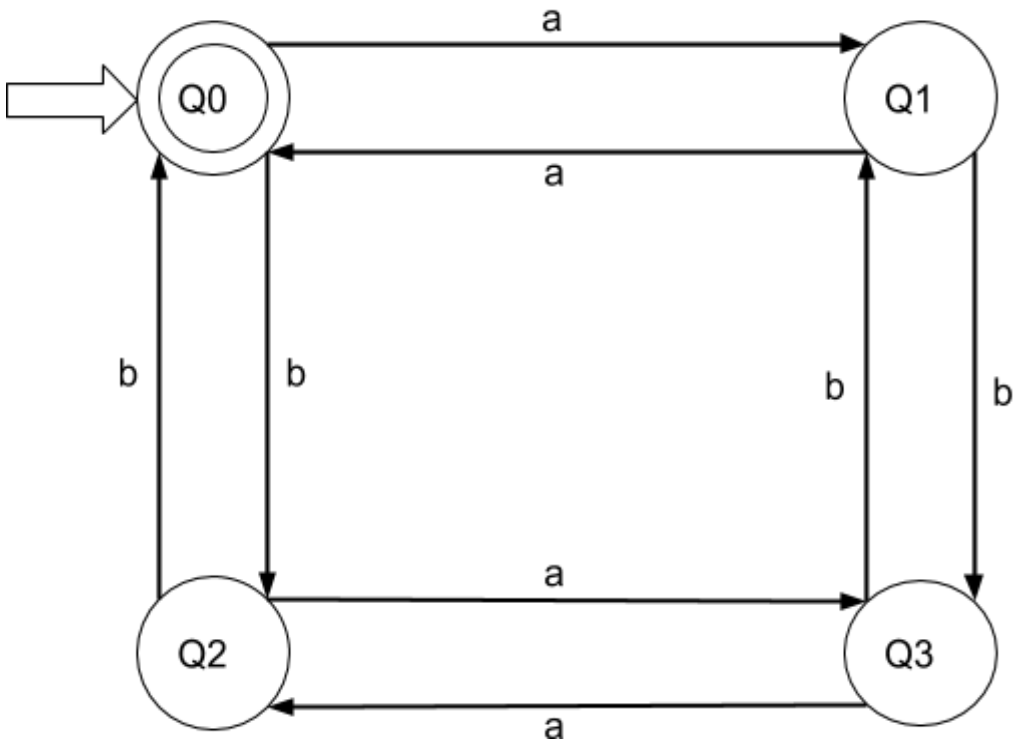
PROGRAM-1:

Implementation of Language recognizer for set of all strings over input alphabet ∑={a,b} containing even number of a's and even number of b's.

DESCRIPTION:

The acceptable strings of the language are ε(Null string), aa, bb, abba, babbab etc. Deterministic Finite Automata for the given language is given below:



A DFA is a five tuple. Let D be the name of DFA;
D=(Q,∑,δ,Q0,F) Where
Q=Set of all states ={Q0,Q1,Q2,Q3} .
∑=Input Alphabet={a,b},
Start state is Q0
F=Set of all final States={ Q0}

δ= Transition Function is as follows:

State	a	b
Q0	Q1	Q2
Q1	Q0	Q3
Q2	Q3	Q0
Q3	Q2	Q1

ALGORITHM:

Input:
Input string.

Output:
Algorithm prints a message.

"**String accepted**": If the input is acceptable by the language.
"**String not accepted**": otherwise.
"**Invalid token**": If the input string contains symbols other than the input alphabet.

METHOD:

```
state=0 //initial state
while((current=input[i++])!='\0')
{
   switch(state)
      case 0: if(current=='a') state=1;
         else if(current=='b') state=2;
         else
            Print "Invalid token"; exit;
      case 1: if(current=='a') state=0;
         else if(current=='b') state=3;
         else
            Print "Invalid token"; exit;
      case 2: if(current=='a') state=3;
         else if(current=='b') state=0;
         else
```

```
            Print "Invalid token"; exit;
        case 3: if(current=='a') state=2;
            else if(current=='b') state=1;
            else
                Print "Invalid token"; exit;
    end switch
end while
}
//Print output
if(state==0)
Print "String accepted"
else
Print "String not accepted"
```

C LANGUAGE CODE FOR GIVEN LANGUAGE:

```
#include<stdio.h>
void main()
{
int state=0,i=0;
char current,input[20];
printf("Enter input string:");
scanf("%s",&input);
while((current=input[i++])!='\0')
{
    switch(state)
    {
        case 0: if(current=='a')
            state=1;
        else if(current=='b')
            state=2;
        else
        {
        printf("Invalid token");
        exit(0);
        }
        break;
        case 1: if(current=='a')
            state=0;
        else if(current=='b')
            state=3;
        else
```

```
        {
        printf("Invalid token");
        exit(0);
        }
        break;
        case 2: if(current=='a')
            state=3;
        else if(current=='b')
            state=0;
        else
        {
        printf("Invalid token");
        exit(0);
        }
        break;
        case 3: if(current=='a')
            state=2;
        else if(current=='b')
            state=1;
        else
        {
        printf("Invalid token");
        exit(0);
        }
        break;
    }
}
if(state==0)
printf("String accepted");
else
printf("String not accepted");
}
```

TEST CASES:

INPUT	OUTPUT
aabb	String accepted
abab	String accepted
aaabb	String not accepted
aaa	String not accepted
abcd	Invalid token

CONCLUSION:

Hence, a language recognizer has been implemented that recognizes the set of all strings over the alphabet ∑={a,b} containing an even number of a's and an even number of b's.