Assignment-01

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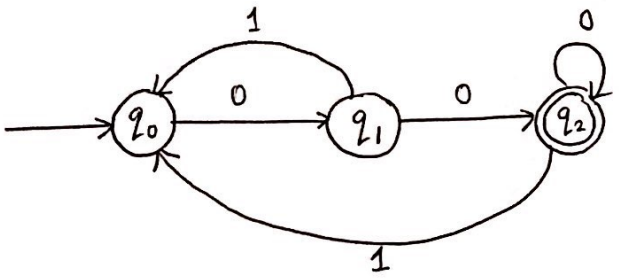
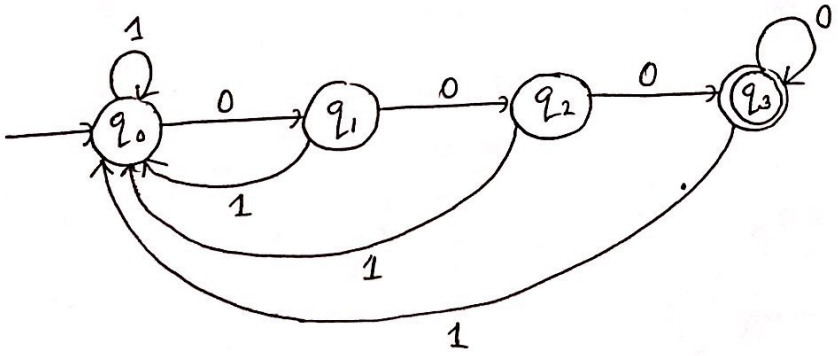
Question 1: Design DFA's accepting the following languages over the alphabet $\{0,1\}$:

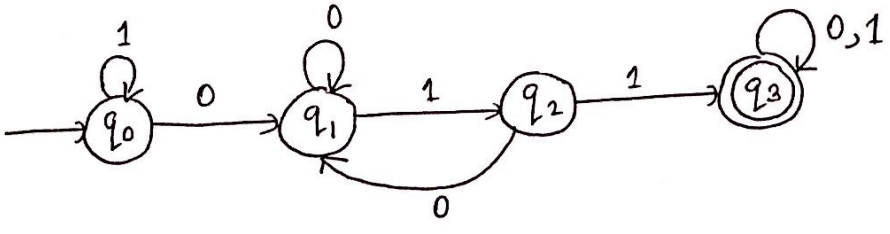
a) The set of all strings ending in 00.



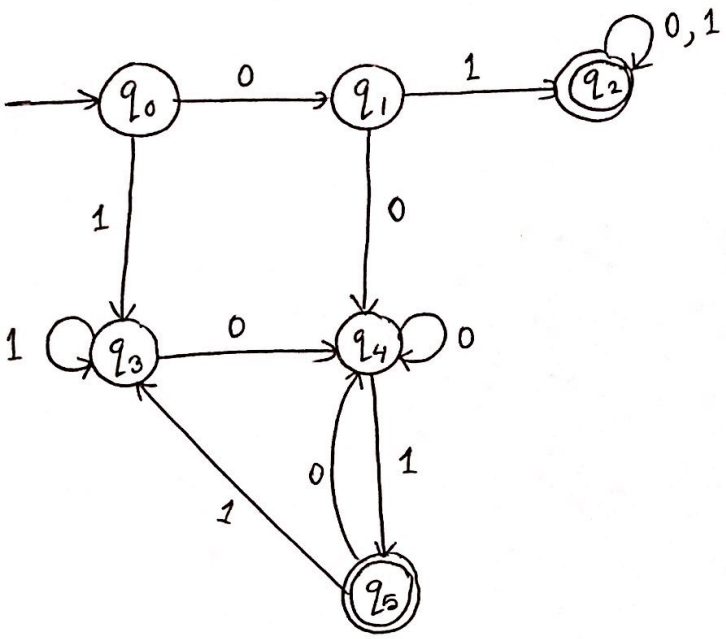
b) The set of all strings with three consecutive 0's.



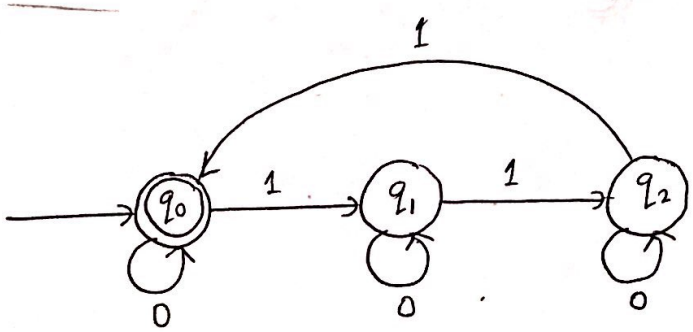
c) The set of strings with 011 as substring.



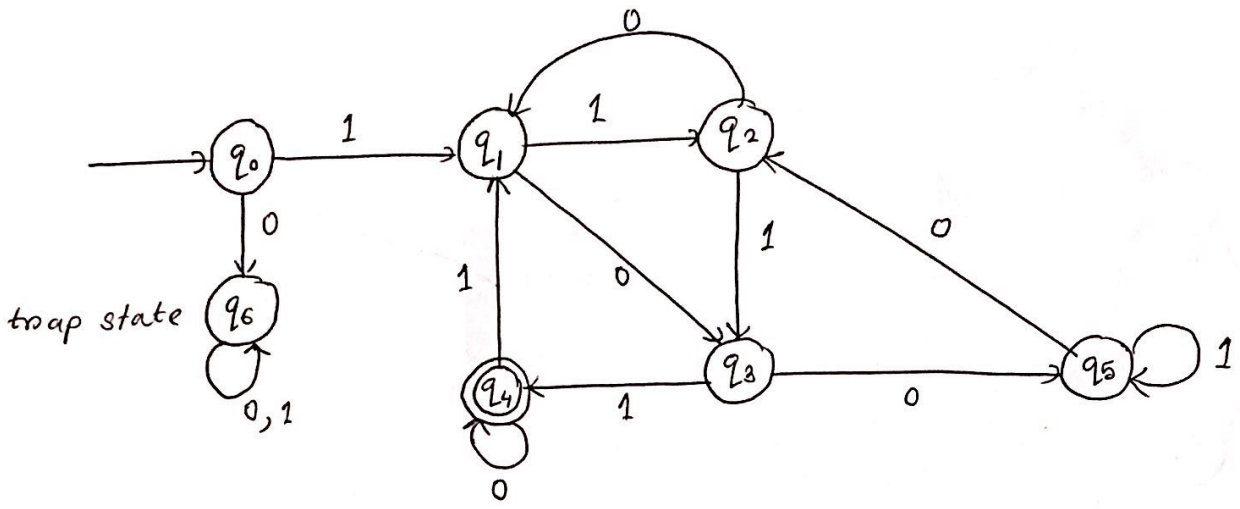
d) The set of strings that either begin on end (on both) with 01.



e) The set of strings such that the number of 1's is divisible by 3.

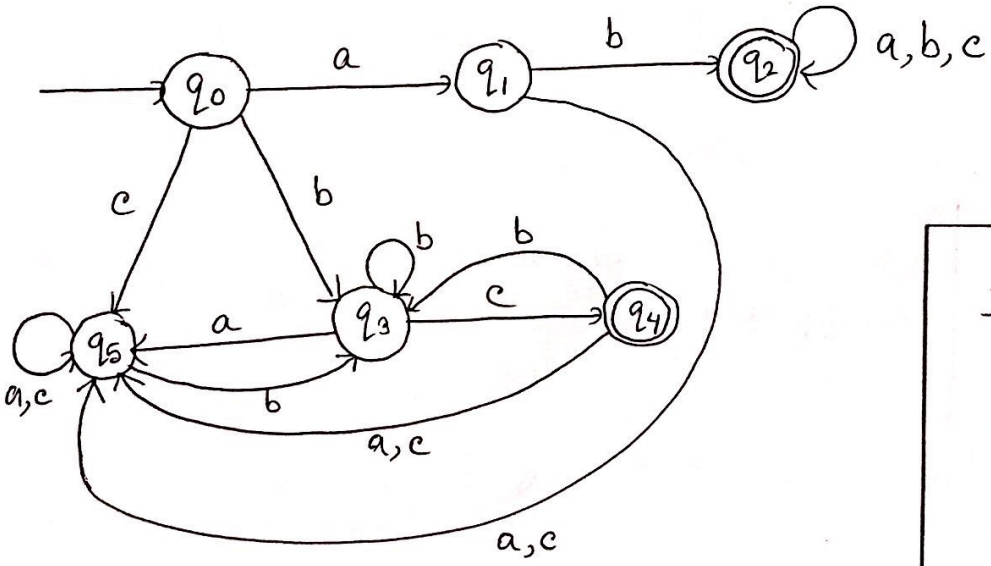


f) The set of all strings beginning with a 1 that when interpreted as a binary integer, is a multiple of 5.



Question 2

a) Design a DFA to accept the language $L = \{ w/w$ starts with ab or ends with bc$\}$ from $\Sigma = \{a, b, c\}$.



	a	b	c
→ q_0	q_1	q_3	q_5
q_1	q_5	q_2	q_5
* q_2	q_2	q_2	q_2
q_3	q_5	q_3	q_4
* q_4	q_5	q_3	q_5
q_5	q_5	q_3	q_5

Verification: c a c b c

$q_0 \xrightarrow{c} q_5$

$q_5 \xrightarrow{a} q_5$

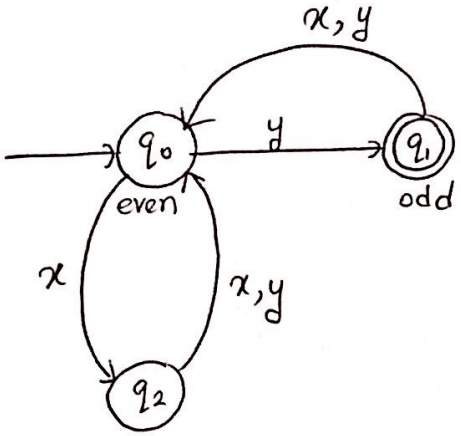
$q_5 \xrightarrow{c} q_5$

$q_5 \xrightarrow{b} q_3$

$q_3 \xrightarrow{c} (q_4)$

[Verified]

b) Design a DFA to accept the language $L = \{w/w$ has odd length and ends with $y\}$ from $\Sigma = \{x, y\}$.



	x	y
$\rightarrow q_0$	q_2	q_1
q_1	q_0	q_0
q_2	q_0	q_0

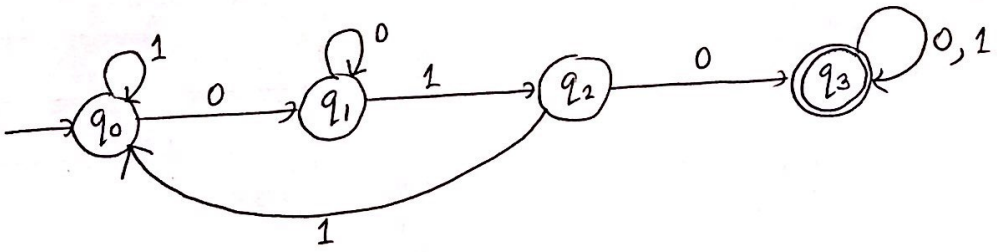
Verification : $x\ y\ x$

$q_0 \xrightarrow{x} q_2$

$q_2 \xrightarrow{y} q_0$

$q_0 \xrightarrow{x} q_2$ [Verified]

Question 3 : Design a DFA that has 010 as substrings over the alphabet $\{0, 1\}$ and also depict the transition table.



	0	1
$\rightarrow q_0$	q_1	q_0
q_1	q_1	q_2
q_2	q_3	q_0
$*q_3$	q_3	q_3