



4. It can recognize regular languages

1. DFA can be simulated by Turing machine which using stay instead of left obviously.

2. To Prove this Turing machine can be instead by NFA (M)

Set  $Q_1 = Q \times \Gamma_\Sigma \cup \{q_{end}\}$   $F = \{q_{end}\}$   $q_0 = (q_1, \epsilon)$

for any  $q \in \{q_{accept}, q_{reject}\}, a \in \Sigma$

$$\delta_1((q, \epsilon), a) = \{(q, a)\}$$

for any  $a \in \{q_{accept}, q_{reject}\}, a \in \Gamma$

$$\text{if } \delta(q, a) = (r, b, R) \text{ then } \delta_1((q, a), \epsilon) = \{(r, \epsilon)\}$$

$$\text{if } \delta(q, a) = (r, b, S), \text{ then } \delta_1((q, a), \epsilon) = \{(r, b)\}$$

for  $a \in \Gamma_\Sigma, b \in \Gamma$

$$\text{set } \delta_1((q_{accept}, a), b) = \{(q_{accept}, \epsilon)\}$$

for  $q \in Q, S_q = (Q, \Sigma, \Gamma, \delta, q, q_{accept}, q_{reject})$

$$\text{if } z \in L(S_q) \text{ then } \delta_1((q, z), \epsilon) = \{q_{end}\}$$

