Theory of Computation

Homework 10: (Turing Machine) (No exercise)

*1. Find the language of Turing Machine M.

M = $(\{q0, q1, q2, q3, q4, qf\}, \{a, b\}, \{a, b, x, y, \square\}, \delta, q0, \square, \{qf\})$

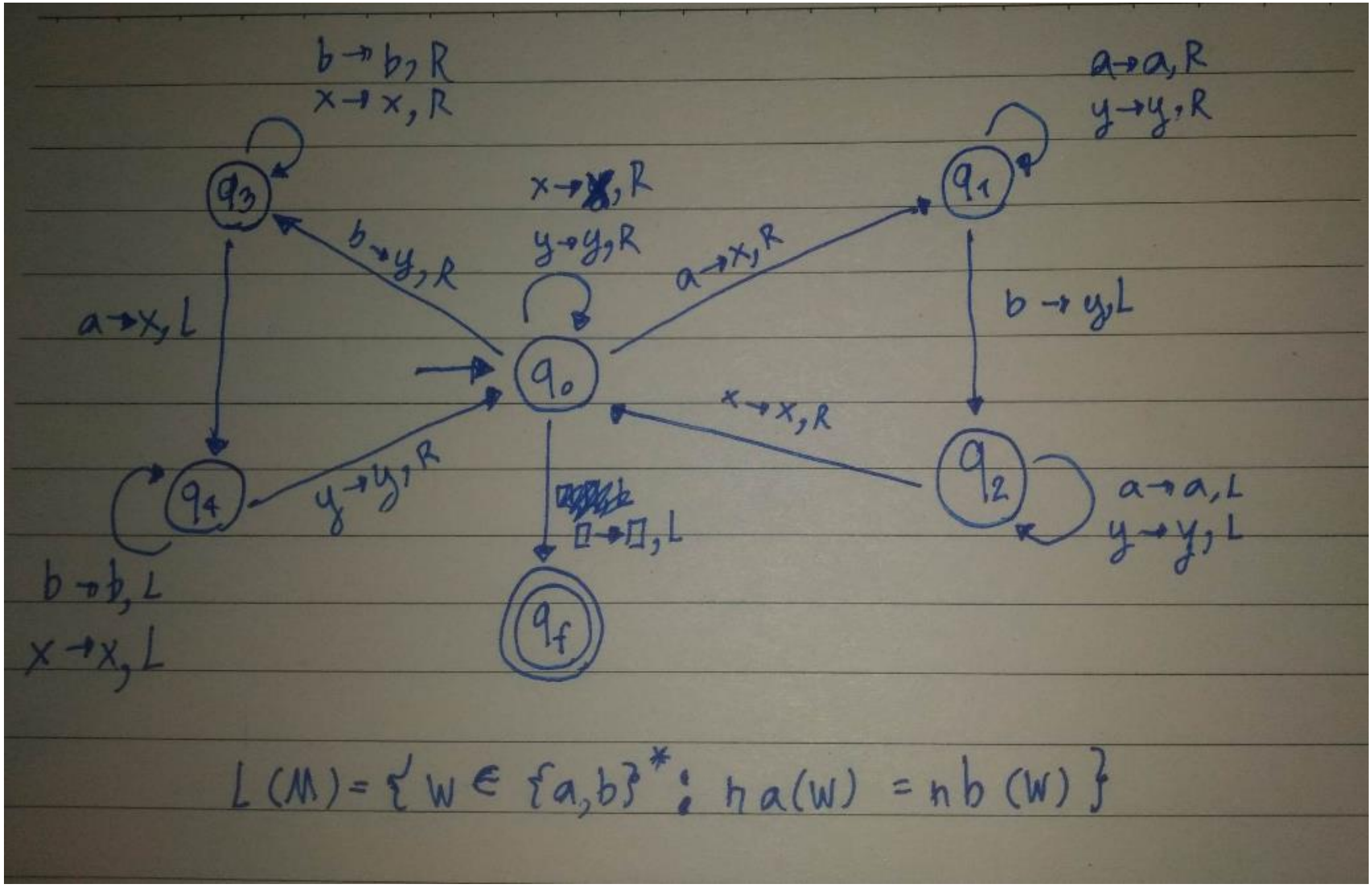
δ: δ(q0, x) = (q0, x, R) ,
δ(q0, y) = (q0, y, R) ,
δ(q0, a) = (q1, x, R) ,
δ(q0, b) = (q3, y, R) ,
δ(q0, $\square$) = (qf, $\square$, L) ,

δ(q1, a) = (q1, a, R) ,
δ(q1, y) = (q1, y, R) ,
δ(q1, b) = (q2, y, L) ,

δ(q2, a) = (q2, a, L) ,
δ(q2, y) = (q2, y, L) ,
δ(q2, x) = (q0, x, R) ,

δ(q3, a) = (q4, x, L) ,
δ(q3, b) = (q3, b, R) ,
δ(q3, x) = (q3, x, R) ,

δ(q4, b) = (q4, b, L) ,
δ(q4, x) = (q4, x, L) ,
δ(q4, y) = (q0, y, R)



$$L(M) = \{ w \in \{a,b\}^* : n_a(w) = n_b(w) \}$$