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Lab Cycle 2 - Experiment 10

Write a program to find ε – closure of all states of any given NFA with ε transition.

Code:

```
#include <stdio.h>
#include <string.h>
char result[20][20], copy[3], states[20][20];
void add_state(char a[3], int i)
{
   strcpy(result[i], a);
}
void display(int n)
{
   int k = 0;
   printf("\nEpsilon closure of %s = {", copy);
   while (k < n)
   {
       printf(" %s", result[k]);
       k++;
   }
   printf(" } \n");
}
int main()
{
   FILE *INPUT;
   INPUT = fopen("input.txt", "r");
   char state[3];
   int end, i = 0, n, k = 0;
   char state1[3], input[3], state2[3];
   printf("\nEnter the no of states: ");
   scanf("%d", &n);
   printf("\nEnter the states:");
   for (k = 0; k < 3; k++)
   {
       scanf("%s", states[k]);
   }
   for (k = 0; k < n; k++)
   {
       i = 0;
       strcpy(state, states[k]);
```

```
        strcpy(copy, state);
        add_state(state, i++);
        while (1)
        {
            end = fscanf(INPUT, "%s%s%s", state1, input, state2);
            if (end == EOF)
            {
                break;
            }
            if (strcmp(state, state1) == 0)
            {
                if (strcmp(input, "e") == 0)
                {
                    add_state(state2, i++);
                    strcpy(state, state2);
                }
            }
        }
        display(i);
        rewind(INPUT);
    }
    return 0;
}
```

Output:

```
gokz1119@gokz-Lenovo:/media/gokz1119/New Volume/S7/CD Lab/Epsilon_Closure$ gcc epsilon_closure.c
gokz1119@gokz-Lenovo:/media/gokz1119/New Volume/S7/CD Lab/Epsilon_Closure$ ./a.out

Enter the no of states: 3

Enter the states:q0 q1 q2

Epsilon closure of q0 = { q0 q1 q2 }

Epsilon closure of q1 = { q1 q2 }

Epsilon closure of q2 = { q2 }
gokz1119@gokz-Lenovo:/media/gokz1119/New Volume/S7/CD Lab/Epsilon_Closure$
```