Lab Task

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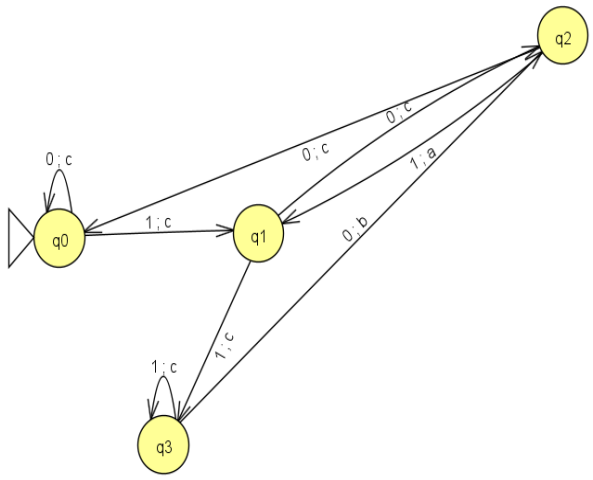
Task : Implement Mealy Machine in C

Design a Mealy machine for a binary input sequence such that if it has a substring 101, the machine output A, if the input has substring 110, it outputs B otherwise it outputs C

Mealy Machine Diagram :



Input	Result
10101010	ccacacac
0000000	ccccccc
1111111111	cccccccccc
111111111000	ccccccccbcc
100000100000	cccccccccccc
101010101000001	ccacacacacccccc
0000000101101100101	ccccccccacbacbccca

C Program :

```
#include <stdio.h>

int n, m;
```

```
int Mealy(int curr, char c, char a[], int trasnTable[100][100], char
output[100][100])
{
    int i;
    for (i = 1; i <= m; i++)
    {
        if (a[i] == c)
        {
            printf("%c ", output[curr][i]);
            return trasnTable[curr][i];
        }
    }
    return -1;
}
int main()
{
    printf("Give input for the no of states - ");
    scanf("%d", &n);
    printf("Enter the no. of input symbols - ");
    scanf("%d", &m);
    printf("Enter the %d input symbols - \n", m);
```

```
char a[m + 2], cc;
int i, j;
for (i = 1; i <= m; i++)
{
    scanf(" %c", &cc);
    if (cc == '\n')
        break;
    a[i] = cc;
}

int transTable[100][100];
char output[100][100];
printf("Enter the transitions :\n");
for (i = 0; i < n; i++)
{
    for (j = 1; j <= m; j++)
    {
        printf("(q%d, %c) = q", i, a[j]);
        scanf("%d", &transTable[i][j]);
    }
```

```
}
printf("Enter the outputs at each transition :\n");
for (i = 0; i < n; i++)
{
    for (j = 1; j <= m; j++)
    {
        printf("(q%d, %c) = ", i, a[j]);
        scanf(" %c", &output[i][j]);
    }
}
while (1)
{
    printf("\nEnter a string :\n");
    char s[100];
    scanf("%s", s);
    int curr_state = 0, i = 0;
    while (s[i] != '\0')
    {
        curr_state = Mealy(curr_state, s[i], a, transTable, output);
        if (curr_state == -1)
        {
```

```
            printf("Invalid Input symbol %c not defined.\n", s[i]);
            break;
        }
        i++;
    }
    printf("\n");
    char op;
    printf("Do you wish to continue (Y/N) : ");
    scanf(" %c", &op);
    if (op == 'N')
        break;
  }
  return 0;
}
```

Output :

```
Give input for the no of states - 4
Enter the no. of input symbols - 2
Enter the 2 input symbols -
0 1
Enter the transitions :
(q0, 0) = q0
(q0, 1) = q1
(q1, 0) = q2
(q1, 1) = q3
(q2, 0) = q0
(q2, 1) = q1
(q3, 0) = q2
(q3, 1) = q3
Enter the outputs at each transition :
(q0, 0) = c
(q0, 1) = c
(q1, 0) = c
(q1, 1) = c
```

```
(q2, 0) = c
(q2, 1) = a
(q3, 0) = b
(q3, 1) = c

Enter a string :
101010101
c c a c a c a c a
Do you wish to continue (Y/N) : Y

Enter a string :
000000101011011001010
c c c c c c c c a c a c b a c b c c c a c
Do you wish to continue (Y/N) : Y

Enter a string :
11111111111
c c c c c c c c c c c
```