PRACTICAL-10

AIM:

Implement Deterministic Finite Automata.

PROGRAM CODE:

```
/*
 * DFA Simulation in C
 */
#include <stdio.h>
#include <stdlib.h>

struct node{
  int id_num;
  int st_val;
  struct node *link0;
  struct node *link1;
};
struct node *start, *q, *ptr;
int vst_arr[100], a[10];
int main(){
  int count, i, posi, j;
  char n[10];
  //clrscr();
  printf("\nPARTH PATEL\n19DCS098\n");
  printf("=-=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=\n");
  printf("Enter the number of states in the m/c:");
  scanf("%d",&count);

  q=(struct node *)malloc(sizeof(struct node)*count);

  for(i=0;i<count;i++)
  {
    (q+i)->id_num=i;

    printf("State Machine::%d\n",i);
    printf("Next State if i/p is 0:");
    scanf("%d",&posi);
    (q+i)->link0=(q+posi);
```

```
  printf("Next State if i/p is 1:");
  scanf("%d",&posi);
  (q+i)->link1=(q+posi);

  printf("Is the state final state(0/1)?");
  scanf("%d",&(q+i)->st_val);
 }

 printf("Enter the Initial State of the m/c:");
 scanf("%d",&posi);
 start=q+posi;

 printf("=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=\n");

 while(1){
  printf("=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=\n");
  printf("Perform String Check(0/1):");
  scanf("%d",&j);
  if(j){
    ptr=start;
    printf("Enter the string of inputs:");
    scanf("%s",n);
    posi=0;

    while(n[posi]!='\0'){
  a[posi]=(n[posi]-'0');
  //printf("%c\n",n[posi]);
  //printf("%d",a[posi]);
  posi++;
    }

    i=0;
    printf("The visited States of the m/c are:");
    do{
  vst_arr[i]=ptr->id_num;
  if(a[i]==0){
    ptr=ptr->link0;
  }
  else if(a[i]==1){
    ptr=ptr->link1;
  }
```

```
    else{
      printf("iNCORRECT iNPUT\n");
      return;
    }
    printf("[%d]",vst_arr[i]);
    i++;
      }while(i<posi);

      printf("\n");
      printf("Present State:%d\n",ptr->id_num);
      printf("String Status:: ");
      if(ptr->st_val==1)
    printf("String Accepted\n");
      else
    printf("String Not Accepted\n");
    }
    else
      return 0;

  }
    printf("=-=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=-=\n");
  return 0;
}
```

OUTPUT:

```
PARTH PATEL
19DCS098
=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=
Enter the number of states in the m/c:2
State Machine::0
Next State if i/p is 0:1
Next State if i/p is 1:0
Is the state final state(0/1)?0
State Machine::1
Next State if i/p is 0:0
Next State if i/p is 1:1
Is the state final state(0/1)?1
Enter the Initial State of the m/c:0
=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=
=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=
Perform String Check(0/1):1
Enter the string of inputs:00
The visited States of the m/c are:[0][1]
Present State:0
String Status:: String Not Accepted
=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=
Perform String Check(0/1):1
Enter the string of inputs:1010
The visited States of the m/c are:[0][0][1][1]
Present State:0
String Status:: String Not Accepted
=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=
Perform String Check(0/1):1
Enter the string of inputs:0
The visited States of the m/c are:[0]
Present State:1
String Status:: String Accepted
=-=-=-=-=-=-=-=-==-=-=-=-=-=-=-=-=-=-=
```