**WEEK 1 PROGRAMS**

**Program 1:**

Implement a language recogniser 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 acceptable strings of the language are ε(Null string), aa, bb, abba, babbab etc.

**Deterministic Finite Automata for the given language is given below:-**



**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 the transitions are defined in

the transition diagram



**Algorithm: Language recognizer**

**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”

**C code: -**

#include<stdio.h>

void main(){

int state=0, i=0;

char current,input[20];

printf("Enter input string \t :");

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("\n\nString accepted\n\n");

else

printf("\n\nString not accepted\n\n");

}

**Test cases:**

|  |  |
| --- | --- |
| **Input** | **Expected Output** |
| ababab | String not accepted |
| bababa | String not accepted |
| abab | String accepted |
| aabb | String accepted |
| abcde | Invalid token |