Name:M.Sri Krishna Kumar

Roll No: AP18110010506

Class &Sec: CSE-H

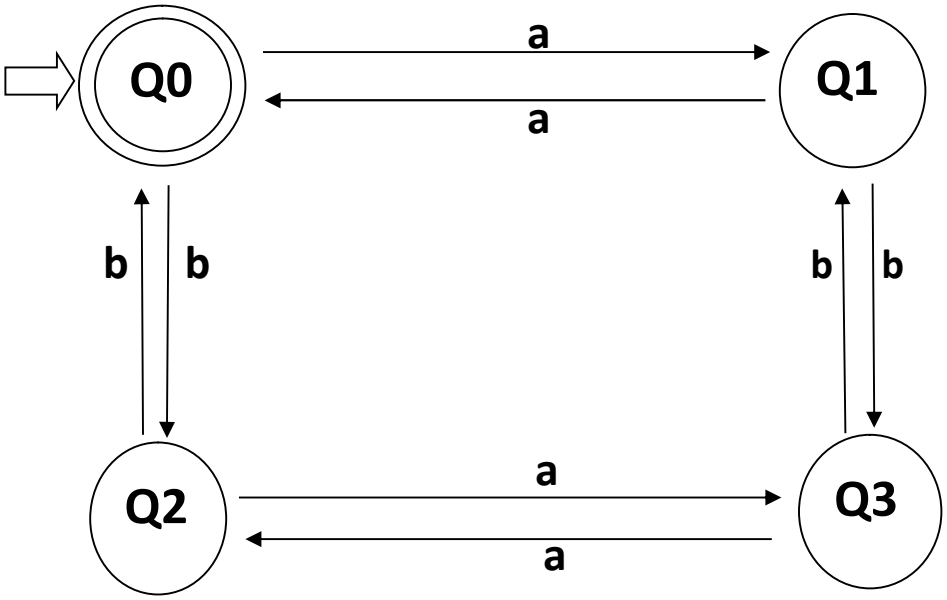
Program-1

Implement a language recognizer which accepts set of all strings over the alphabet ∑={a,b} containing an even number of a's and an even number of b's.

Description

The strings that are been accepted by the language are ε (Null string), aa, bb, abba, babbab etc.

The Deterministic Finite Automata (DFA) for the given language is: -



A DFA is a five tuple. Let M be the name of DFA,

M= (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} and

δ= Transition Function is as follows:

States	a	b
Q0	Q1	Q2
Q1	Q0	Q3
Q2	Q3	Q0
Q3	Q2	Q1

Algorithm

Input:

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 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”
```

Code for the given language in C

```
#include<stdio.h>
#include<stdlib.h>
int 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");

  return 0;
}
```

Sample Inputs and their Outputs

Sample Inputs	Outputs
aabb	String accepted
abab	String accepted
aaa	String not accepted
aabbc	Invalid token
aabbb	String not accepted

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.