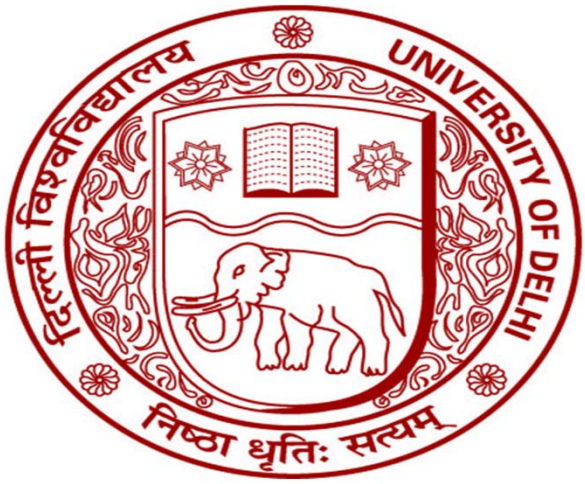
RAMANUJAN COLLEGE DELHI UNIVERSITY



SYSTEM PROGRAMMING PRACTICALS

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SIGNATURE

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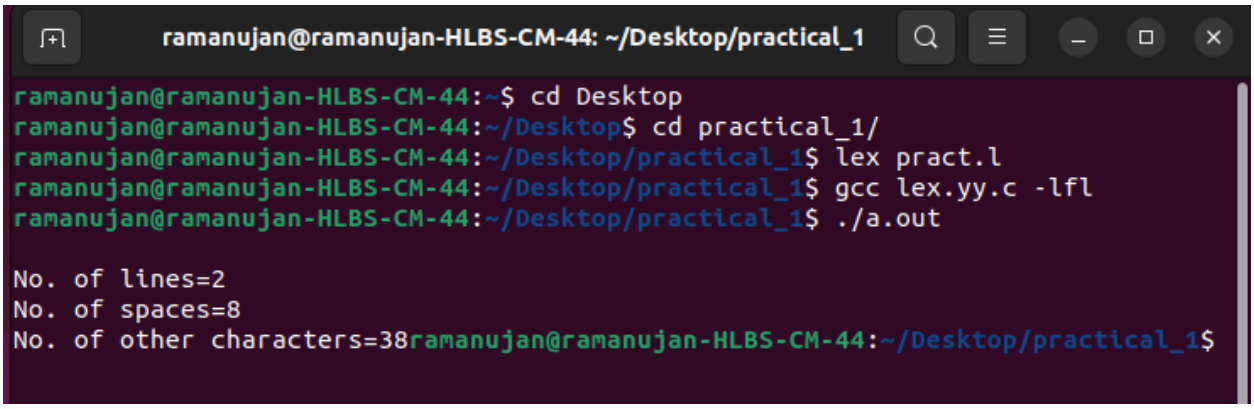
ANS 1.

```
%{
        #include<stdio.h>
        int lc=0, sc=0, tc=0, ch=0; /*Global variables*/
        %}


        /*Rule Section*/
        %%
        \n lc++; //line counter
        ([ ])+ sc++; //space counter
        \t tc++; //tab counter
        . ch++; //characters counter
        %%


        int main()
        {
                // The function that starts the analysis
                yyin=fopen("abc.txt","r");
                yylex();

                printf("\nNo. of lines=%d", lc);
                printf("\nNo. of spaces=%d", sc);

                printf("\nNo. of other characters=%d", ch);

        }
```

OUTPUT:



ANS 2.

```
%{


        %}
        %%
        [A-Wa-w] {printf("%c",yytext[0]+3);}
        [X-Zx-z] {printf("%c",yytext[0]-23);}
        %%
        int main()
        {
        //yyin=fopen("bbc.txt","r");
        //yyout=fopen("kbc.txt","w");
        yylex();


        }
```

OUTPUT:

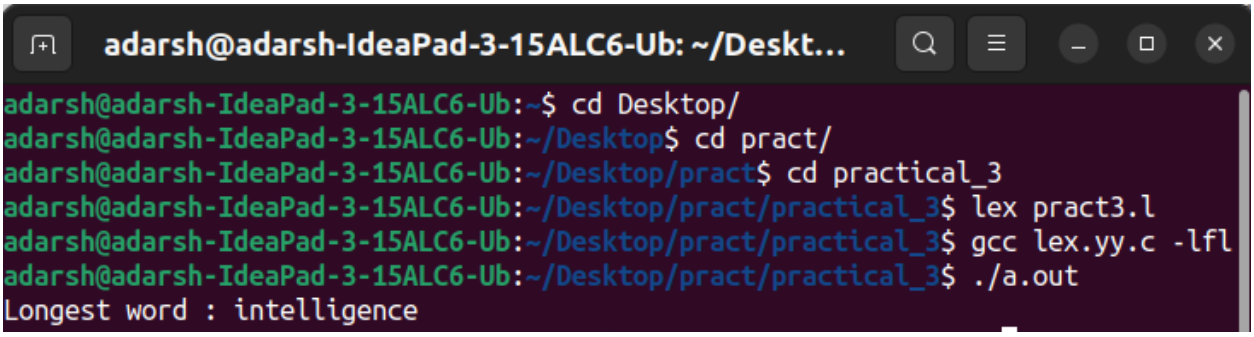
```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_2$ lex pract2.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_2$ gcc lex.yy.c -lfl
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_2$ ./a.out
kkdkww
nngnzz
hsshshshscececevever
kvvkvkvkvfhfhfhyhyhu
```

ANS 3.

```
%{
        #include<stdio.h>
        #include<strings.h>
        // initialising length
        int length=0;
        // char array for storing longest word
        char longestword[50];
        %}


        %%
        [A-Za-z0-9]+ { if (yyleng > length) {


                length=yyleng;
              // strcpy function to copy current word in yytxt in longest
                strcpy(longestword,yytext);
                }
```

```
        }
"." return 1;
%%
int main()
{
yyin=fopen("tbc.txt","r");


yylex();
printf("Longest word : %s\n",longestword);
//printf("Length of Longest word : %s\n",length);


return 0;
}
int yywrap(){
    return 1;
}
```

OUTPUT:



ANS 4.

```
%{

        %}
        %%
        [0-9]* {printf("Integer\n");}
        [0-9]+\.[0-9]+ {printf("Float\n"); }
        int|float|if|else|printf|main|exit|switch {printf("Keyword\n");}
        [+|*|/|%|&] {printf("Operators\n");}
        "-" {printf("Operators\n");}
        "/*".*"*/" {printf("comment\n");}
        [_a-zA-Z][_a-zA-Z0-9]{0,30} {printf("Identifier\n");}
        . {printf("Invalid\n");}
        %%
        int main()
        {
        yyin=fopen("code.c","r");
        yyout=fopen("kmd.txt","w");
        yylex();


        }
```

OUTPUT:

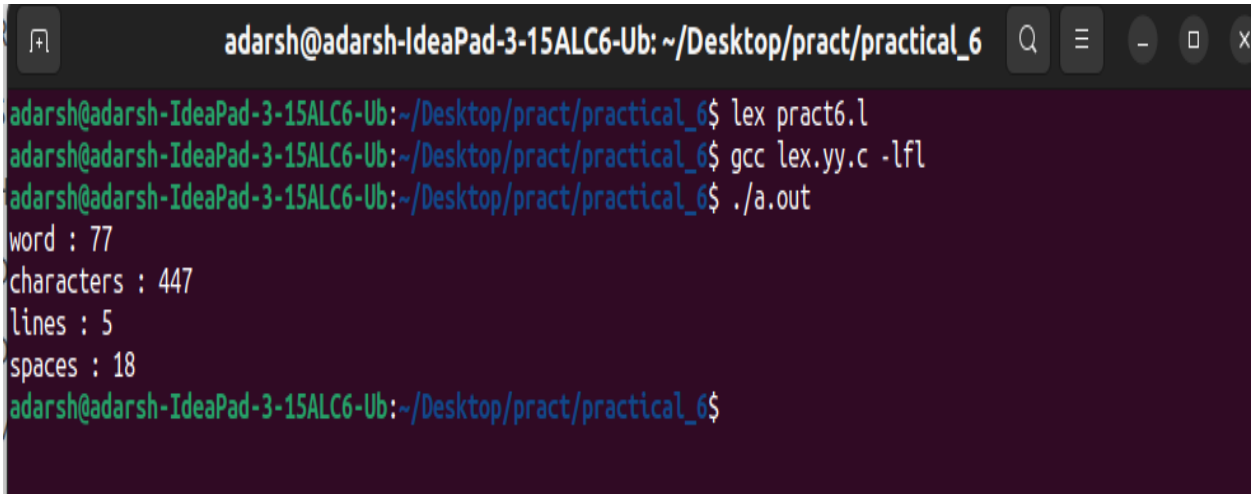
```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~$ cd Desktop/
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop$ cd pract/
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract$ cd practical_4
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_4$ lex prac4.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_4$ gcc lex.yy.c -lfl
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_4$ ./a.out
Invalid
Identifier
Invalid
Invalid
Identifier
Invalid
Identifier
Invalid
Invalid
Invalid
Keyword
Invalid
Keyword
Invalid
Invalid
Invalid
Invalid
Invalid
Invalid
Invalid
Invalid
Invalid
Invalid
Invalid
Keyword
Invalid
Identifier
Invalid
Invalid
Identifier
Invalid
Invalid
Operators
Operators
Invalid
Identifier
Invalid
Identifier
Invalid
Identifier
```

ANS 5.

```
%{
```

```
#include<stdio.h>
int word=0,character=0,space=0,lines=0;
%}
%%
[A-Za-z|0-9]+ {word++;character=character+strlen(yytext);}
. {character++;}
\n {lines++;character++;}
[ \n\t\r]+ {space++;}
%%
int main(int agrc,char **argv)
{
yyin=fopen("pla.txt","r");
yylex();
printf("word : %d\n",word);
printf("characters : %d\n",character);
printf("lines : %d\n",lines);
printf("spaces : %d\n",space);
}
```

OUTPUT:

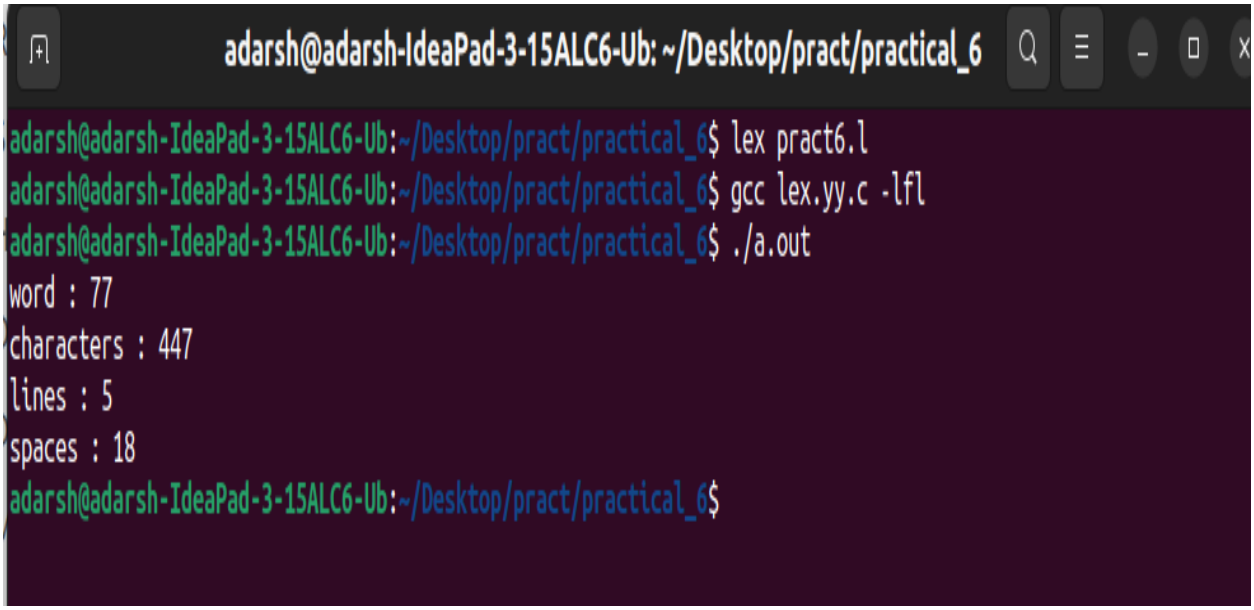


ANS 6.

```
%{
```

```
#include<stdio.h>
int word=0,character=0,space=0,lines=0;
%}
%%
[A-Za-z|0-9]+ {word++;character=character+strlen(yytext);}
. {character++;}
\n {lines++;character++;}
[ \n\t\r]+ {space++;}
%%
int main(int agrc,char **argv)
{
yyin=fopen("pla.txt","r");
yylex();
printf("word : %d\n",word);
printf("characters : %d\n",character);
printf("lines : %d\n",lines);
printf("spaces : %d\n",space);
}
```

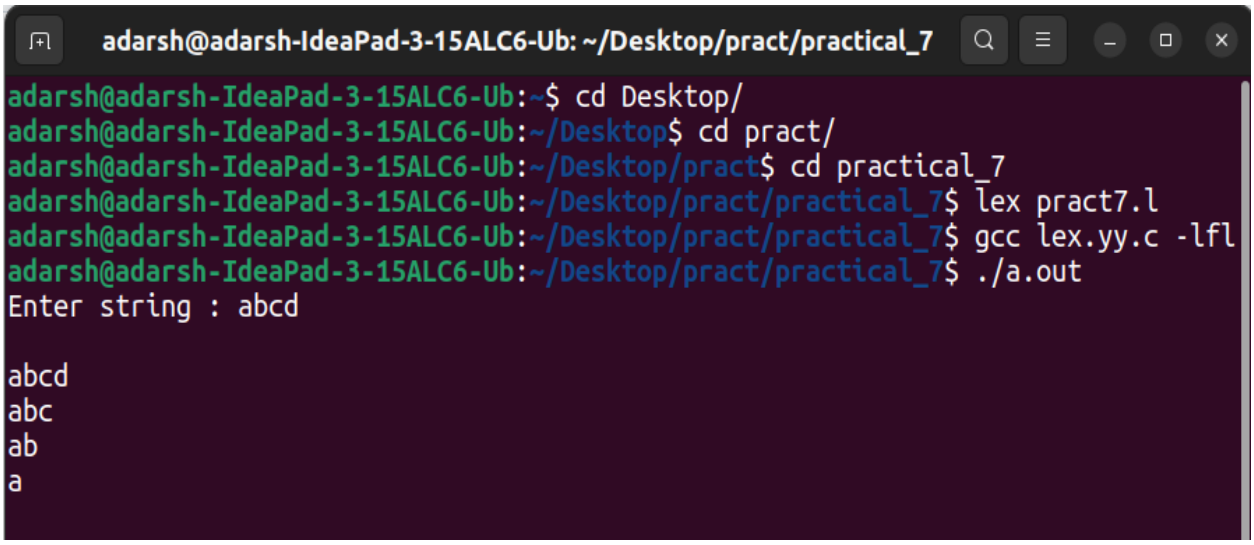
OUTPUT:



ANS 7.

```
%{
        %}
        %%
        [A-Za-z]+ {int len=yyleng;
                  int i=len;
                  printf("\n");
                  while(i>=0)
                  {
                    int j=0;
                    while(j<i)
                    {
                      printf("%c",yytext[j]);
                      j++;
                    }
                    printf("\n");
                    i--;
                  }
                 }
        %%
        int main()
        {
        printf("Enter string : ");
        yylex();
        }
```

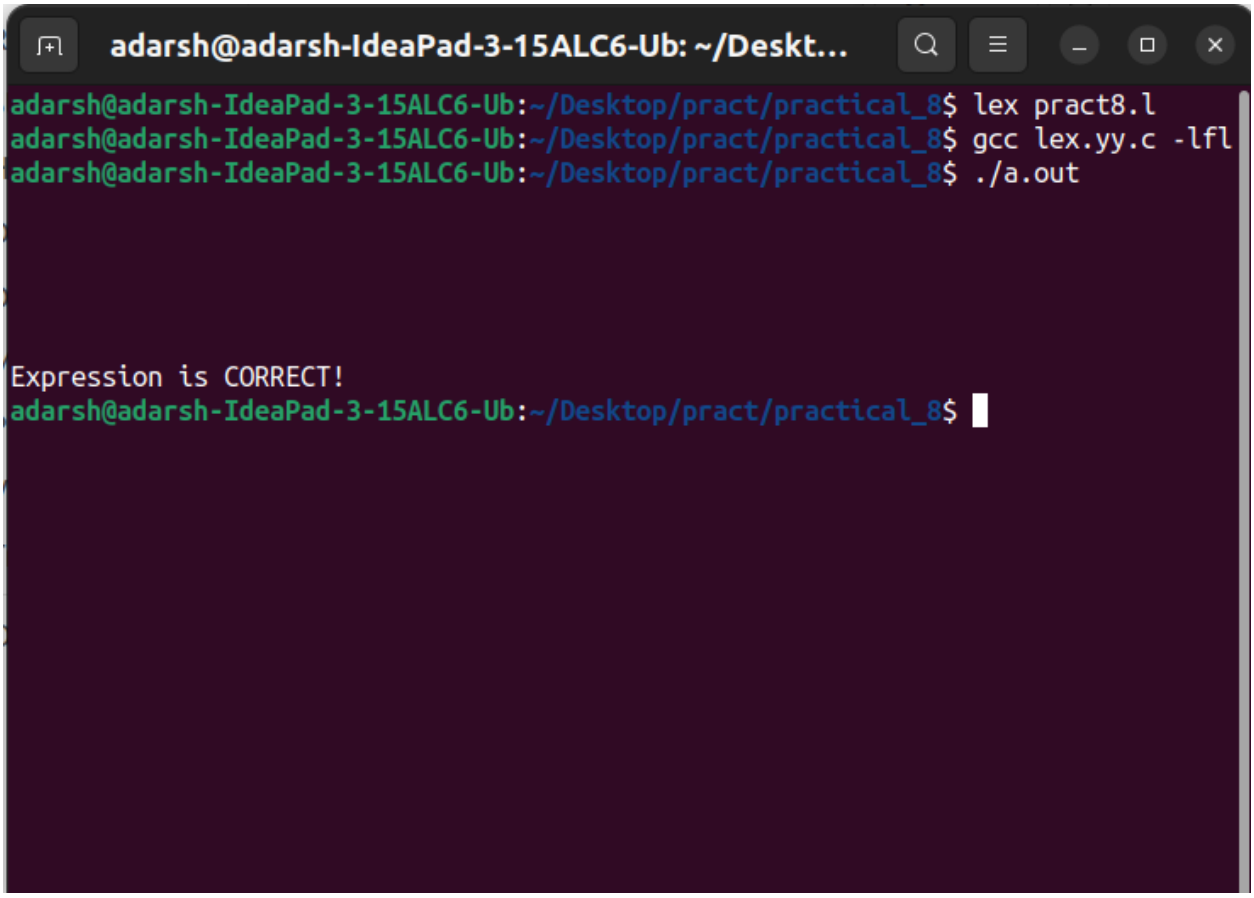
OUTPUT:



ANS 8.

```
%{
        #include<strings.h>
        int opcount=0,intcount=0,check=1,top=0;
        %}
        %%
        ['('] {check=0;}
        [')'] {check=1;}
        [+|*|/|-] {opcount++;}
        [0-9]+ {intcount++;}
        . {printf("Invalid Input only digits and +|-|*|/ is valid\n");}
        %%
        int main()
        {


        yyin=fopen("abd.txt","r");
        yylex();
        if(intcount=opcount+1)
        {
         if(check==1)
         {
            printf("Expression is CORRECT!\n");
         }
         else{
            printf("')' bracket missing from expression\n");
         }
        }
        else{
           printf("Expression is INCORRECT!\n");
        }
        }
```

OUTPUT:


adarsh@adarsh-IdeaPad-3-15ALC6-Ub: ~/Deskt...
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_8$ lex pract8.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_8$ gcc lex.yy.c -lfl
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_8$ ./a.out
Expression is CORRECT!
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_8$

ANS 9.

Lex program:

```
%{
        #include<stdio.h>
        #include "y.tab.h"
        %}


        %%
        [a-zA-Z]+ return VARIABLE;
        [0-9]+ return NUMBER;
        [\t] ;
        [\n] return 0;
        . return yytext[0];
        %%
        int yywrap()
        {
        return 1;
        }
```

Yacc program:

```
%{
            #include<stdio.h>
        %}
        %token NUMBER
        %token VARIABLE


        %left '+' '-'
        %left '*' '/' '%'
        %left '(' ')'


        %%


        S: VARIABLE'='E {
               printf("\nEntered arithmetic expression is Valid\n\n");
               return 0;
             }
        E:E'+'E
         |E'-'E
         |E'*'E
         |E'/'E
         |E'%'E
         |'('E')'
         | NUMBER
         | VARIABLE
        ;


        %%


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

```
}


void yyerror()
{
   printf("\nEntered arithmetic expression is Invalid\n\n");


}
```

OUTPUT:

```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_9$ yacc -d pract9.y
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_9$ lex pract9.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_9$ cc lex.yy.c y.tab.c -ll
y.tab.c: In function ‘yyparse’:
y.tab.c:1034:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
 1034 |       yychar = yylex ();
      |                ^~~~~
y.tab.c:1178:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
 1178 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
      |       yyerrok
pract9.y: At top level:
pract9.y:35:6: warning: conflicting types for ‘yyerror’; have ‘void()’
   35 | void yyerror()
      |      ^~~~~~~
y.tab.c:1178:7: note: previous implicit declaration of ‘yyerror’ with type ‘void()’
 1178 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_9$ ./a.out

Enter Any Arithmetic Expression which can have operations Addition, Subtraction, Multiplication, Divison, Modulus and Round brac
a=56-9

Entered arithmetic expression is Valid

adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_9$ ./a.out

Enter Any Arithmetic Expression which can have operations Addition, Subtraction, Multiplication, Divison, Modulus and Round brac
aaaa4s

Entered arithmetic expression is Invalid

adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_9$
```

ANS 10.

Lex program:

```
%{
        #include "y.tab.h"
        %}
        %%
        [0-9]+ {return DIGIT;}
        [a-z]+ {return LETTER;}
        [ \t] {;}
        \n { return 0;}
        . {return yytext[0];}
        %%
```

Yacc program:

```
%{
        #include<stdio.h>
        #include<stdlib.h>
        %}
        %token DIGIT LETTER
        %%
        stmt:A
             ;
        A: LETTER B
         ;
        B: LETTER B
         | DIGIT B
         | LETTER
         | DIGIT
         ;
        %%
        void main(){
        printf("enter string \n");
```

```
yyparse();
printf("valid \n");
exit(0);
}
void yyerror()
{
printf("invalid \n");
exit(0);
}
```

OUTPUT:

```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$ yacc -d pract10.y
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$ lex pract10.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$ cc lex.yy.c y.tab.c -ll
y.tab.c: In function ‘yyparse’:
y.tab.c:1014:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
 1014 |       yychar = yylex ();
      |                ^~~~~
y.tab.c:1149:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
 1149 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
      |       yyerrok
pract10.y: At top level:
pract10.y:23:6: warning: conflicting types for ‘yyerror’; have ‘void()’
   23 | void yyerror()
      |      ^~~~~~~
y.tab.c:1149:7: note: previous implicit declaration of ‘yyerror’ with type ‘void()’
 1149 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$ ./a.out
enter string
a1
valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$ ./a.out
enter string
54a
invalid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$ ./a.out
enter string
q9
valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_10$
```

ANS 11.

Lex program:

```
%{
        #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;
        }
```

Yaac program:

```
%{
            #include<stdio.h>
```

```
    int flag=0;

%}
%token NUMBER


%left '+' '-'
%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;}
 |'('E')' {$$=$2;}
 | NUMBER {$$=$1;}
;
%%


void main()
{
   printf("\nEnter Any Arithmetic Expression :\n");
   yyparse();
  if(flag==0)
   printf("\nEntered arithmetic expression is Valid\n\n");

}
void yyerror()
{
   printf("\nEntered arithmetic expression is Invalid\n\n");
   flag=1;
}
```

OUTPUT:

```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ yacc -d pract11.y
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ lex pract11.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ cc lex.yy.c y.tab.c
y.tab.c: In function ‘yyparse’:
y.tab.c:1026:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
 1026 |       yychar = yylex ();
      |                ^~~~~
y.tab.c:1212:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
 1212 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
      |       yyerrok
pract11.y: At top level:
pract11.y:34:6: warning: conflicting types for ‘yyerror’; have ‘void()’
   34 | void yyerror()
      |      ^~~~~~~
y.tab.c:1212:7: note: previous implicit declaration of ‘yyerror’ with type ‘void()’
 1212 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out

Enter Any Arithmetic Expression :
4+6-9

Result=1

Entered arithmetic expression is Valid

adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out

Enter Any Arithmetic Expression :
a+b

Entered arithmetic expression is Invalid

adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out

Enter Any Arithmetic Expression :
(45+6)-(21*2)

Result=9

Entered arithmetic expression is Valid
```

ANS 12.

Lex program:

```
%{
        #include "y.tab.h"
        %}
        alpha [Aa]
        beta [Bb]
        newline [\n]
        %%
        {alpha} { return alpha ;}
        {beta} {return beta;}
        {newline} { return newline ;}
        . { printf("Invalid Expression\n");exit(0); }
        %%
```

Yaac program:

```
%{
        #include<stdio.h>
        #include<stdlib.h>
        #include<strings.h>
        %}
        %token alpha beta newline
        %%
        line : term newline {printf("Input is Valid\n"); exit(0);};
        term: alpha term beta | ;
        %%


        int yyerror(char *msg)
        {
        printf("Invalid Input\n");
        exit(0);
        }


        int main ()
        {
        printf("Enter the expresssion: ");
        yyparse();
        }
```

OUTPUT:

```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ yacc -d pract11.y
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ lex pract11.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ cc lex.yy.c y.tab.c -ll
y.tab.c: In function ‘yyparse’:
y.tab.c:1018:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
 1018 |       yychar = yylex ();
      |                ^~~~~
y.tab.c:1159:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
 1159 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
      |       yyerrok
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out
Enter the expresssion: ab
Input is Valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ aabb
aabb: command not found
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out
Enter the expresssion: aabb
Input is Valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out
Enter the expresssion: aaabbb
Input is Valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out
Enter the expresssion: a
Invalid Input
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$ ./a.out
Enter the expresssion: iii
Invalid Expression
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_11$
```

ANS 13.

Lex program:

```
%{
        #include "y.tab.h"
        %}
        alpha [a]{10,}
        beta [b]
        newline [\n]
        %%
        {alpha} { return alpha ;}
        {beta} {return beta;}
        {newline} { return newline ;}
        . { printf("Invalid Expression\n");exit(0); }
        %%
```

Yaac program:

```
%{
        #include<stdio.h>
        #include<stdlib.h>
        #include<strings.h>
        %}
        %token alpha beta newline
        %%
        line : term beta newline {printf("Input is Valid\n"); exit(0);};
        term: alpha term |;
        %%


        int yyerror(char *msg)
        {
        printf("Invalid Input\n");
        exit(0);
        }


        int main ()
        {
        printf("Enter the expresssion: ");
        yyparse();
        }
```

OUTPUT:

```
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ yacc -d pract13.y
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ lex pract13.l
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ cc lex.yy.c y.tab.c -ll
y.tab.c: In function ‘yyparse’:
y.tab.c:1018:16: warning: implicit declaration of function ‘yylex’ [-Wimplicit-function-declaration]
 1018 |       yychar = yylex ();
      |                ^~~~~
y.tab.c:1159:7: warning: implicit declaration of function ‘yyerror’; did you mean ‘yyerrok’? [-Wimplicit-function-declaration]
 1159 |       yyerror (YY_("syntax error"));
      |       ^~~~~~~
      |       yyerrok
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ ./a.out
Enter the expresssion: aab
Invalid Expression
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ aaaaaaaaab
aaaaaaaaab: command not found
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ ./a.out
Enter the expresssion: aaaaaaaaaab
Input is Valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ ./a.out
Enter the expresssion: aaaaaaaaaaaaaaaaaaaaaaaab
Input is Valid
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$ ./a.out
Enter the expresssion: vbvv
Invalid Expression
adarsh@adarsh-IdeaPad-3-15ALC6-Ub:~/Desktop/pract/practical_13$
```