

# 202509171257 - CSC371 - Assignment 1.2

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Course: CSC371 – Finite Automata

Assignment: A1.2

## Problem 4

$$\Sigma = \{0, 1\}$$

1)  $\{w|w \text{ contains a single } 0\} = \Sigma^*0\Sigma^*$

2)  $\{w|w \text{ contains at least two } 0\} = \Sigma^*0\Sigma^*0\Sigma^*$

3)  $\{w|w \text{ ends with either } 00 \text{ or } 11\} = [\Sigma^*00] \cup [\Sigma^*11]$

4)  $\{w|w \text{ starts and ends with different symbols}\} = [0\Sigma^*1] \cup [1\Sigma^*0]$

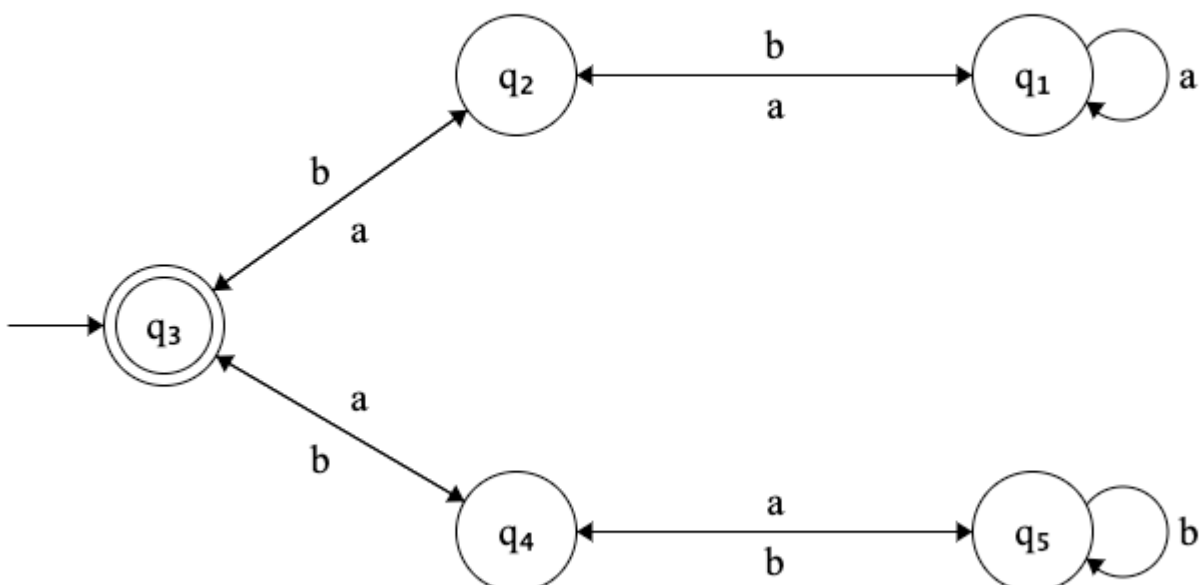
5)  $\{w|w \text{ is a string of odd length}\} = \Sigma(\Sigma\Sigma)^*$

6)  $\{w| \text{ every } 1 \text{ in } w \text{ is followed by at least one } 0\} = 0^* \cup (0^*100^*)^*$

## Problem 5

Formal Definition  $M = (\{q_1, q_2, q_3, q_4, q_5\}, \{a, b\}, \delta, q_3, \{q_3\})$

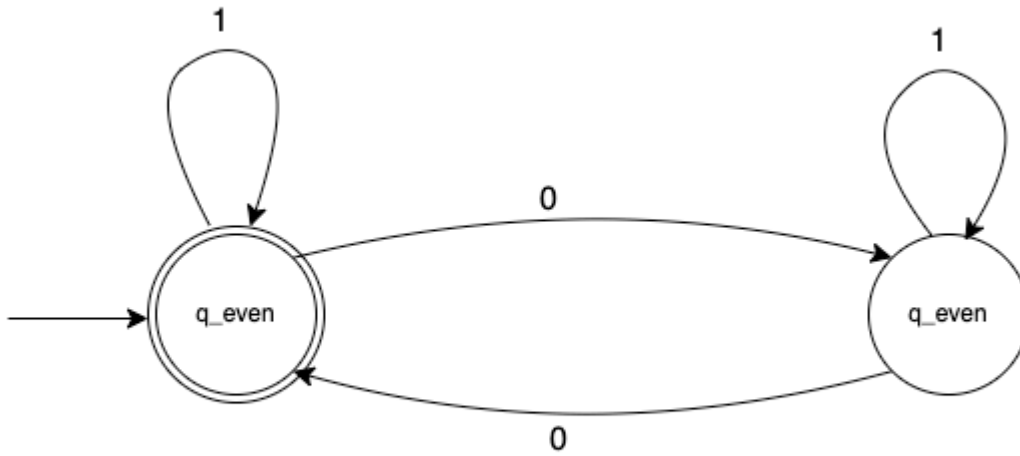
	<b>a</b>	<b>b</b>
$q_1$	$q_1$	$q_2$
$q_2$	$q_1$	$q_3$
$q_3$	$q_2$	$q_4$
$q_4$	$q_3$	$q_5$
$q_5$	$q_4$	$q_5$



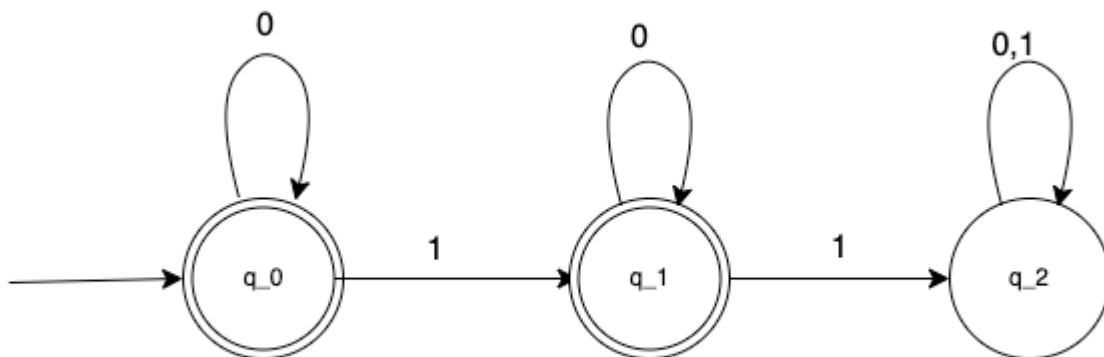
## Problem 6

$$\Sigma = \{0,1\}$$

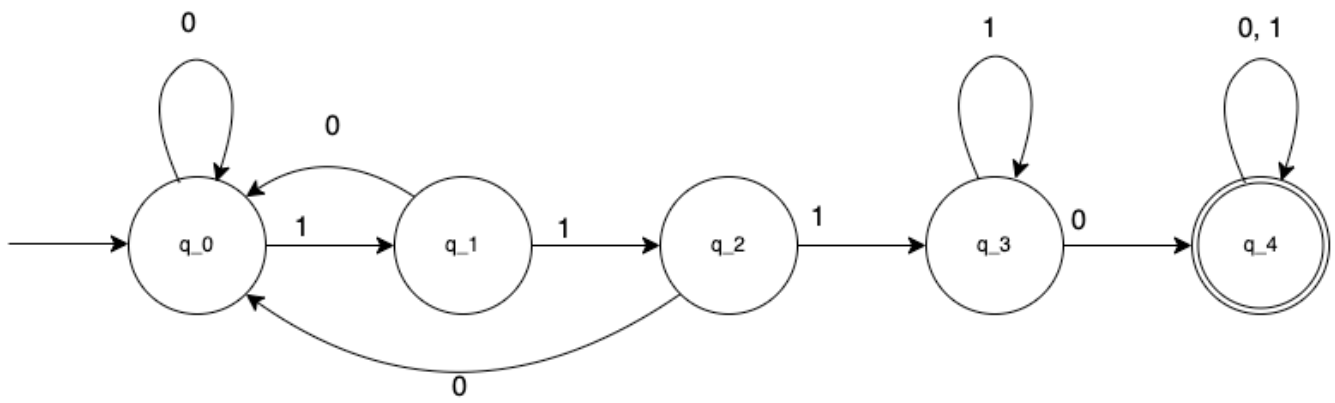
1)  $\{w \mid w \text{ contains an even number of 0s}\}$



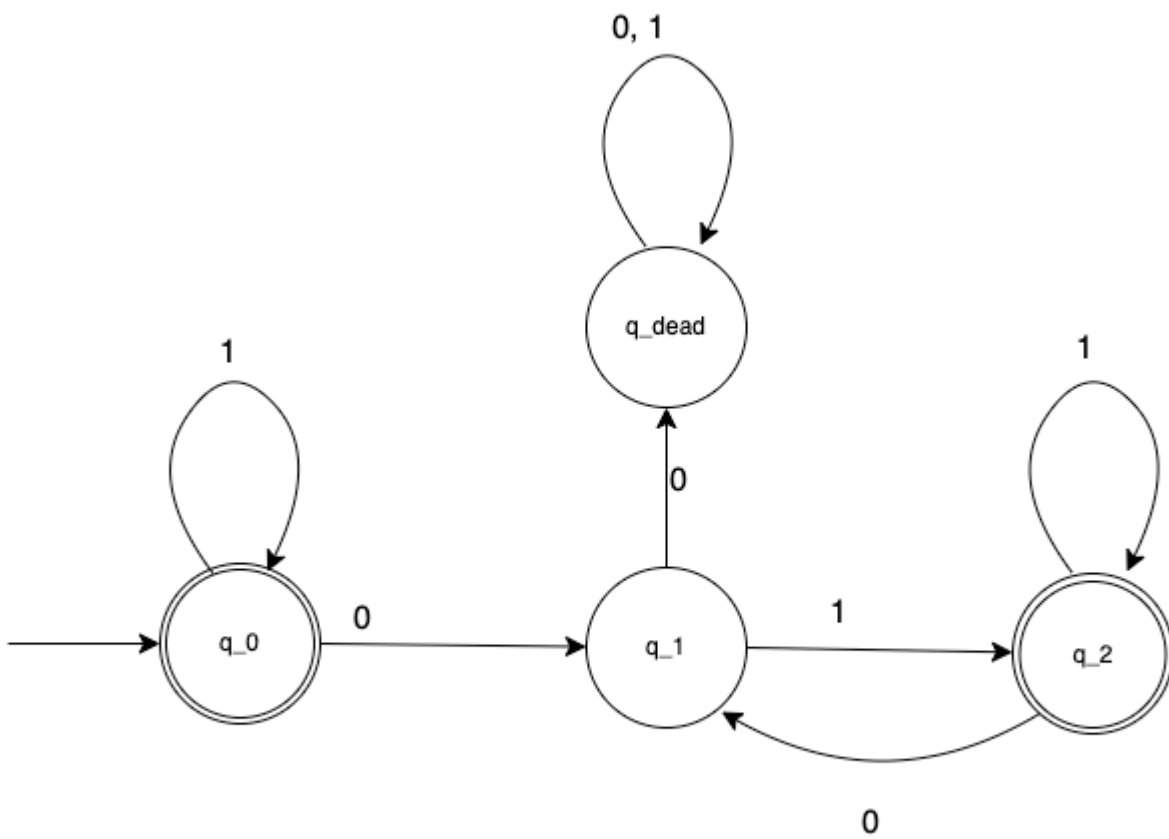
2)  $\{w \mid w \text{ at most one 1}\}$



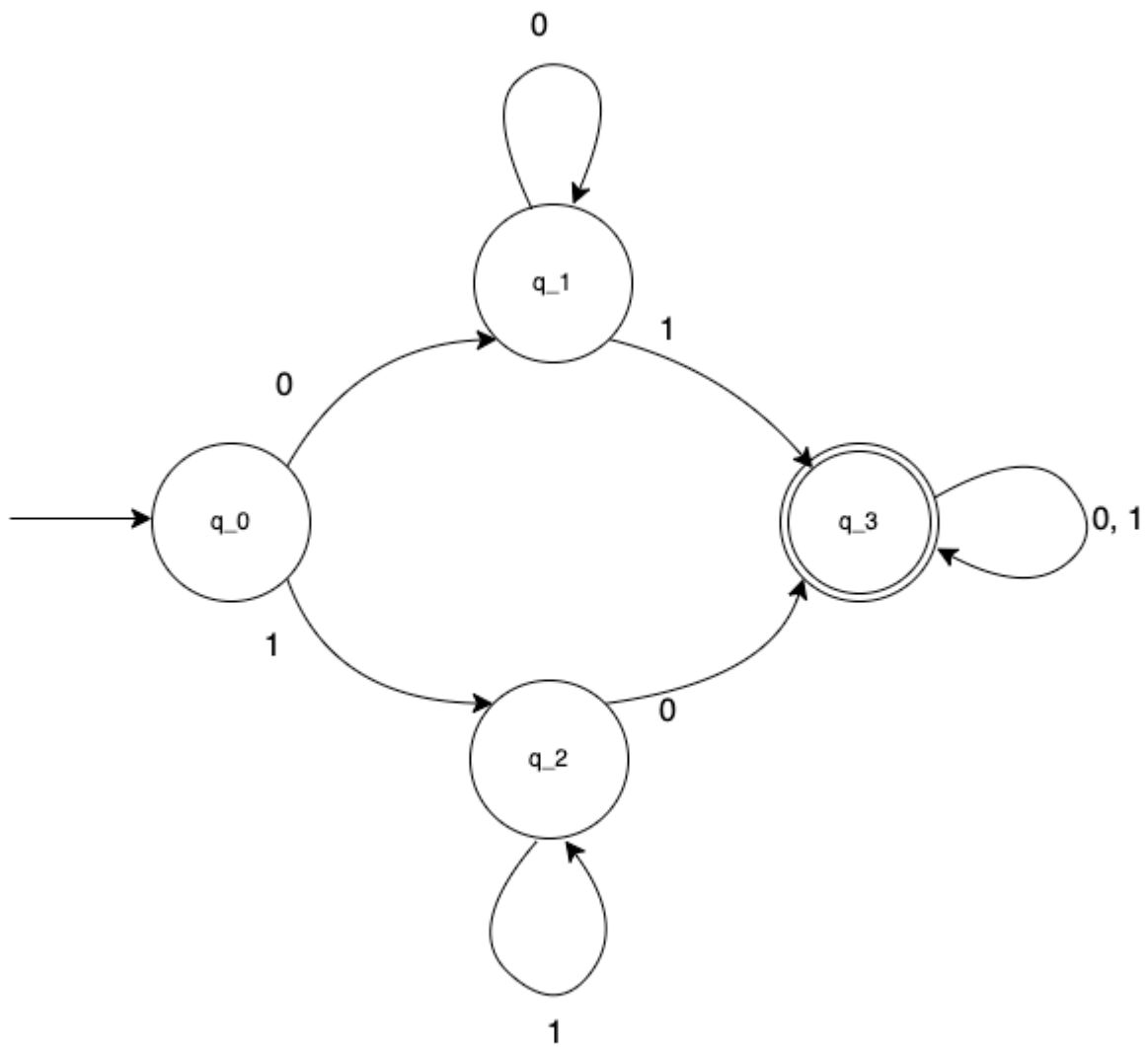
3)  $\{w \mid w \text{ contains the substring 1110}\}$



4)  $\{w \mid \text{each 0 in } w \text{ is followed by at least 1}\}$



5)  $\{w \mid w \text{ contains either the substrings 01 or 10}\}$



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