Program 2:

WAP to implement a MEALY MACHINE, where the program generates an output corresponding to an input string given through the console.

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#define MAX_TRANSISTION 100
#define MAX_VARIABLES 100

struct Transistion
{
 int stateToTransistion;
 char output[5];
};

int Read(char *str)
{
 int i = 0;
 while (1)
 {
  str[i] = getchar();
  if (str[i] == '\n' || str[i] == '\r')
  {
   str[i] = '\0';
   return i;
  }
  i++;
 }
}

int main()
{

 int tempInt1, tempInt2;
 char ch1, ch2, ch;
 int i = 0, j = 0, k = 0;
 char str1[10] = {0};
 char str2[10] = {0};

 FILE *filePointer = NULL;
 filePointer = fopen("MEALY2.txt", "r");

 if (filePointer == NULL)
 {
  printf("Unable to open MEALY.txt\n");
  return 1;
```

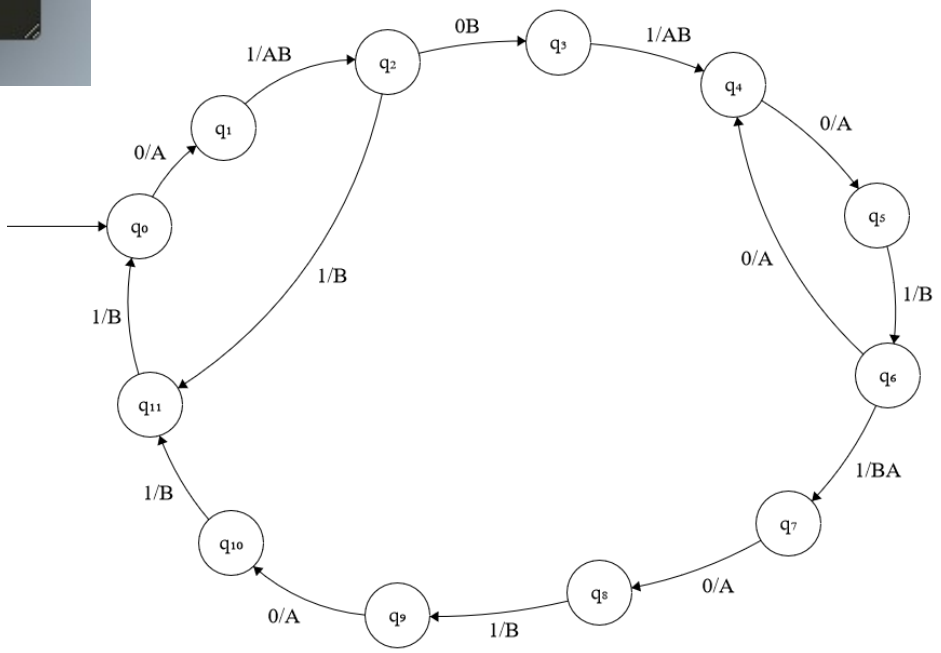
```
 }

 struct Transistion Transistion_Table[MAX_TRANSISTION]
[MAX_VARIABLES];

 for (i = 0; i < MAX_TRANSISTION; ++i)
  for (j = 0; j < MAX_VARIABLES; ++j)
  {
   Transistion_Table[i][j].output[0] = '\0';
   Transistion_Table[i][j].stateToTransistion = -1;
  }

 int initialState = -1;
 int currentState = -1;
 int numberOfStates = 0;
 int numberOfInputs = 0;

 fscanf(filePointer, "%d%c", &initialState, &ch1);
 printf("Initial state : %d\n", initialState);
 fscanf(filePointer, "%d%c", &numberOfInputs, &ch1);
 printf("Number of inputs : %d\n", numberOfInputs);

 i = j = 0;
 while (1)
 {
  if (fscanf(filePointer, "%s%s", str1, str2) == EOF)
   break;
  tempInt1 = atoi(str1);
  if (tempInt1 > -1)
  {
   Transistion_Table[i][j].stateToTransistion = tempInt1;
   strcpy(Transistion_Table[i][j].output, str2);
  }
  else
  {
   Transistion_Table[i][j].stateToTransistion = -1;
   strcpy(Transistion_Table[i][j].output, "-1");
  }
  j++;
  if (j == numberOfInputs)
   j = 0, i++;
 }
 numberOfStates = i;
 fclose(filePointer);
```

```
 printf("Number of states : %d\n", numberOfStates);

 printf("Transistion Table\n");
 printf("| State | Input(0) Output | Input(1) Output |\n");
 for (i = 0; i < numberOfStates; ++i)
 {
  printf("| %3d   | ", i);
  for (j = 0; j < numberOfInputs; j++)
  {
   printf("  %3d   %6s  | ", Transistion_Table[i]
[j].stateToTransistion, Transistion_Table[i][j].output);
  }
  printf("\n");
 }

 int flag = 0;
 char inputString[100] = {0};
 char outputString[100] = {0};
 int inputStringLen = 0;
 int outputStringLen = 0;

 while (1)
 {
  outputString[0] = '\0';

  printf("\n----------------------\nEnter input string ('#' to
exit) : ");
  inputStringLen = Read(inputString);

  if (inputString[0] == '#')
   break;

  printf("Input string : %s, Input string len : %d\n\n",
inputString, inputStringLen);

  currentState = initialState;
  flag = 0;
  for (i = 0; i < inputStringLen; ++i)
  {
   tempInt1 = inputString[i] - '0';

   printf("input string and state transition : %d , q%d --> ",
tempInt1, currentState);
```

```
   int oldState = currentState;
   currentState = Transistion_Table[currentState]
[tempInt1].stateToTransistion;

   if (currentState == -1)
   {
    printf("NO TRANSISTION\n");
    flag = 1;
    break;
   }
   strcat(outputString, Transistion_Table[oldState]
[tempInt1].output);
   printf("q%d / %s\n", currentState, Transistion_Table[oldState]
[tempInt1].output);
  }

  printf("\nOutput of Mealy Machine : %s\n", outputString);
 }

 printf("\nExiting ... \n");

 return 0;
}
```

MEALY.txt

```
1   0 2
2   1 A -1 -1
3   -1 -1 2 AB
4   3 B 11 B
5   -1 -1 4 AB
6   5 A -1 -1
7   -1 -1 6 B
8   4 A 7 BA
9   8 A -1 -1
10  -1 -1 9 B
11  10 A -1 -1
12  -1 -1 11 B
13  0 A -1 -1
14
```



Output :

```
Initial state : 0
Number of inputs : 2
Number of states : 12
Transistion Table
| State | Input(0) Output | Input(1) Output |
|   0   |      1        A |     -1       -1 |
|   1   |     -1       -1 |      2       AB |
|   2   |      3        B |     11        B |
|   3   |     -1       -1 |      4       AB |
|   4   |      5        A |     -1       -1 |
|   5   |     -1       -1 |      6        B |
|   6   |      4        A |      7       BA |
|   7   |      8        A |     -1       -1 |
|   8   |     -1       -1 |      9        B |
|   9   |     10        A |     -1       -1 |
|  10   |     -1       -1 |     11        B |
|  11   |      0        A |     -1       -1 |

----------------------
Enter input string ('#' to exit) : 0101010
Input string : 0101010, Input string len : 7

input string and state transition : 0 , q0 -> q1 / A
input string and state transition : 1 , q1 -> q2 / AB
input string and state transition : 0 , q2 -> q3 / B
input string and state transition : 1 , q3 -> q4 / AB
input string and state transition : 0 , q4 -> q5 / A
input string and state transition : 1 , q5 -> q6 / B
input string and state transition : 0 , q6 -> q4 / A

Output of Mealy Machine : AABBABABA

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Enter input string ('#' to exit) : 01101
Input string : 01101, Input string len : 5

input string and state transition : 0 , q0 -> q1 / A
input string and state transition : 1 , q1 -> q2 / AB
input string and state transition : 1 , q2 -> q11 / B
input string and state transition : 0 , q11 -> q0 / A
input string and state transition : 1 , q0 -> NO TRANSISTION

Output of Mealy Machine : AABBA
```