Regular Languages and NFAs

CS712

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Theorem Any regular language can be recognized by an NFA.

Proof By induction on the recursive structure of regular expressions.

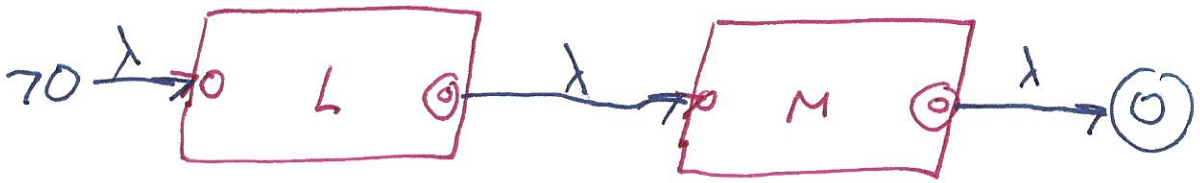
base i) $a \in A$ 

ii) λ 

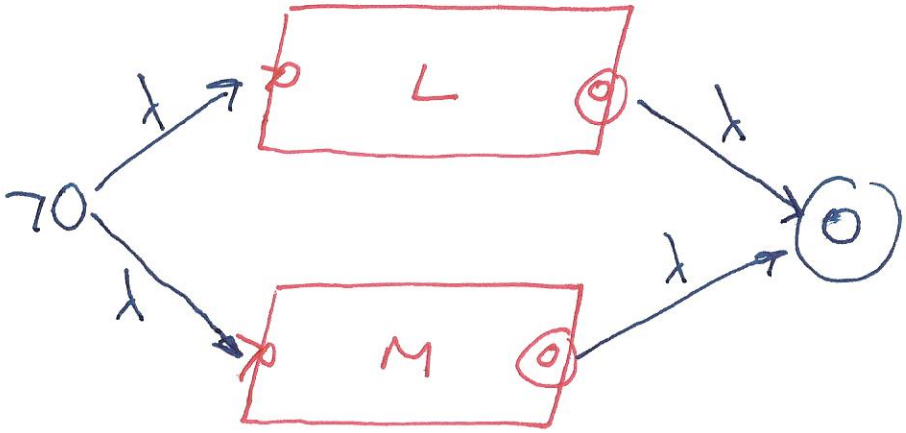
iii) ϕ 

induction step L & M are NFAs recognizing regular sets R & S respectively

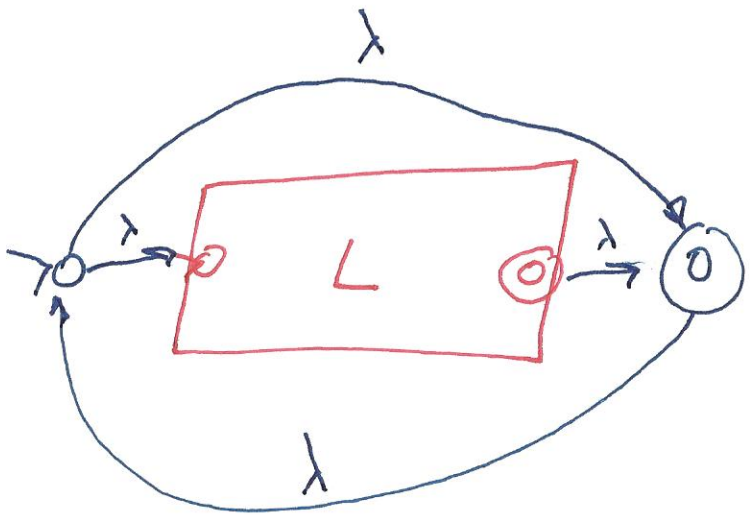
i) LM



ii) L / M



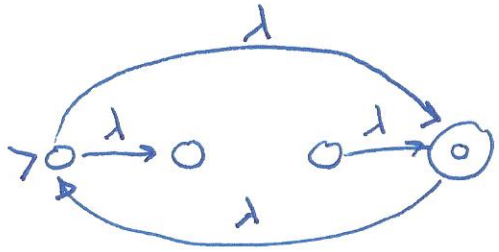
iii) L^*



QED

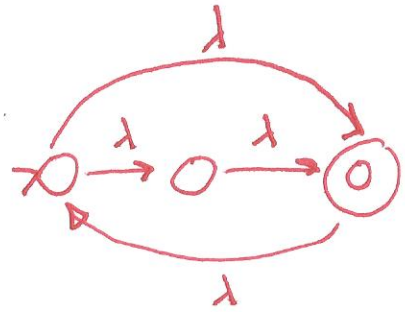
note

ϕ^*



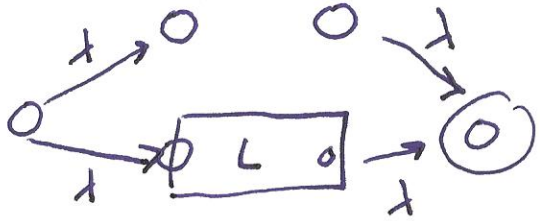
i.e. $\phi^* = \{\lambda\}$

$\{\lambda\}^*$



i.e. $\{\lambda\}^* = \{\lambda\}$

$\phi \cup L$



i.e. $\phi \cup L = L$