In-Class Assignment

- Given,

$M = (Q, \Sigma, \delta, q_0, F)$ recognizing L

We define

$N = (Q', \Sigma, \delta', q_0', F')$ that recognizes $1/2 L$

where,

S is a new start state

$q_0' = S$

$Q' = Q \times Q \times Q \cup \{S\}$ where $S \notin Q$

$\delta'(S, \epsilon) = \{ \langle q_0, q_i, q_i \rangle \mid q_i \in Q \}$

$\delta'(\langle q_i, q_j, q_K \rangle, a) = \{ \langle q_l, q_j, q_m \rangle \mid$
$\delta(q_i, a) = q_l, \exists b \in \Sigma.$
$\delta(q_K, b) = q_m \}$

$F' = \{ \langle q_i, q_i, q_j \rangle \mid q_i \in Q, q_j \in F \}$

- In ~~q_0~~ $\langle q_i, q_j, q_K \rangle$
  - q_i - left finger
  - q_j - Initial Guess for right finger
  - q_K - right finger
- We move left finger based on input we read from x
- Initial Guess remains the same through out the process
- Moving Right Fingers:
  Every time we read an input from x & change left fingers, we will generate all possible threads for state on right

fingers & create multiple new right threads. We say that we accept x if by the end of execution of x, atleast one thread has right fingers on one of final states.

- Initial Guess for Right Fingers:
We will create 'n' initial threads where n is number of states in DFA with right fingers on each of the state. If by the end of execution of x, atleast one of 'n' threads has right finger on one of final states, then that input is accepted.