11 **. write a C program to find ε-closure of a Non-Deterministic Finite Automata with ε-moves**

**CODE :**

**#include<stdio.h>**

**#include<string.h>**

**int trans\_table[10][5][3];**

**char symbol[5],a;**

**int e\_closure[10][10],ptr,state;**

**void find\_e\_closure(int x);**

**int main()**

**{**

**int i,j,k,n,num\_states,num\_symbols;**

**for(i=0;i<10;i++)**

**{**

**for(j=0;j<5;j++)**

**{**

**for(k=0;k<3;k++)**

**{**

**trans\_table[i][j][k]=-1;**

**}**

**}**

**}**

**printf("How may states in the NFA with e-moves:");**

**scanf("%d",&num\_states);**

**printf("How many symbols in the input alphabet including e :");**

**scanf("%d",&num\_symbols);**

**printf("Enter the symbols without space. Give 'e' first:");**

**scanf("%s",symbol);**

**for(i=0;i<num\_states;i++)**

**{**

**for(j=0;j<num\_symbols;j++)**

**{**

**printf("How many transitions from state %d for the input%c:",i,symbol[j]);**

**scanf("%d",&n);**

**for(k=0;k<n;k++)**

**{**

**printf("Enter the transitions %d from state %d for the input%c :", k+1,i,symbol[j]);**

**scanf("%d",&trans\_table[i][j][k]);**

**}**

**}**

**}**

**for(i=0;i<10;i++)**

**{**

**for(j=0;j<10;j++)**

**{**

**e\_closure[i][j]=-1;**

**}**

**}**

**for(i=0;i<num\_states;i++)**

**e\_closure[i][0]=i;**

**for(i=0;i<num\_states;i++)**

**{**

**if(trans\_table[i][0][0]==-1)**

**continue;**

**else**

**{**

**state=i;**

**ptr=1;**

**find\_e\_closure(i);**

**}**

**}**

**for(i=0;i<num\_states;i++)**

**{**

**printf("e-closure(%d)= {",i);**

**for(j=0;j<num\_states;j++)**

**{**

**if(e\_closure[i][j]!=-1)**

**{**

**printf("%d, ",e\_closure[i][j]);**

**}**

**}**

**printf("}\n");**

**}**

**}**

**void find\_e\_closure(int x)**

**{**

**int i,j,y[10],num\_trans;**

**i=0;**

**while(trans\_table[x][0][i]!=-1)**

**{**

**y[i]=trans\_table[x][0][i];**

**i=i+1;**

**}**

**num\_trans=i;**

**for(j=0;j<num\_trans;j++)**

**{**

**e\_closure[state][ptr]=y[j];**

**ptr++;**

**find\_e\_closure(y[j]);**

**}**

**}**

**OUTPUT :**

