

UI9CS076

DFA - Deterministic Finite Automata

1. Construct DFA for $\Sigma = \{a, b\}$ that accepts

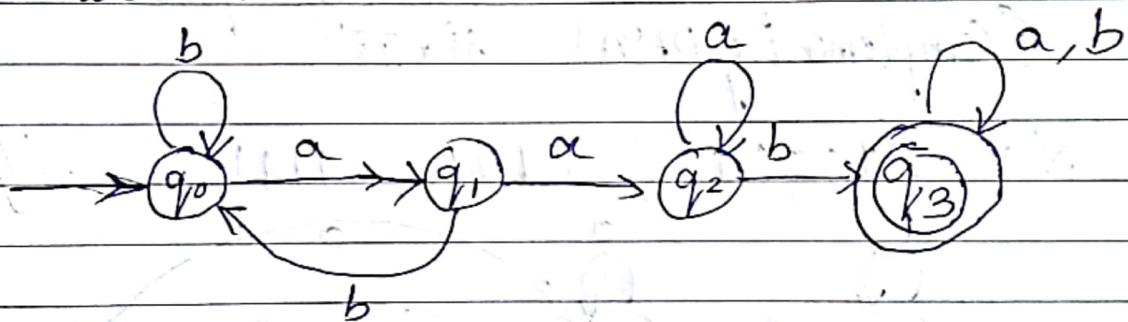
a) All string with aab as substring

All string of sub language having 'aab'
length of substring = 3

\Rightarrow Minimum DFA states = $3+1=4$

$\alpha = \{ \underline{aab}, \underline{aab}aabb, bab\underline{aab}, bba\underline{aab} \}$

DFA is



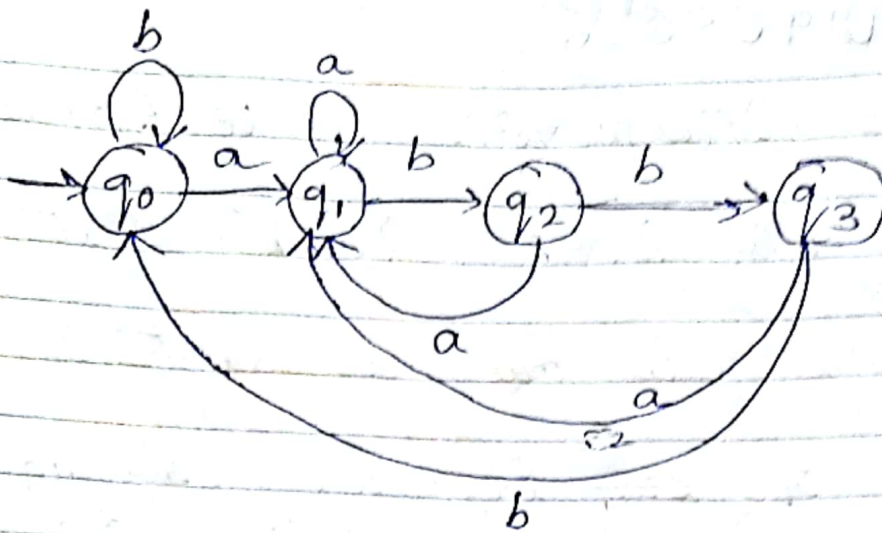
b) All strings ending with 'abb'

All strings of language ending with 'abb'

Length of substring = 3

Min DFA states = 4

$\alpha = \{ \underline{abb}, b\underline{abb}, a\underline{abb}, aabbab\underline{abb} \dots \}$

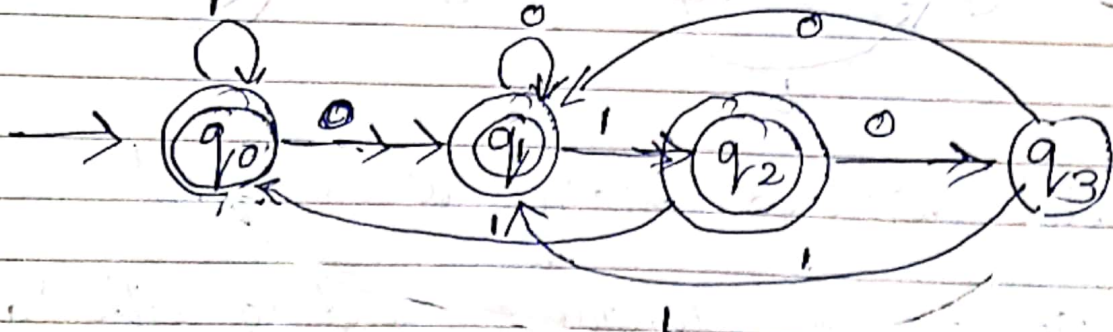


Q2] Design DFA on alphabet $\Sigma = \{0, 1\}$ that accepts

a) All strings not ending with 010

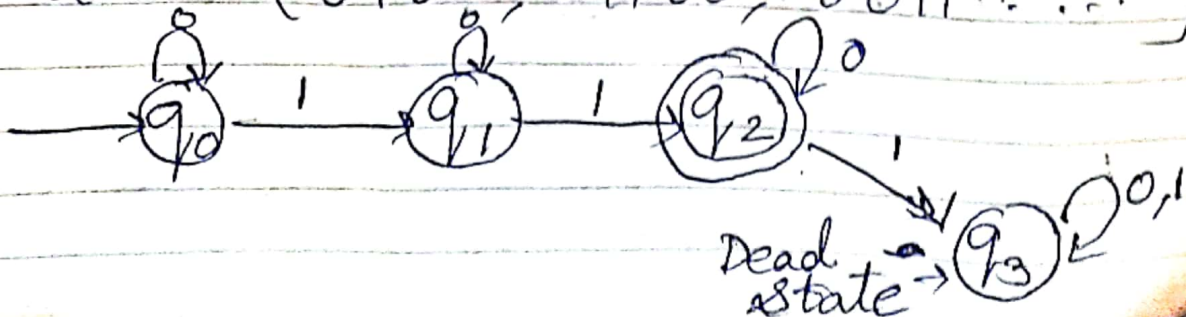
For NOT ending :- exchange final & non final
(Complement of DFA) states

$\alpha = \{10001, 0101, 1111, \dots\}$

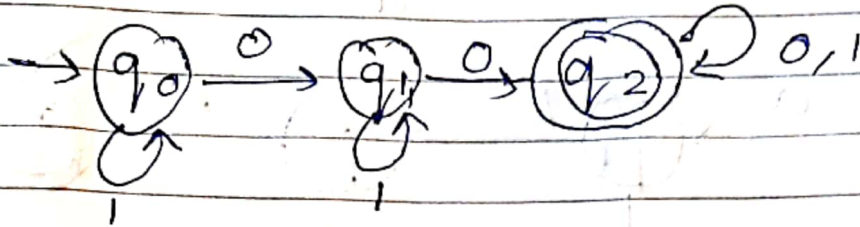


b) All strings with exactly two 1's

Dead state represent
 $\alpha = \{0101, 1100, 0011, \dots\}$



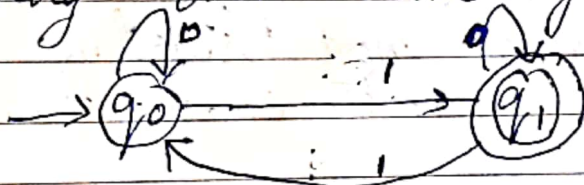
- c) All strings with at least two 0's
 $\Sigma = \{0, 1\}$
 $X = \{010, 0011, 0000, 0100, \dots\}$



- ③. Construct DFA for $\Sigma = \{0, 1\}$ that have odd number of 1s and even number of 0s

Doing separately

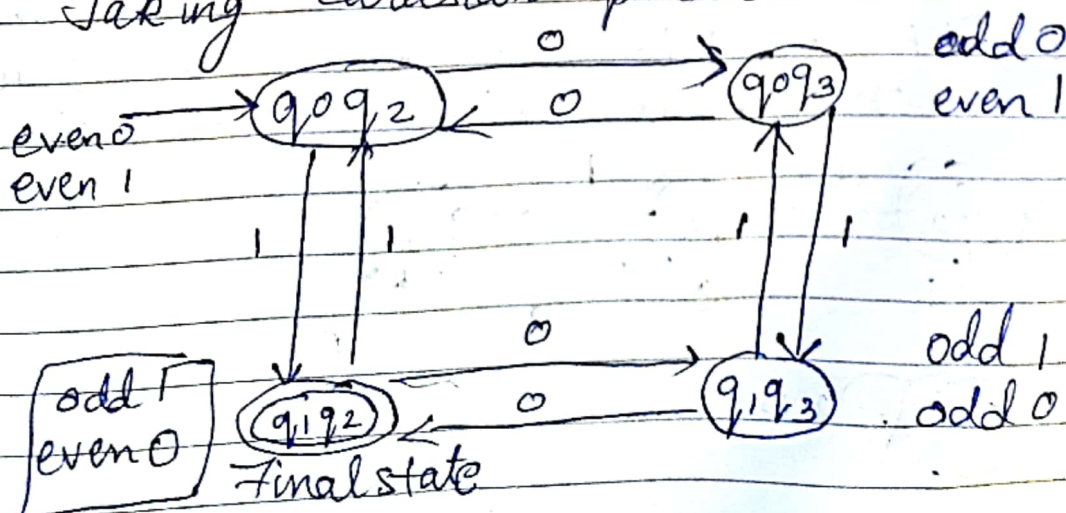
- Accepting odd number of 1s



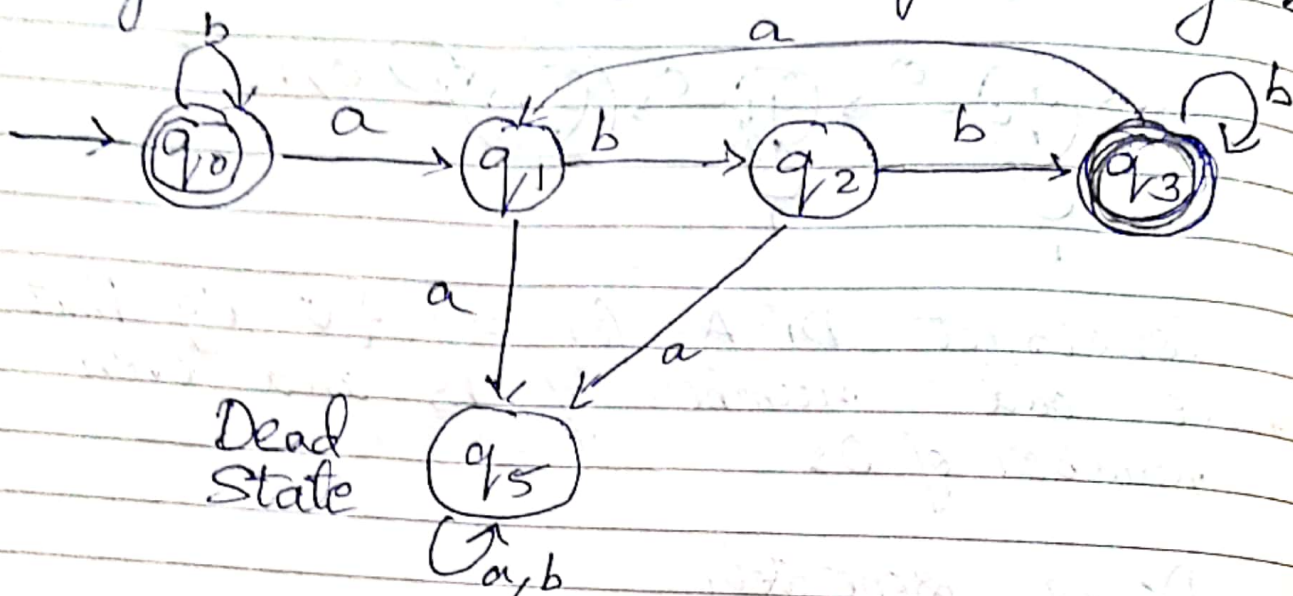
- Accepting even number of 0s



Taking cartesian product



84) Construct a DFA which accepts all strings over $\Sigma = \{a, b\}$ in which every 'a' should be followed by 'bb'



85) Construct DFA which accepts a language of all strings not starting with 'a' or not ending with 'b'.

Let not starting with 'a' = P
not ending with 'b' = Q

According to De Morgan Law $(P \cup Q)^c = P^c \cap Q^c$

→ Starting with A and ending with B
Drawing DFA of this and swapping final and non-final states, we get:

