Brithikha Balamurugan

U19CS076

DFA - Deterministic Finite Automata

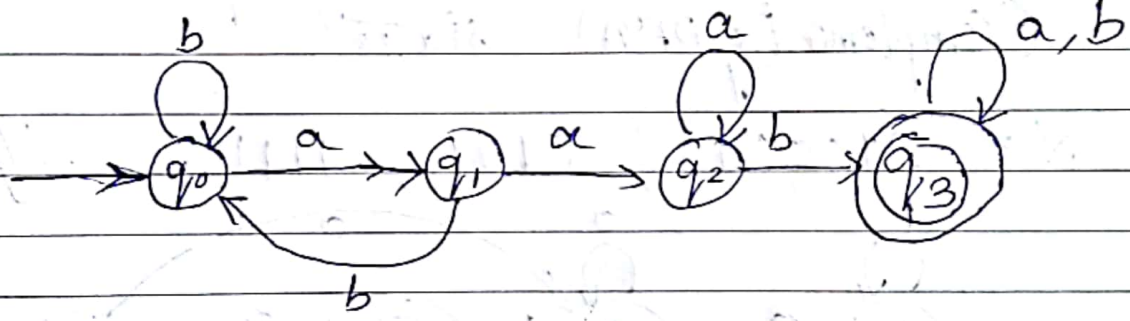
1. Construct DFA for $\Sigma = \{a, b\}$ that accepts

a) All string with aab as substring

All string of ~~sub~~ language having 'aab'
length of substring = 3
⇒ Minimum DFA states = 3+1 = 4

$L = \{ aab, aaab, aabb, baab, aab, bbaab, \ldots \}$

DFA is



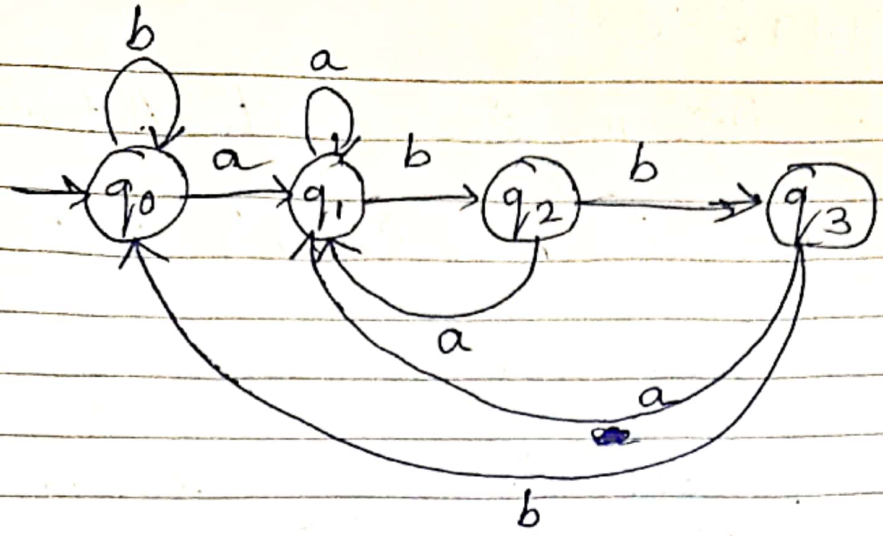
b) All strings ending with 'abb'

All strings of language ending with 'abb'

Length of substring = 3
Min DFA states = 4

$L = \{ abb, babb, aabb, aabbabb \ldots \}$

U19CS076

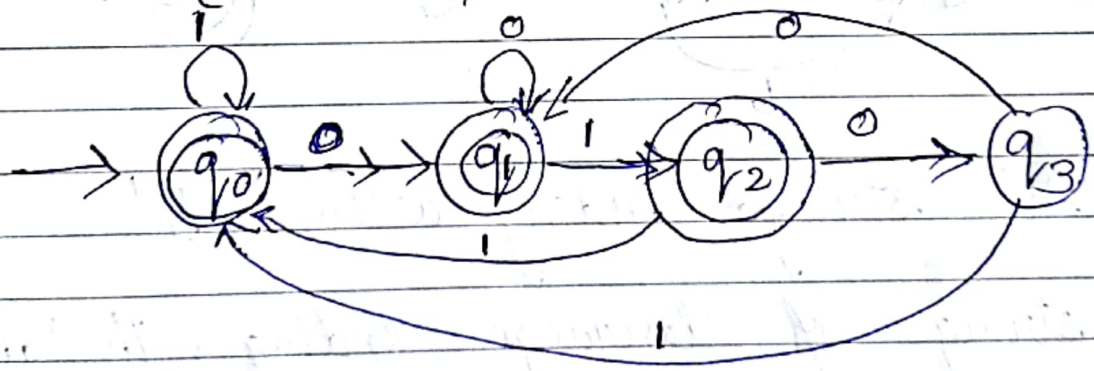


Q2] Design DFA on alphabet $\Sigma = \{0, 1\}$ that accepts

a) All strings not ending with 010

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

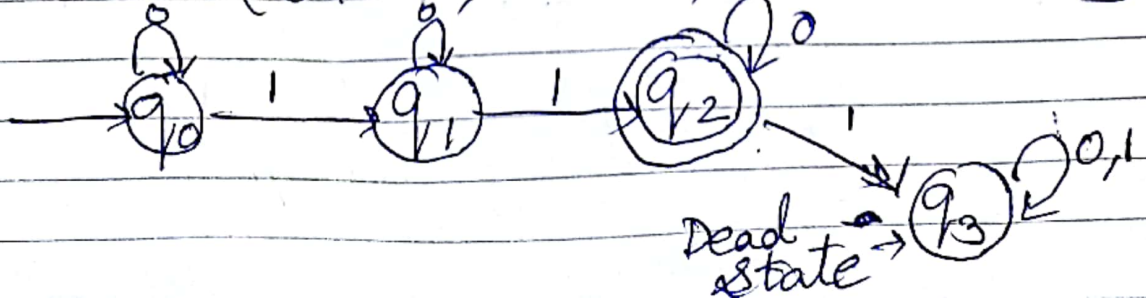
$L = \{10001, 0101, 1111 \ldots\}$



b) All strings with exactly two 1's

~~Dead state represent~~

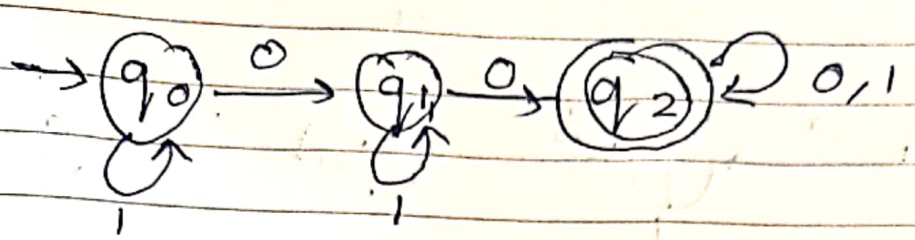
$L = \{0101, 1100, 0011 \ldots\}$



U19CS076

c) All strings with at least two 0's

$L = \{010, 00111, 0000, 0100 \ldots\}$

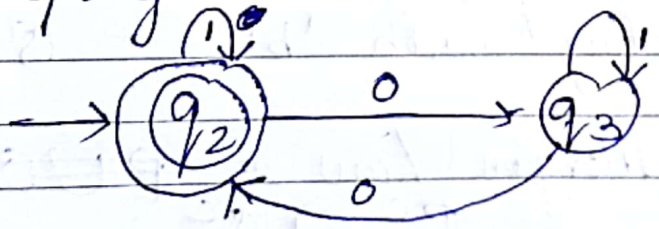


(3). Construct DFA for $\Sigma = \{0, 1\}$ that have odd number of 1s and even number of 0s

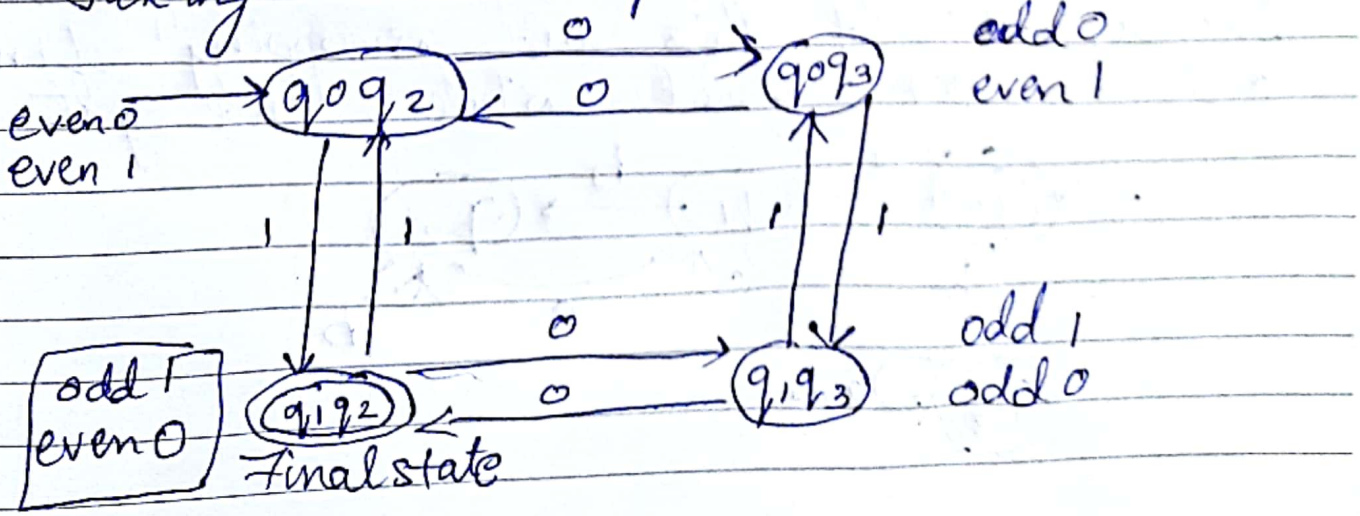
Doing seperately

- Accepting odd number of 1s

- Accepting even ~~odd~~ number of 0s

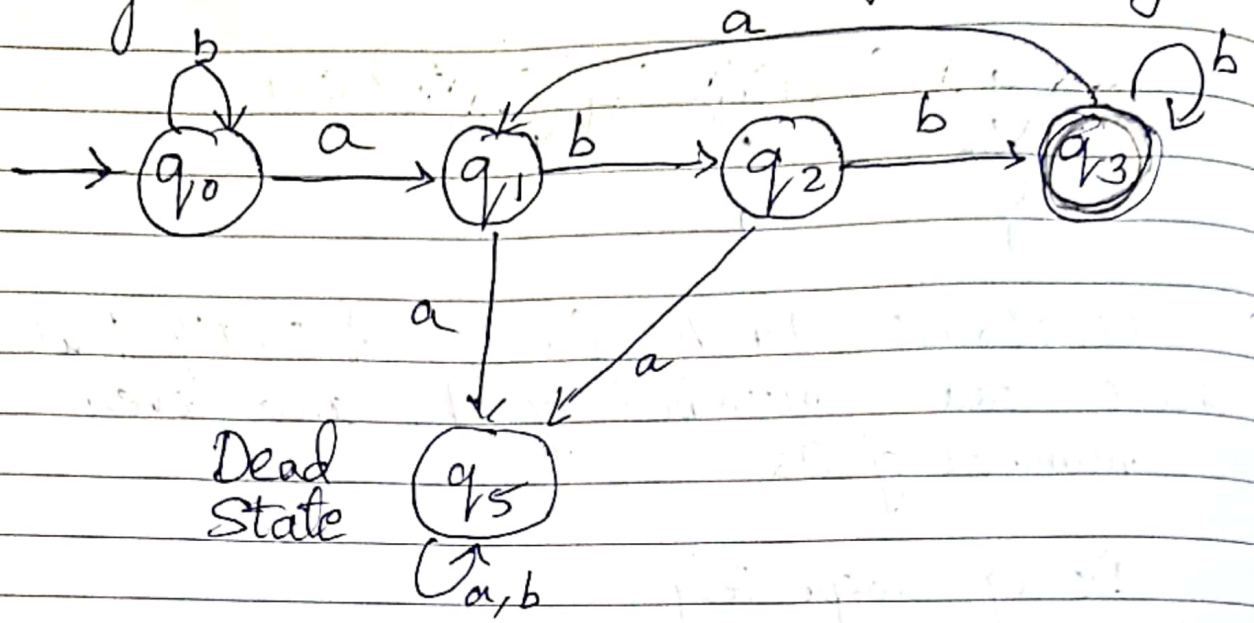


Taking cartesian product



U19CS076

Q4] Construct a DFA which accepts all strings over $\Sigma = \{a, b\}$ in which every 'a' should be followed by 'bb'



Q5] 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 ~~$P \cup Q$~~
$(P \cup Q)^c = P^c \cap Q^c$

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