Exp13 : FIRST & FOLLOW

1. Start
2. Read the no of productions n , the productions in a[10][10] and the character in c
3. first(c)
4. remove_duplicate()
5. print f if(f[i] != '0')
6. follow()
7. remove_duplicate()
8. print f if(f[i] != 'e & f[i] != '0')

9. void remove_duplicate()
    1. for i = 0 to m
        1. for j = i+1 to m
            1. if(f[i] == f[j]) then
                1. f[j] = '0'

10. void first(c)
    1. if(islower(c)) then
        1. f[m] = c
        2. return
    2. for i = 0 to n
        1. if (a[i][0] = c) then
            1. for j = 2 to strlen(a[i]) do
                1. if(islower(a[i][j])) then
                    1. f[m] = c
                    2. m++
                2. else
                    1. first(a[i][j])
                    2. if (f[m-1] = 'e') then
                        1. break
                    3. else
                        1. if(a[i][j+1] != '\0') then
                            1. m--
                            2. continue

11. void follow(c)
    1. if(a[0][0] = c) then
        1. f[m] = '$'
        2. return
    2. for i = 0 to n
        1. for j = 2 to strlen(a[i])
            1. if(a[i][j] = c) then do
                1. if(a[i][j+1] != '\0') then
                    1. do
                        1. temp = m
                        2. for k = temp to m do
                            1. if(f[k] = e)
                                1. flag = 1
                                2. j++
                    2. while(flag=1 & a[i][j+1] != '\0')
                2. if(a[i][j+1] = '\0' & a[i][0] != c) then call follow(a[i][0])
12. Stop

```c
#include<stdio.h>
#include<string.h>
#include<ctype.h>

void first(char);
void follow(char);
void remove_duplicate();

int n,m=0,i,j,k,flag;
char a[10][10],f[10];

void remove_duplicate(){
    for(i=0;i<m;i++){
        for(j=i+1;j<m;j++){
            if(f[i]==f[j]){
                f[j] = '0';
            }
        }
    }
}

void first(char c){
    if(islower(c)){
        f[m++]=c;
        return;
    }
    for(i=0;i<n;i++){
        if(a[i][0]==c){
            for(j=2;j<strlen(a[i]);j++){
                if(islower(a[i][j])){
                    f[m++]=a[i][j];
                    break;
                }else{
                    first(a[i][j]);
                    if(f[m-1] != 'e'){
                        break;
                    }else{
                        if(a[i][j+1]!='\0'){
                            m--;
                            continue;
                        }
                    }
                }
            }
        }
    }
}

void follow(char c){
    if(a[0][0]==c){
        f[m++]='$';
```

```c
            return;
        }
    for(i=0;i<n;i++){
        for(j=2;j<strlen(a[i]);j++){
            if(a[i][j]==c){
                if(a[i][j+1]!='\0'){
                    do{
                            int temp = m;
                            first(a[i][j+1]);
                            flag=0;
                            for(k=temp;k<m;k++){
                                    if(f[k] == 'e'){
                                            flag=1;
                                            j++;
                                    }
                            }
                    }while(flag==1 && a[i][j+1]!='\0');
                }
                if(a[i][j+1]=='\0' && c!=a[i][0]){
                    follow(a[i][0]);
                }
            }
        }
    }
}

int main(){
    int z;
    char c,ch;
    printf("Enter the no of productions = ");
    scanf("%d",&n);
    printf("Enter the productions\n");
    for(i=0;i<n;i++){
        scanf("%s%c",a[i],&ch);
    }

    do{
        m=0;
        printf("Enter the elemet whose first & follow is to be found : ");
        scanf("%c",&c);
        first(c);
        rem_duplicate();
        printf("First(%c) = { ",c);
        for(i=0;i<m;i++){
            if(f[i] != '0'){
                printf("%c ",f[i]);
            }
        }printf("}\n");

        strcpy(f," ");
        m=0;
        follow(c);
```

```
    rem_duplicate();
    printf("Follow(%c) = { ",c);
    for(i=0;i<m;i++){
        if(f[i] != 'e' && f[i] != '0'){
            printf("%c ",f[i]);
        }
    }printf("}\n");

    printf("Continue(0/1) = ");
    scanf("%d%c",&z,&ch);
    }while(z==1);

    return 0;
}
```

output