NAME : EBIN MATHEW
CLASS : S7R
ROLL NO : 19

AIM : NFA TO DFA

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
char mat[20][20]
[20],states[20],trans[3]={'0','1','e'},stack[100],epsilon[20][20];
int numst,numtra=3,i=0,y,top=0;
char dummy;
char generated[20][20];
char ans[50];
void findep(char state);
int findindex(char state);
void findepsilon();
void nfa2dfa();
void printepsilon(char ch[],int i);
int present();
void printanswer();
void main()
{
  printf("Enter the states:");
  scanf("%s",states);
  numst=strlen(states);
  for(i=0;i<numst;i++)
  {
   printf("Enter transition under %c : ",states[i]);
```

```
 for(int j=0;j<numtra;j++)
 { scanf("%s",mat[i][j]); }
}
printf("0 1 e\n");
for(i=0;i<numst;i++)
{
 printf("%c ",states[i]);
 for(int j=0;j<numtra;j++)
  printf("%s ",mat[i][j]);
 printf("\n");
}
findepsilon();
printf("\n Epsilon Closure\n");
for(i=0;i<numst;i++)
 printf("%c: %s \n",states[i],epsilon[i]);
printf("\n DFA \n");
nfa2dfa();
}
void findepsilon()
{
 char temp[2];
 for(y=0;y<numst;y++)
 {
  temp[0]=states[y];
  temp[1]='\0';
  strcat(epsilon[y],temp);
  findep(states[y]);
  }
}
int findindex(char state)
{
 for(i=0;i<numst;i++)
  if(states[i]==state)
   return i;
  return -1;
```

```
}
void findep(char state)
{
 char eps[20];
 int ind=findindex(state);
 if(ind!=-1)
 {
  strcpy(eps,mat[ind][2]);
  if(strcmp(eps,"-")!=0)
  {
   strcat(epsilon[y],eps);
   int num=strlen(eps);
   for(int x=0;x<num;x++)
    findep(eps[x]);
  }
 }
}
void nfa2dfa()
{
 char temp[20];
 printf("   0   1\n");
 printf("A: ");
 strcpy(generated[top++],epsilon[0]);
 strcpy(temp,epsilon[0]);
 printepsilon(temp,0);
 printepsilon(temp,1);
 for(int xy=1;xy<top;xy++)
 {
 printf("\n%c :",xy+'A');
 strcpy(temp,generated[xy]);
 printepsilon(temp,0);
 printepsilon(temp,1);
 }
 printf("\n");
}
```

```
void printanswer(char ch[])
{
 int flag=0;
 for(int i=0;i<top;i++)
 {
  if(strcmp(ch,generated[i])==0)
  {
   printf("%c",i+'A');
   flag=1;
   break;
  }
 }
 if(flag==0)
  printf("%c",top+'A');
}
void printepsilon(char ch[],int off)
{
 char temp[20]=" ",temp1[20]=" ",tt;
 int f1=0,index1=-1;
 for(int i=0;i<strlen(ch);i++)
 {
 int index=findindex(ch[i]);
 if(strcmp(mat[index][off],"-")!=0)
 {
 strcat(temp1,mat[index][off]);
 if(strlen(temp1)>1)
 {
 for(int xyz=0;xyz<strlen(temp1);xyz++)
 {
 tt=temp1[xyz];
 index1=findindex(tt);
 strcat(temp,epsilon[index1]);
 }
 }
 else
```

```
{
 tt=temp1[0];
 index1=findindex(tt);
 strcat(temp,epsilon[index1]);
 f1++;
}
}
strcpy(temp1," ");
}
printanswer(temp);
printf("\t");
if(present(temp)==0)
{
strcpy(generated[top++],temp);
}
strcpy(temp,"");
f1=0;
strcpy(temp1,"");
}
int present(char new[])
{
 for(int i=0;i<top;i++)
 {
  if(strcmp(new,generated[i])==0)
  return 1;
 }
 return 0;
}
```