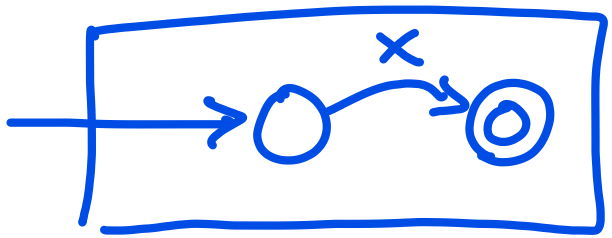
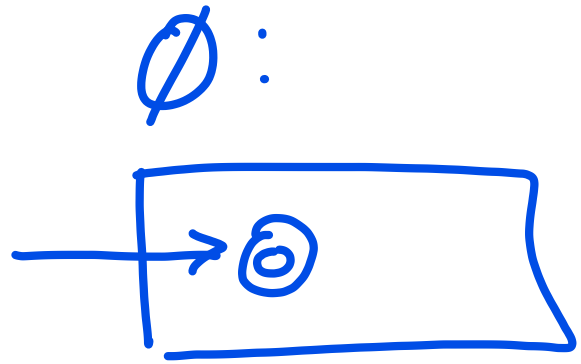
Question 22

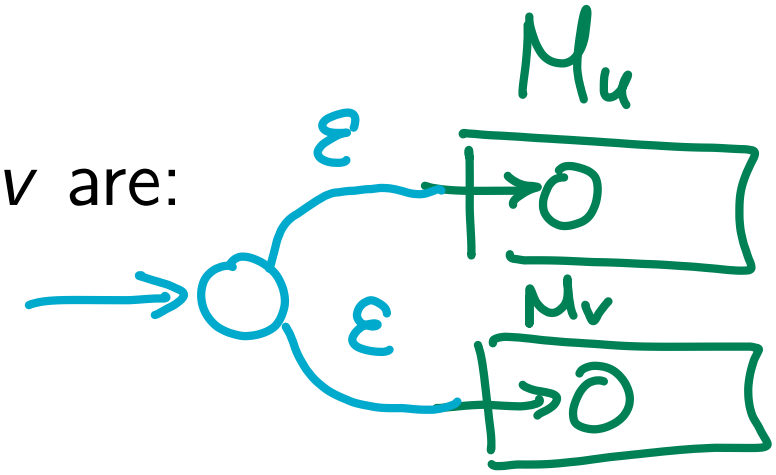
Given RegEx, draw NFA for same language

- Any char $x \in \Sigma$ is valid, as is $\emptyset$:





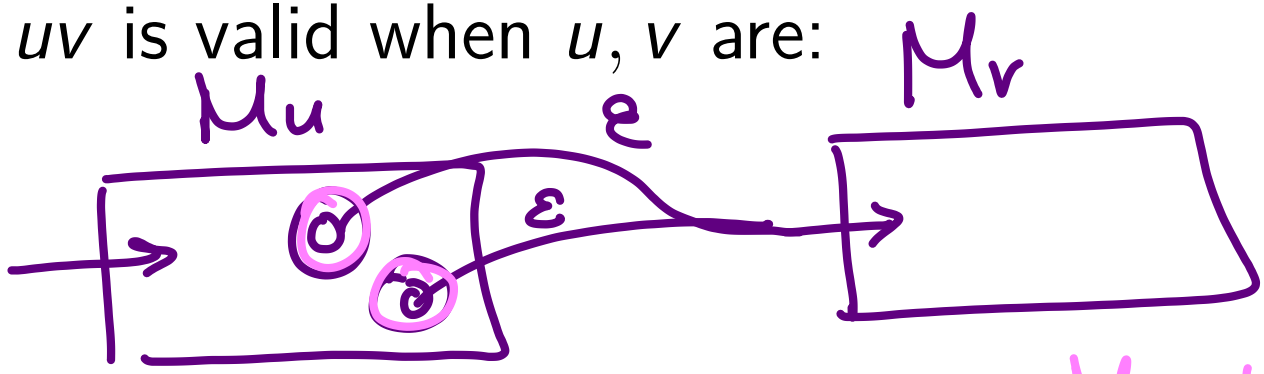
- $u \cup v$ is valid when u, v are:



Question 22

Given RegEx, draw NFA for same language

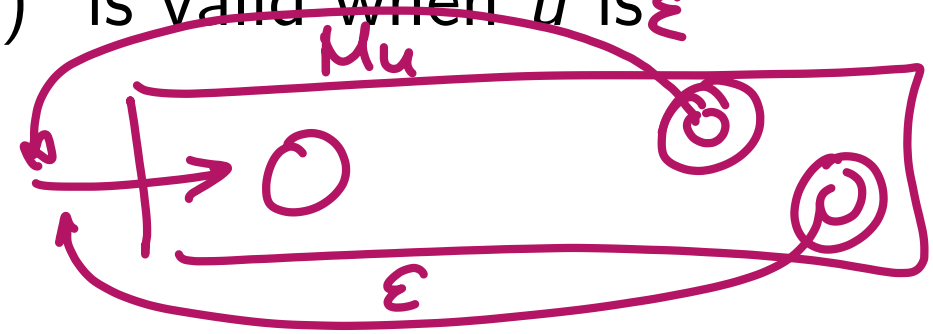
- uv is valid when u, v are:



convert ea accept in Mu to non-accept.
Connect those via ε to Mv. start.
Accept on Mv's accepts

Kleene closure

- $(u)^*$ is valid when u is:



Every accept: ε back to new start

add new accept
ε from new start.
new start ε to "real" start

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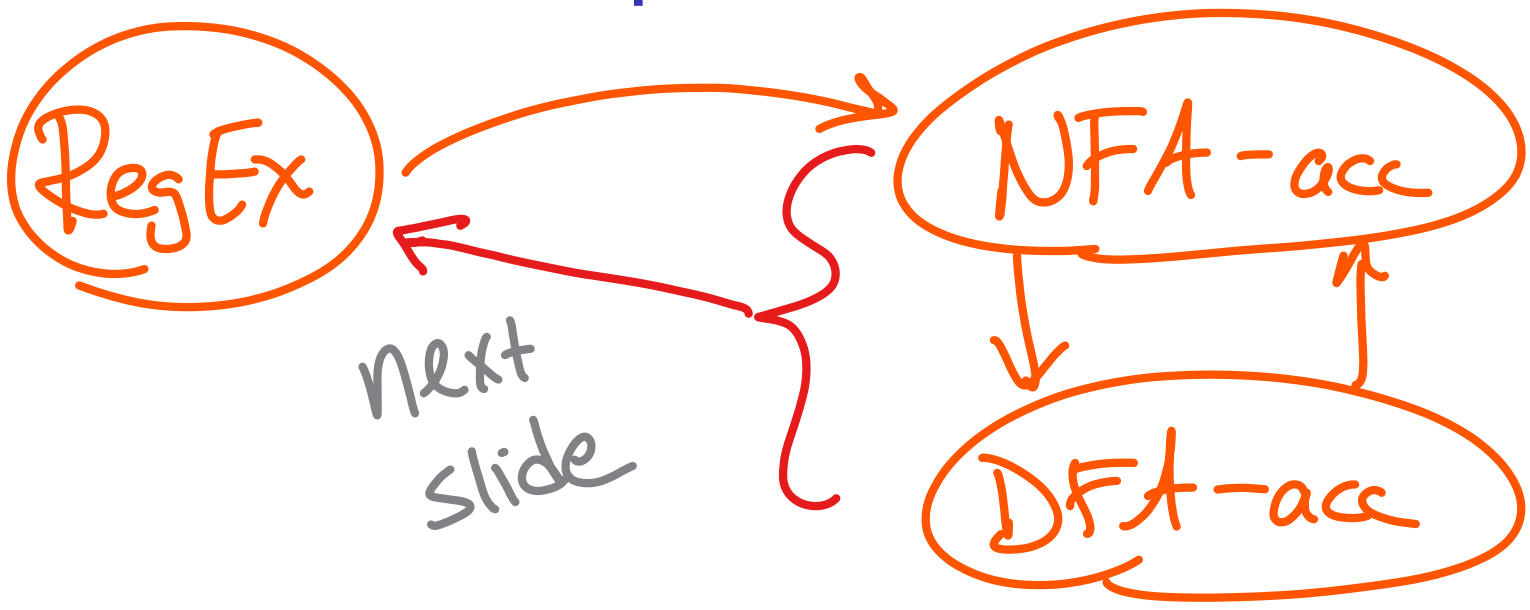
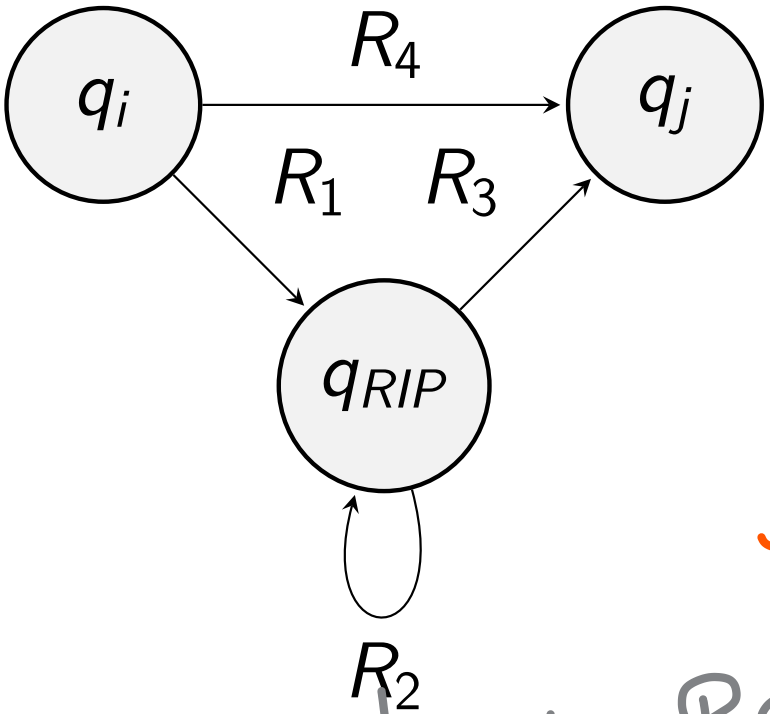


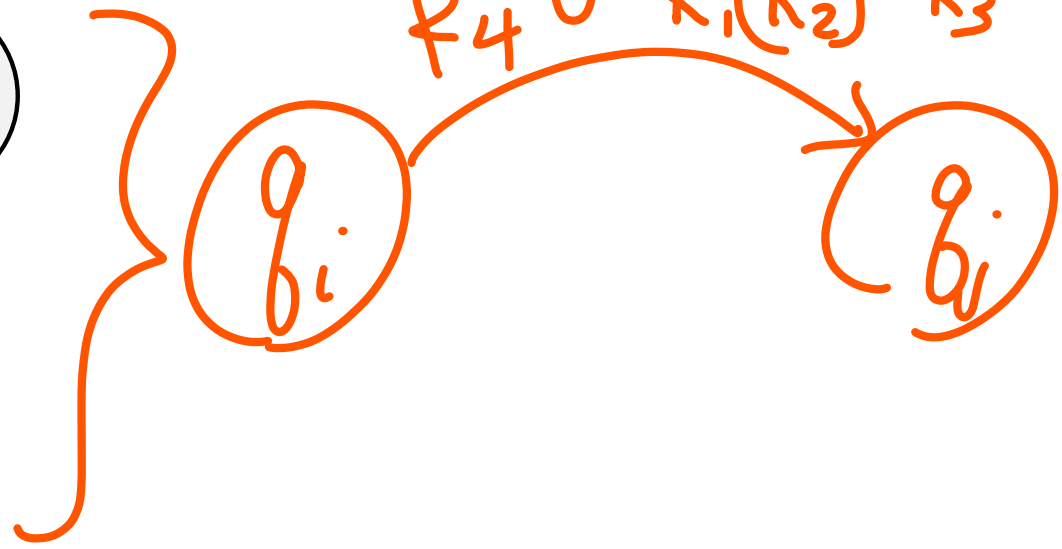
Question 23, General Procedure

Given DFA, give equivalent regular expression



Move to NFA: ε to new start. New accept, ε to that from all.

$R_4 \cup R_1(R_2)^* R_3$



When done: RegEx

Question 24

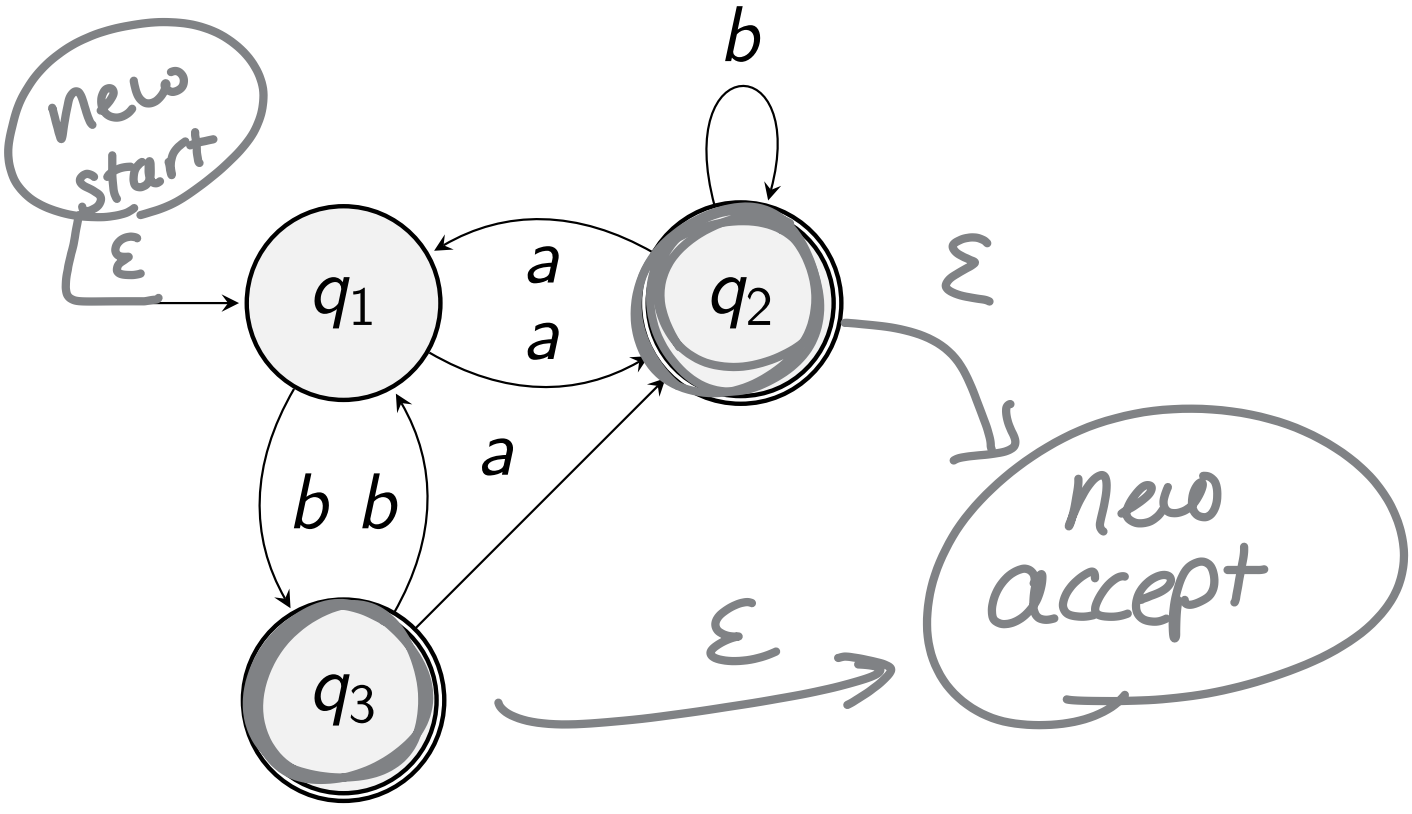
Relationship between DFA/NFA-acceptable and RegEx?

Question 25

Make an NFA that accepts $(ab \cup a)^*$.

Question 26

Convert to a regular expression:



Question 27

Regular languages closed under complementation.
L is a regular language $\rightarrow \overline{L} = \Sigma^* - L$ is regular.

L is regular, so ∃ DFA D that accepts it.

Copy D to D' // Plan: D' will accept $\overline{L}$

In D', swap (invert) set of accept / reject states.