PES UNIVERSITY, Bangalore

(Established under Karnataka Act No. 16 of 2013)

Department of Computer Science & Engineering

UE19CS205 - Automata Formal Languages & Logic

Homework - DFA

1) Describe with words the language accepted by the following DFA:

	0	1	2
$\rightarrow q_0$	q_1	q_0	q_2
q_1	q_2	q_1	q_1
$^*q_2$	q_2	q_2	q_2

2) Let L be the language that contains a set of strings over the alphabet {0, 1, 2} that do not have two consecutive identical symbols. That is, strings of L are any string in {0,1,2}* such that there is no occurrence of 00, no occurrence of 11, and no occurrence of 22. Design a DFA (transition table or transition diagram -- your choice) that accepts L.

3) Construct a DFA that accepts L = {x01y : x,y $\in$ {0,1}*}

4) Let L be the language consisting of all strings of zero or more 0's followed by one or more 1's, followed by two or more 2's For example 001122, 122 and 0111122 are in L; 012 (too few 2's) and 0112122 (a 2 precedes a a are not). Draw the transition diagram of a DFA whose language is L.

5) Define a DFA that accepts the language over the alphabet {0, 1} where words start and end with a 1, have even length and where any 0 in the word is immediately followed by at least a 1.

   Example of accepted words: 1011, 101101, 1111

   Example of non accepted words: 101, 1001, 010

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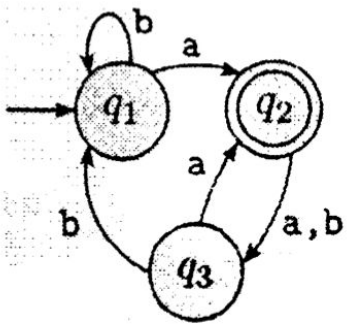
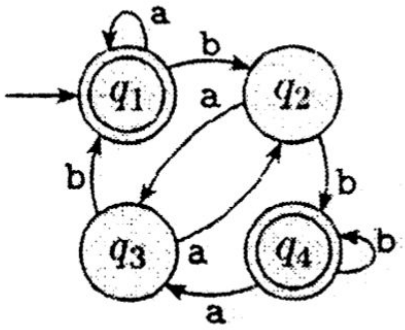
6) Given the state diagrams of two DFAs, M1 and M2 . Answer the following questions about these machines.



M_1



M_2

a. What is the start state of M1 ?

b. What is the set of accepting states of M1 ?

c. What is the start state of M2 ?

d. What is the set of accepting states of M2 ?

e. What sequence of states does M1 go through on input aabb?

f. Does M1 accept the string aabb?

g. Does M2 accept the empty string λ?

7) Given the alphabet is {0, 1}, construct a DFA that accepts L = {w | w begins with a 1 and ends with a 0}.

8) Given the alphabet is {0, 1}, construct a DFA that accepts L ={w | w contains at least three 1s}.

9) Given the alphabet is {0, 1}, construct a DFA that accepts L ={w | w contains the substring 0101, i.e., w = x0101y for some (possibly empty) x and y}.

10) Given the alphabet is {0, 1}, construct a DFA that accepts L ={w | w has length at least 3 and its third symbol is a 0}.

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