

Theory of Computation

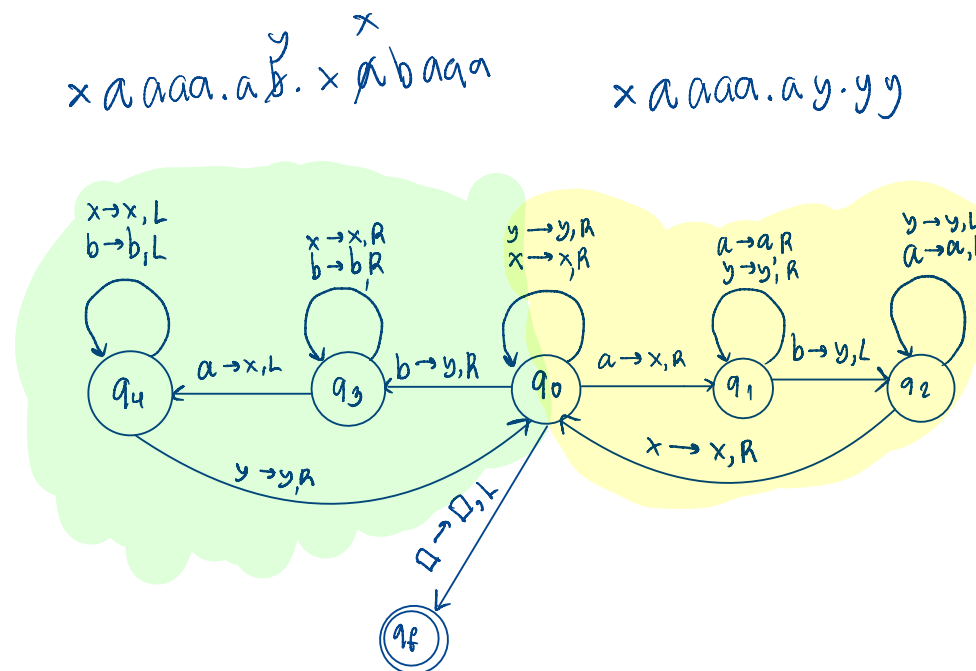
Homework 10: (Turing Machine)

(No exercise)

*1. Find the language of Turing Machine M.

$$M = (\{q_0, q_1, q_2, q_3, q_4, q_f\}, \{a, b\}, \{a, b, x, y, \square\}, \delta, q_0, \square, \{q_f\})$$

$\delta(q_0, x) = (q_0, x, R)$,	$\delta(q_2, a) = (q_2, a, L)$,	$\delta(q_4, b) = (q_4, b, L)$,
$\delta(q_0, y) = (q_0, y, R)$,	$\delta(q_2, y) = (q_2, y, L)$,	$\delta(q_4, x) = (q_4, x, L)$,
$\delta(q_0, a) = (q_1, x, R)$,	$\delta(q_2, x) = (q_0, x, R)$,	$\delta(q_4, y) = (q_0, y, R)$
$\delta(q_0, b) = (q_3, y, R)$,		
$\delta(q_0, \square) = (q_f, \square, L)$,	$\delta(q_3, a) = (q_4, x, L)$,	
	$\delta(q_3, b) = (q_3, b, R)$,	
	$\delta(q_3, x) = (q_3, x, R)$,	
$\delta(q_1, a) = (q_1, a, R)$,		
$\delta(q_1, y) = (q_1, y, R)$,		
$\delta(q_1, b) = (q_2, y, L)$,		



(Language of M is in q_f state)
Ans $L(M) = \{w = \{a, b\}^* \mid n_a(w) = n_b(w)\}$

