Thm. If a language is regular, it is accepted by a finite automaton.

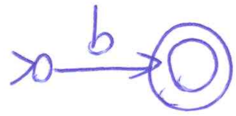
Kun-Mao Chao

F.A. $\Leftrightarrow$ R.E.

$\alpha = (ab \cup aab)^*$

a:

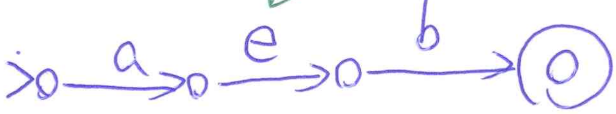
b:



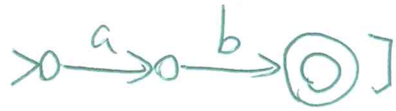
Concatenation:

could be avoided.

ab:

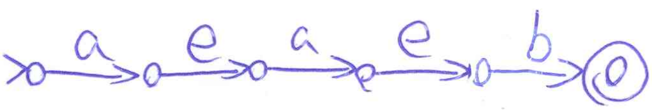


This is correct, too.

[note: 

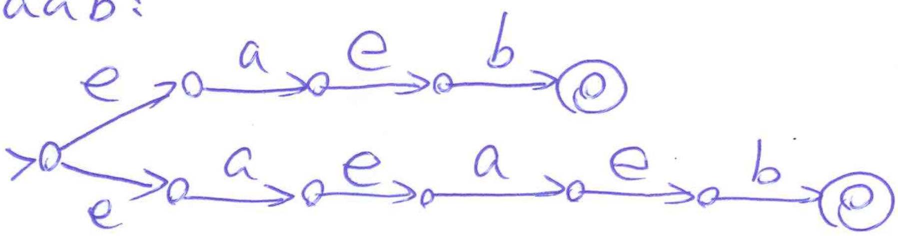
]

aab:



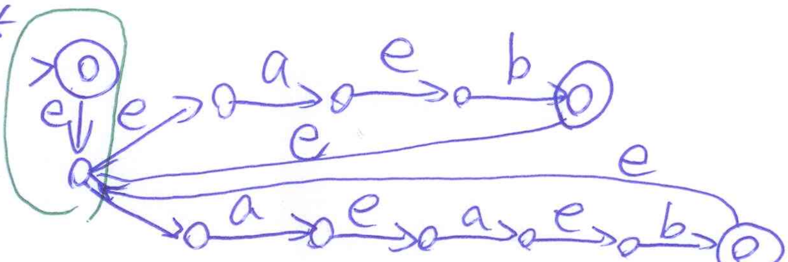
Union:

$ab \cup aab$:



Kleene star:

$(ab \cup aab)^*$

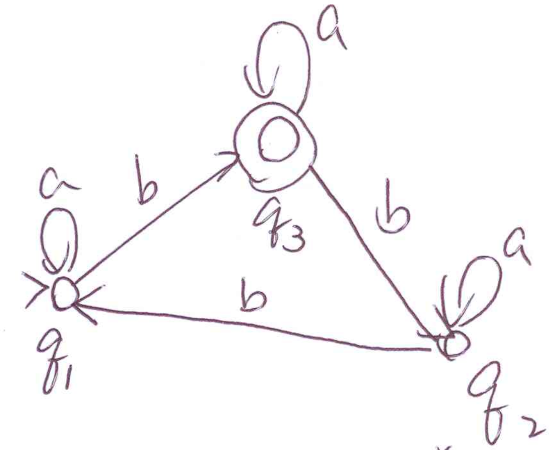


This could be combined as ">◎".

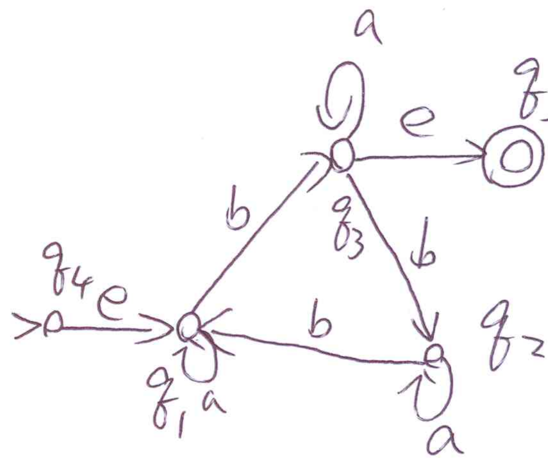
Thm. If a language is accepted by a finite automaton, it is regular.

Kun-Mao Chao

M:

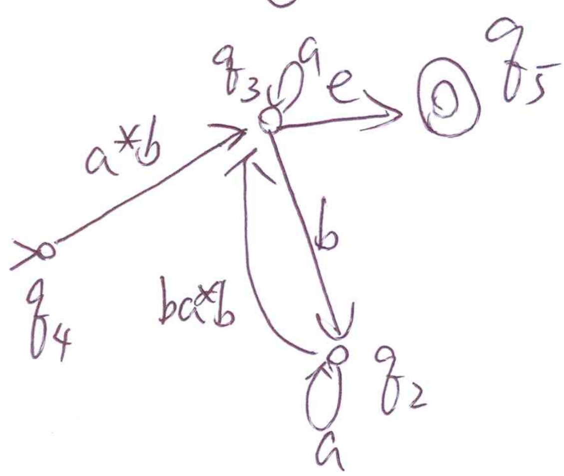


$\Rightarrow$

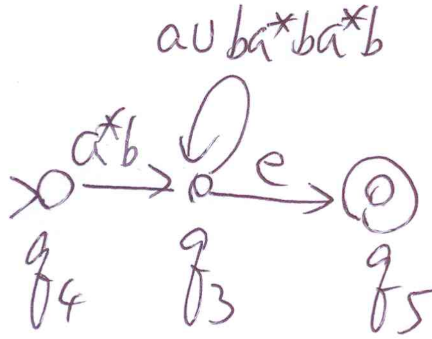


$R(i,j,k)$: the set of all strings in Σ^* that may drive M from q_i to q_j of rank k.

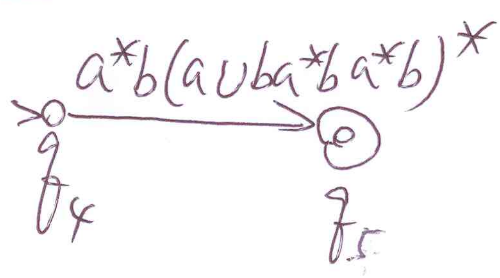
$\Downarrow R(i,j,1)$



$R(i,j,2)$ $\Leftarrow$



$\Downarrow R(i,j,3)$.



or

$a^*b(a^*ba^*ba^*b)^*a^*$

$L(M) = \{w \in \{a,b\}^* : w \text{ has } 3k+1 \text{ } b\text{'s for some } k \in N\}$

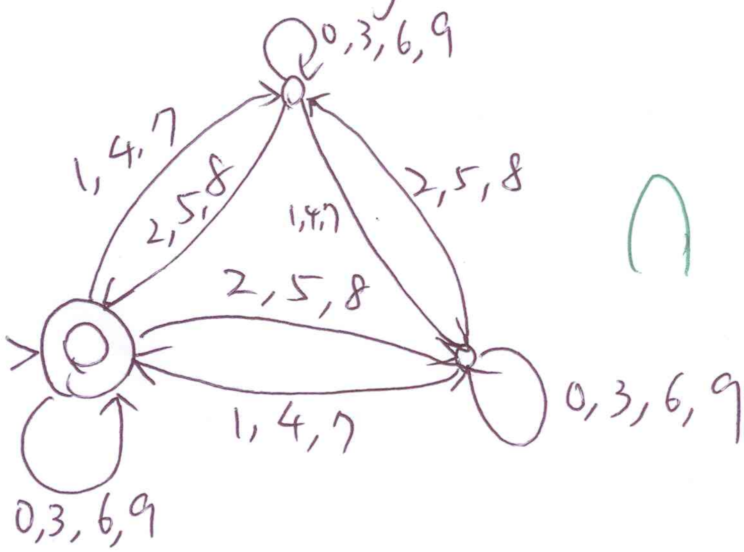
Let $\Sigma = \{0,1,2,3,\cdots,9\}$ and let $L \subseteq \Sigma^*$ be the set of decimal representations for $\mathbb{N}$ divisible by 2 or 3. Is L regular?

Kun-Mao Chao

$$L_1 = 0 \cup \{1,2,\cdots,9\}\Sigma^*$$

$$L_2 = L_1 \cap \Sigma^*\{0,2,4,6,8\} \quad \leftarrow \text{divisible by 2}$$

L_3: divisible by 3 $\leftarrow$

$L_3 =$  $\cap L_1$

L is regular since $L = \underset{\text{regular}}{L_2} \cup \underset{\text{regular}}{L_3}$.