nfa

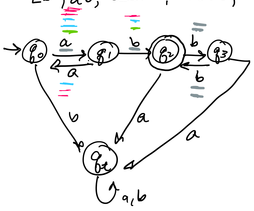
Thursday, September 12, 2024 11:58 AM

quiz #1.2

$L = \{a^n b^m : n*m = odd,\ n, m \geq 0\}$

n = odd, m = odd

$L = \{ab,\ aaab,\ abbb,\ aaabbb, \ldots\}$



nfa:

$M_{nfa} = (Q, \Sigma, \delta, q_i, F)$

- Q = finite set of internal states
- Σ = finite set of symbols = alphabet
- δ = $Q \times (\Sigma \cup \{\lambda\}) \to 2^Q$
- q_i = $\in Q$, initial state
- F = final state(s), $F \subseteq Q$

aside:

$p \to q \wedge q \to p \equiv p \leftrightarrow q$

if nfa → dfa and if dfa → nfa

nfa ≡ dfa

T ∧ T ⇒ T

T T T

$p \to q \wedge q \to p$

F F F

F F T

T T T

F F F

δ: $Q \times (\Sigma \cup \{\lambda\}) \to 2^Q$

ex $Q = \{q_0, q_1, q_2\}$

$\Sigma = \{a, b\}$

DFA: $Q \times \Sigma = \{(q_0, a), (q_1, a), (q_2, a), (q_0, b), (q_1, b), (q_2, b)\}$

NFA: $Q \times (\Sigma \cup \{\lambda\}) = \{(q_0, a), (q_1, a), (q_2, a), (q_0, b), (q_1, b), (q_2, b), (q_0, \lambda), (q_1, \lambda), (q_2, \lambda)\}$

DFA: $Q = \{q_0, q_1, q_2\}$

NFA: $2^Q = \{\phi, \{q_0\}, \{q_1\}, \{q_2\}, \{q_0, q_1\}, \{q_0, q_2\}, \{q_1, q_2\}, \{q_0, q_1, q_2\}\}$

dfa: DFA! δ: $(q_1, a) = q_2$

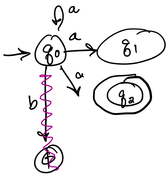
nfa: NFA: δ_n: $(q_1, a) = \{q_2\}$

$(q_1, \lambda) = \phi$

$(q_0, b) = \phi$

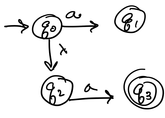
$(q_2, \lambda) = \{q_0, q_1, q_2\}$

$(q_0, a) = \{q_0, q_1, q_2\}$

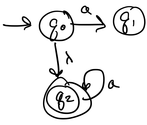


$L = \{a\}$

$\Sigma = \{a, b\}$

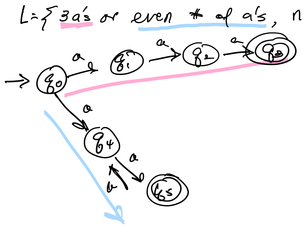


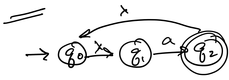
$L(M) = \{a\}$



$L(M) = \{a^n : n \geq 0\}$

$L = \{$3a's or even # of a's, $n \geq 1\}$





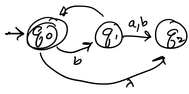
process λ's before symbol or after symbol or both.

a

$a\lambda\lambda a$

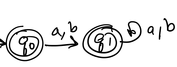
$a\lambda$ λa

nfa? 3 things



$\Sigma = \{a, b\}$

dfa or nfa? both



dfa → nfa ✓

now nfa → dfa. steps to follow