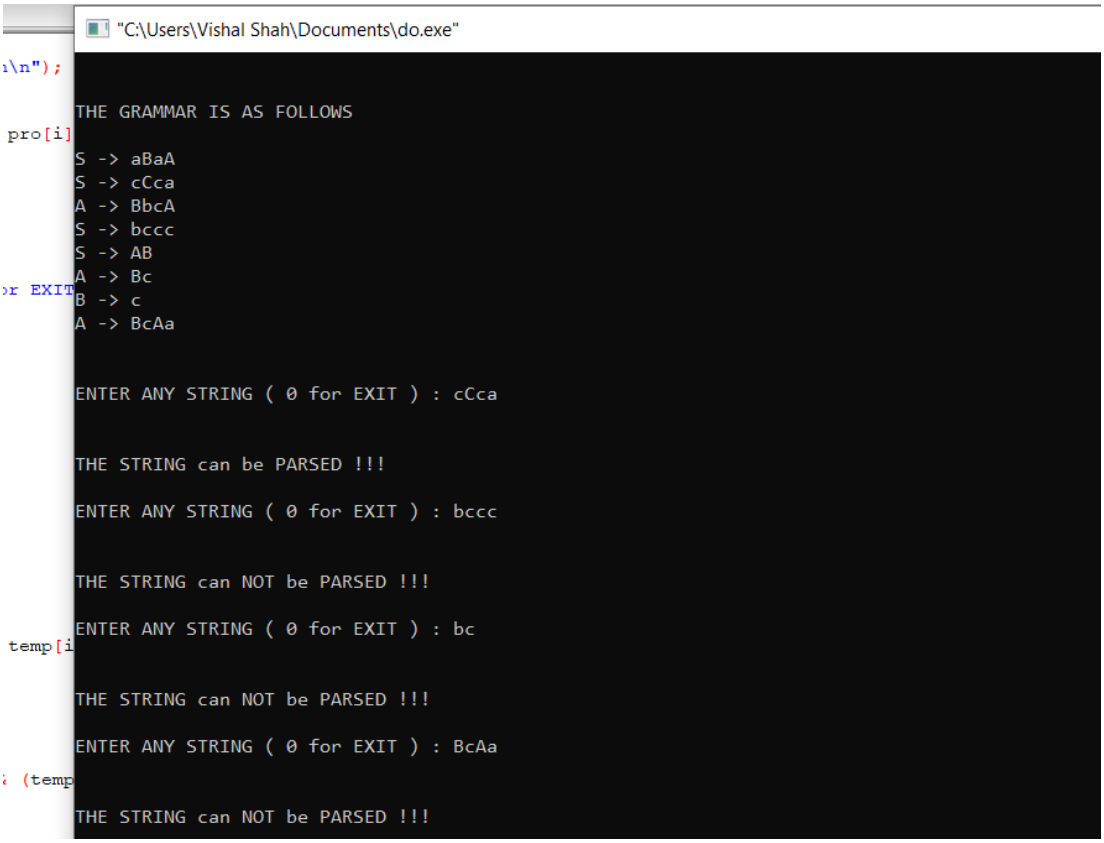
```
        pro[i].n=0;
    f=fopen("input.txt","r");
    while(!feof(f))
    {
fscanf(f,"%s",pro[n].lhs);
        if(n>0)
        {
if( strcmp(pro[n].lhs,pro[n-1].lhs) == 0 )
            {
                pro[n].lhs[0]='\0';
fscanf(f,"%s",pro[n-1].rhs[pro[n-1].n]);
                pro[n-1].n++;
                continue;
            }
        }
fscanf(f,"%s",pro[n].rhs[pro[n].n]);
        pro[n].n++;
        n++;
    }
    n--;
printf("\n\nTHE GRAMMAR IS AS FOLLOWS\n\n");
    for(i=0;i<n;i++)
        for(j=0;j<pro[i].n;j++)
printf("%s -> %s\n",pro[i].lhs,pro[i].rhs[j]);
while(1)
    {
        for(l=0;l<10;l++)
str[0]=NULL;
printf("\n\nENTER ANY STRING ( 0 for EXIT ) : ");
scanf("%s",str);
        if(str[0]=='0')
exit(1);
        for(j=0;j<pro[0].n;j++)
        {
            for(l=0;l<20;l++)
                temp[l]=NULL;
strcpy(temp,pro[0].rhs[j]);
            m=0;
            for(i=0;i<strlen(str);i++)
            {
                if(str[i]==temp[i])
                    m++;
                else if(str[i]!=temp[i] && temp[i]>=65 && temp[i]<=90)
                {
findter();
                    if(str[i]==temp[i])
```

```
                m++;
            }
            else if( str[i]!=temp[i] && (temp[i]<65 || temp[i]>90) )
                break;
        }
        if(m==strlen(str) &&strlen(str)==strlen(temp))
        {
printf("\n\nTHE STRING can be PARSED !!!");
            break;
        }
    }
    if(j==pro[0].n)
printf("\n\nTHE STRING can NOT be PARSED !!!");
  }
}
```

**Input.txt file:**



**OUTPUT:**




**CONCLUSION:** In this practical, we implemented Context Free Grammar.

# PRACTICAL – 7

**AIM: Design of a Predictive parser.**

**CODE:**

```
#include<stdio.h>
#include<ctype.h>
#include<string.h>
#include<stdlib.h>
#define SIZE 128
#define NONE -1
#define EOS '\0'
#define NUM 257
#define KEYWORD 258
#define ID 259
#define DONE 260
#define MAX 999
char lexemes[MAX];
char buffer[SIZE];
int lastchar=-1;
int lastentry=0;
int tokenval=DONE;
int lineno=1;
int lookahead;
struct entry
{
   char *lexptr;
   int token;
}
symtable[100];
struct entry
keywords[]=
{"if",KEYWORD,"else",KEYWORD,"for",KEYWORD,"int",KEYWORD,"float",KEYWO
RD,
"double",KEYWORD,"char",KEYWORD,"struct",KEYWORD,"return",KEYWORD,0,0
};
void Error_Message(char *m)
{
fprintf(stderr,"line %d, %s \n",lineno,m);
exit(1);
}
int look_up(char s[ ])
{
   int k;
for(k=lastentry; k>0; k--)
      if(strcmp(symtable[k].lexptr,s)==0)
```

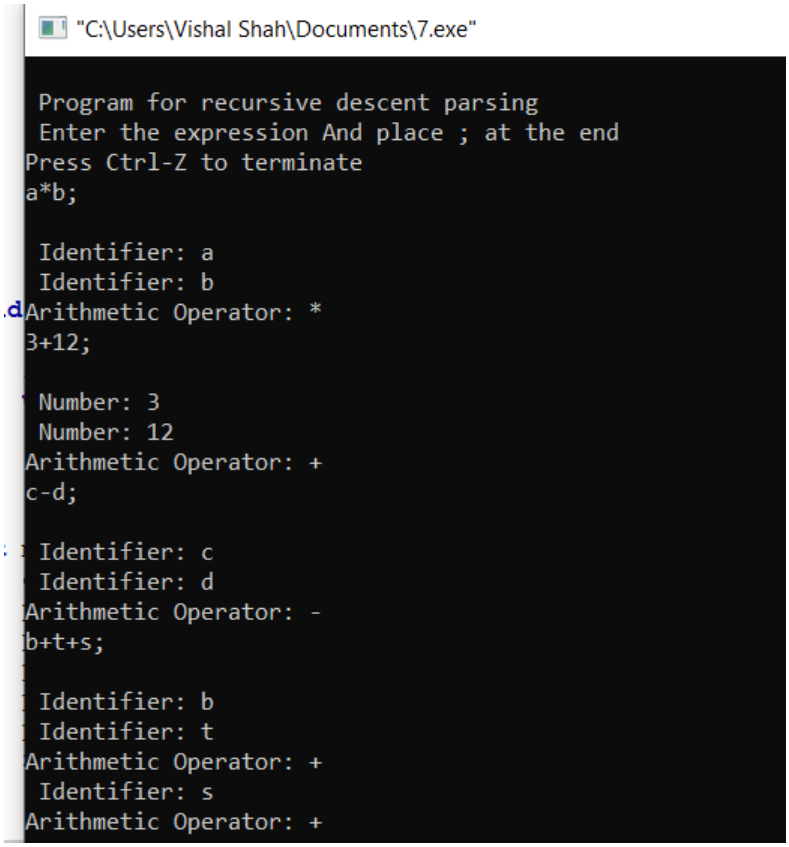
```
            return k;
    return 0;
}
int insert(char s[ ],int tok)
{
    int len;
len=strlen(s);
    if(lastentry+1>=MAX)
Error_Message("Symbpl table is full");
    if(lastchar+len+1>=MAX)
Error_Message("Lexemes array is full");
lastentry=lastentry+1;
symtable[lastentry].token=tok;
symtable[lastentry].lexptr=&lexemes[lastchar+1];
lastchar=lastchar+len+1;
strcpy(symtable[lastentry].lexptr,s);
    return lastentry;
}
/*void Initialize()
{
    struct entry *ptr;
    for(ptr=keywords;ptr->token;ptr+1)
        insert(ptr->lexptr,ptr->token);
}*/
int lexer()
{
    int t;
    int val,i=0;
while(1)
    {
        t=getchar();
if(t==' '||t=='\t');
        else if(t=='\n')
lineno=lineno+1;
        else if(isdigit(t))
        {
ungetc(t,stdin);
scanf("%d",&tokenval);
            return NUM;
        }
        else if(isalpha(t))
        {
            while(isalnum(t))
            {
                buffer[i]=t;
                t=getchar();
```

```
i=i+1;
            if(i>=SIZE)
Error_Message("Compiler error");
          }
          buffer[i]=EOS;
          if(t!=EOF)
ungetc(t,stdin);
val=look_up(buffer);
          if(val==0)
val=insert(buffer,ID);
tokenval=val;
          return symtable[val].token;
       }
       else if(t==EOF)
          return DONE;
       else
       {
tokenval=NONE;
          return t;
       } }}
void Match(int t)
{
   if(lookahead==t)
      lookahead=lexer();
   else
Error_Message("Syntax error");
}
void display(int t,inttval)
{
   if(t=='+'||t=='-'||t=='*'||t=='/')
printf("\nArithmetic Operator: %c",t);
   else if(t==NUM)
printf("\n Number: %d",tval);
   else if(t==ID)
printf("\n Identifier: %s",symtable[tval].lexptr);
   else
printf("\n Token %d tokenval %d",t,tokenval);
}
void F()
{ //void E();
   switch(lookahead)
   {
   case '(' :
Match('(');
E();
Match(')');
```

```
        break;
    case NUM :
display(NUM,tokenval);
Match(NUM);
        break;
    case ID :
display(ID,tokenval);
Match(ID);
        break;
default :
Error_Message("Syntax error");
    }}
void T()
{ int t;
F();
while(1)
{switch(lookahead)
        {
        case '*' :
            t=lookahead;
            Match(lookahead);
F();
            display(t,NONE);
            continue;
        case '/' :
            t=lookahead;
            Match(lookahead);
            display(t,NONE);
            continue;
default :
            return;
        }   }}
void E()
{ int t;
T();
while(1)
{ switch(lookahead)
{case '+' :
            t=lookahead;
            Match(lookahead);
T();
            display(t,NONE);
            continue;
        case '-' :
            t=lookahead;
            Match(lookahead);
```

```
T();
        display(t,NONE);
        continue;
default :
        return;
      } }}
void parser()
{
   lookahead=lexer();
   while(lookahead!=DONE)
{    E();
Match(';');
   }
}
int main()
{   char ans[10];
printf("\n Program for recursive descent parsing ");
printf("\n Enter the expression ");
printf("And place ; at the end\n");
printf("Press Ctrl-Z to terminate\n");
parser();
   return 0;
}
```

**OUTPUT:**



**CONCLUSION:** In this practical, we implemented the Predictive parser.

# PRACTICAL – 8

**AIM: Implementation of code generator.**

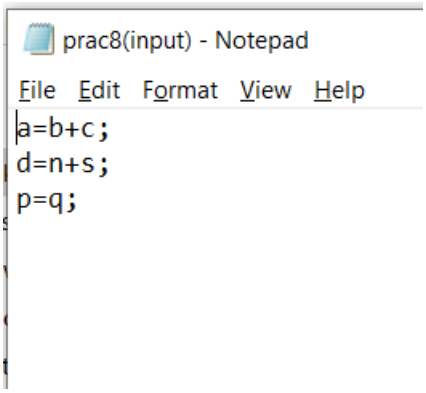
**CODE:**

```
#include<stdio.h>
#include<string.h>
struct table{
char op1[2];
char op2[2];
char opr[2];
char res[2];
}tbl[100];
void add(char *res,char *op1, char *op2,char *opr)
{
	FILE *ft;
	char string[20];
	char sym[100];
	ft=fopen("result.asm","a+");
	if(ft==NULL)
		ft=fopen("result.asm","w");
	printf("\nUpdating Assembly Code for the Input File : File : Result.asm ; Status [ok]\n");
	sleep(2);
	strcpy(string,"mov r0,");
	strcat(string,op1);
	if(strcmp(opr,"&")==0)
	{
		//do nothing
	}
	else
	{
		strcat(string,"\nmov r1,");
		strcat(string,op2);
	}
	fputs(string,ft);
	if(strcmp(opr,"+")==0)
		strcpy(string,"\nadd r0,r1\n");
	else if(strcmp(opr,"-")==0)
		strcpy(string,"\nsub r0,r1\n");
	else if(strcmp(opr,"/")==0)
		strcpy(string,"\ndiv r0,r1\n");
	else if(strcmp(opr,"*")==0)
		strcpy(string,"\nmul r0,r1\n");
	else if(strcmp(opr,"&")==0)
		strcpy(string,"\n");
```

```
        else
                strcpy(string,"\noperation r0,r1\n");
        fputs(string,ft);
        strcpy(string,"mov ");
        strcat(string,res);
        strcat(string,", r0\n");
        fputs(string,ft);
        fclose(ft);
        string[0]='\0';
        sym[0]='\0';
}
main()
{
        int res,op1,op2,i,j,opr;
        FILE *fp;
        char filename[50];
        char s,s1[10];
        remove("result.asm");
        remove("result.sym");
        res=0;op1=0;op2=0;i=0;j=0;opr=0;
        printf("\n Enter the Input Filename with no white spaces:");
        scanf("%s",filename);
        fp=fopen(filename,"r");
        if(fp==NULL)
        {
                printf("\n cannot open the input file !\n");
                return(0);
        }
        else
        {
                while(!feof(fp))
                {
                        s=fgetc(fp);
                                if(s=='=')
                                {
                                        res=1;
                                        op1=op2=opr=0;
                                        s1[j]='\0';
                                        strcpy(tbl[i].res,s1);
                                        j=0;
                                }
                                else if(s=='+'||s=='-'||s=='*'||s=='/')
                                {
                                        op1=1;
                                        opr=1;
                                        s1[j]='\0';
```

```
                                        tbl[i].opr[0]=s;
                                        tbl[i].opr[1]='\0';
                                        strcpy(tbl[i].op1,s1);
                                        j=0;
                                }
                                else if(s==';')
                                {

                                        if(opr)         // for 3 operand format ex: a=b+c;
                                        {
                                                op2=1;
                                                s1[j]='\0';
                                                strcpy(tbl[i].op2,s1);
                                        }
                                        else if(!opr)   // for 2 operand format ex: d=a;
                                        {
                                                op1=1;
                                                op2=0;
                                                s1[j]='\0';
                                                strcpy(tbl[i].op1,s1);
                                                strcpy(tbl[i].op2,"&");         // simplifying the
expr
                                                strcpy(tbl[i].opr,"&");         //-------"--"---------
-
                                        }
                                        add(tbl[i].res,tbl[i].op1,tbl[i].op2,tbl[i].opr);
                                        i++;
                                        j=0;
                                        opr=op1=op2=res=0;
                                }
                                else
                                {
                                        s1[j]=s;
                                        j++;
                        }}}
        return 0;}
```

**Input File:**




**OUTPUT:**

```
 Enter the Input Filename with no white spaces:prac8(input).txt

Updating Assembly Code for the Input File : File : Result.asm ; Status [ok]

Updating Assembly Code for the Input File : File : Result.asm ; Status [ok]

Updating Assembly Code for the Input File : File : Result.asm ; Status [ok]

Process returned 0 (0x0)   execution time : 33.038 s
Press any key to continue.
```

**CONCLUSION:** In this practical, we implemented code generator.

# PRACTICAL – 9

**AIM:Implementation of code optimization for Common sub-expression elimination, Loop invariant code movement.**

**CODE:**

```
#include<stdio.h>
#include<string.h>
struct op
{
   char l;
   char r[20];
}
   op[10],pr[10];
void main()
{
   int a,i,k,j,n,z=0,m,q;
   char *p,*l;
   char temp,t;
   char *tem;
printf("Enter the Number of Values:");
scanf("%d",&n);
   for(i=0;i<n;i++)
   {
printf("left: ");
scanf(" %c",&op[i].l);
printf("right: ");
scanf(" %s",&op[i].r);
   }
printf("Intermediate Code\n") ;
   for(i=0;i<n;i++)
   {
printf("%c=",op[i].l);
printf("%s\n",op[i].r);
   }
   for(i=0;i<n-1;i++)
   {
      temp=op[i].l;
      for(j=0;j<n;j++)
      {
         p=strchr(op[j].r,temp);
         if(p)
         {
pr[z].l=op[i].l;
```

```
strcpy(pr[z].r,op[i].r);
            z++;
          }
       }
   }
   pr[z].l=op[n-1].l;
strcpy(pr[z].r,op[n-1].r);
   z++;
printf("\nAfter Dead Code Elimination\n");
   for(k=0;k<z;k++)
   {
printf("%c\t=",pr[k].l);
printf("%s\n",pr[k].r);
   }
   for(m=0;m<z;m++)
      {
tem=pr[m].r;
      for(j=m+1;j<z;j++)
         {
            p=strstr(tem,pr[j].r);
            if(p)
            {
               t=pr[j].l;
               pr[j].l=pr[m].l;
               for(i=0;i<z;i++)
               {
                  l=strchr(pr[i].r,t) ;
                  if(l)
                  {
                     a=l-pr[i].r;
printf("pos: %d\n",a);
pr[i].r[a]=pr[m].l;
                  }
               }
            }
         }
printf("Eliminate Common Expression\n");
   for(i=0;i<z;i++)
   {
printf("%c\t=",pr[i].l);
printf("%s\n",pr[i].r);
   }
   for(i=0;i<z;i++)
   {
      for(j=i+1;j<z;j++)
```

```
      {
         q=strcmp(pr[i].r,pr[j].r);
         if((pr[i].l==pr[j].l)&&!q)
         {
pr[i].l='\0';
         }
      }
   }
printf("Optimized Code\n");
   for(i=0;i<z;i++)
   {
      if(pr[i].l!='\0')
      {
printf("%c=",pr[i].l);
printf("%s\n",pr[i].r);
      }
   }
}
```

**OUTPUT:**

"C:\Users\Vishal Shah\Documents\9.exe"

```
Enter the Number of Values:6
left: a
right: t
left: 1+2
right: left: c
right: 3
left: a*b
right: left: b+c
right: left: d-a
right: Intermediate Code
a=t
1=+2
c=3
a=*b
b=+c
d=-a

After Dead Code Elimination
a       =t
c       =3
a       =*b
b       =+c
d       =-a
Eliminate Common Expression
a       =t
c       =3
a       =*b
b       =+c
d       =-a
Optimized Code
a=t
c=3
a=*b
b=+c
d=-a

Process returned 5 (0x5)   execution time : 34.469 s
Press any key to continue.
```

**CONCLUSION:** In this practical, we implemented code optimization for Common sub-expression elimination, Loop invariant code movement.

# PRACTICAL – 10

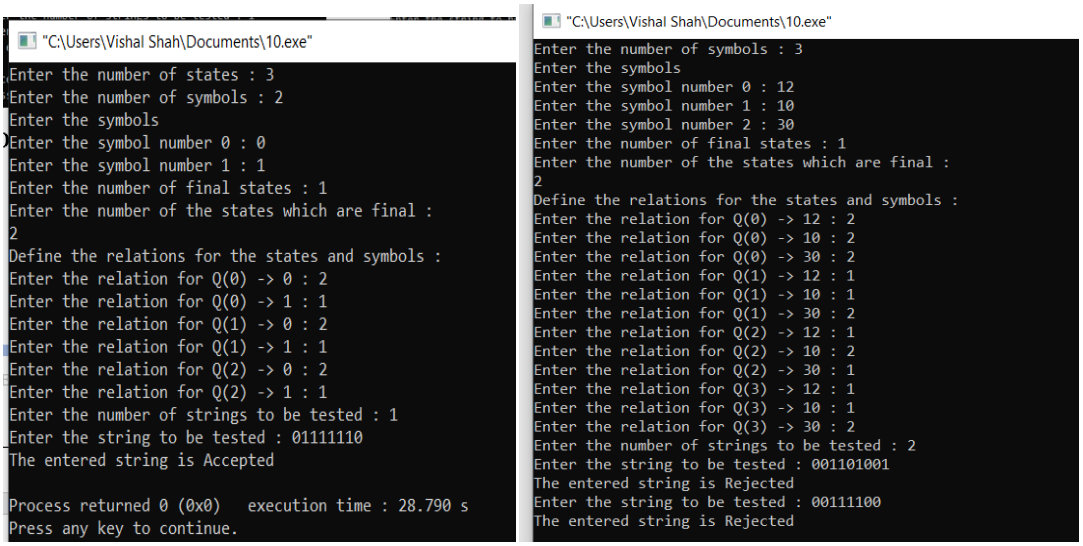
**AIM: Implement Deterministic Finite Automata.**

**CODE:**

```
#include<stdio.h>
#include<string.h>
#define fl(i,a,b) for(i=a; i<b; i++)
#define scan(a) scanf("%d", &a)
#define nlineprintf("\n")
#define MAX 1000
int states, symbols, symdir[20], final_states, mark[20], mat[20][20];
int main()
{
	int i, j, k;
	printf("Enter the number of states : ");
	scan(states);
	printf("Enter the number of symbols : ");
	scan(symbols);
	printf("Enter the symbols ");
	nline;
	fl(i,0,symbols)
	{
		printf("Enter the symbol number %d : ", i);
		scan(symdir[i]);
	}

	printf("Enter the number of final states : ");
	scan(final_states);
	printf("Enter the number of the states which are final : ");
	nline;
	fl(i,0,final_states)
	{
		int temp;
		scan(temp);
		mark[temp]=1;
	}
	printf("Define the relations for the states and symbols : ");
	nline;
	fl(i,0,states)
	{
		fl(j,0,symbols)
		{
			printf("Enter the relation for Q(%d) -> %d : ", i, symdir[j]);
```

```
                scan(mat[i][symdir[j]]);
        }
}
//-------------------------------------------------------//
int cases;
printf("Enter the number of strings to be tested : ");
scan(cases);
fl(k,0,cases)
{
        printf("Enter the string to be tested : ");
        char str1[MAX];
        scanf("%s", &str1);
        int curr=0;
        int limit=strlen(str1);
        fl(i,0,limit)
        {
                int ele=(int)(str1[i]-'0');
                curr=mat[curr][ele];
        }
        printf("The entered string is ");
        if(mark[curr]==1)
                printf("Accepted");
        else
                printf("Rejected");
        nline;
}
return 0;}
```

**OUTPUT:**




**CONCLUSION:** In this practical, we implemented Deterministic Finite Automata.