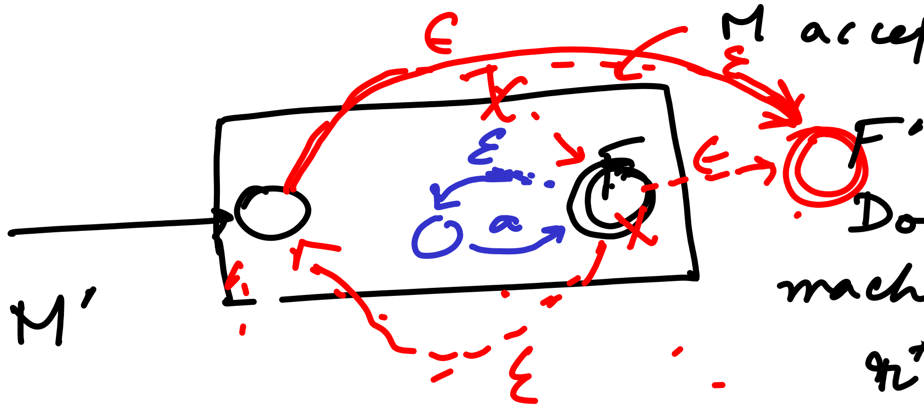
COL 352 Lecture 11 Jan 28



M accepts r.e. r

Does the modified machine accept r^*

M' accepts strings in r^*

If $w \in L(r^*) \Rightarrow w = w_1 w_2 \cdots w_k$

$w_i \in L(r)$

Must prove that if $w \in L(M')$ then $w \in L(r^*)$

Suppose $a \notin L(r)$

Suppose $w \in L(M')$ $\quad w \neq \varepsilon$

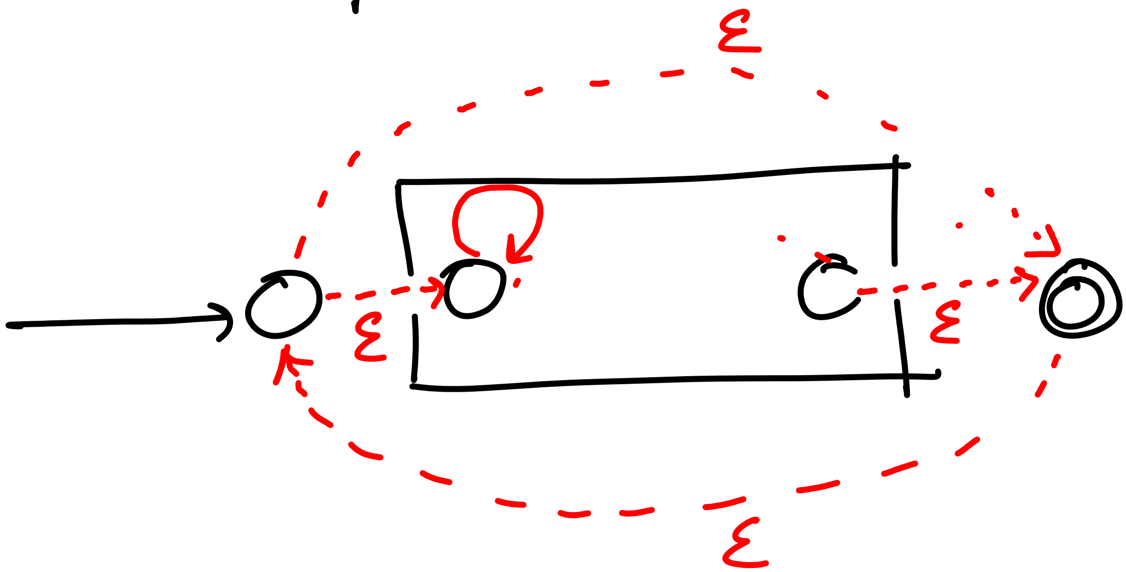
$\Rightarrow \hat{\delta}(q_0, w) = F'$

$\Rightarrow \hat{\delta}(q_0, w) = F \longrightarrow F'$

w must consist of partition

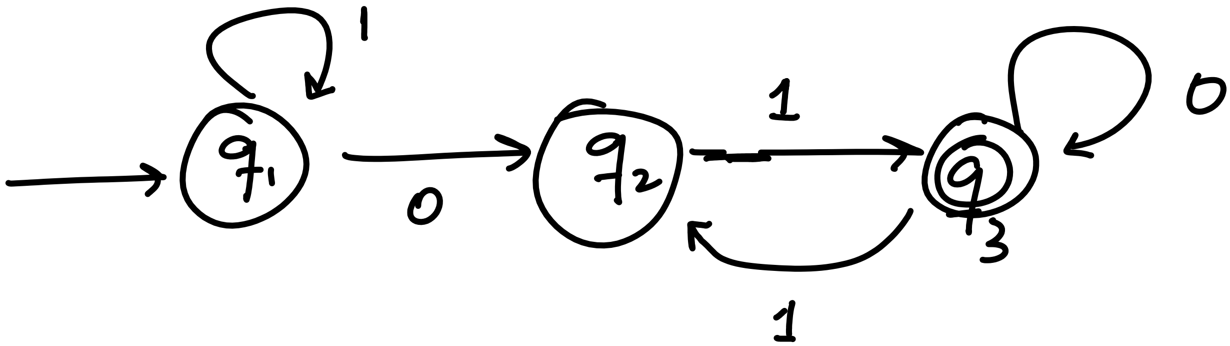
$w_1\ w_2\ w_3 \ldots w_\ell$ such that

$\hat{\delta}(q_0, w_i) = F$



The overall proof is by complete induction on the length of the regular expression (not the strings in the language)

From DFA $\longrightarrow$ regular expression



$1^*01(0+11)^*$

Capture all string w | s.t $\hat{\delta}(q_1, w) \in F$

using a r.e.

We will compute r.e. to traverse between all pairs of states

$R_{ij} = r_{ij}$ s.t $\hat{\delta}(q_i, w) = q_j$ for all $w \in r_{ij}$

Finally $\bigcup_{\substack{i=1 \\ j \in F}} R_{ij}$ is the r.e. corresponding to $L(M)$

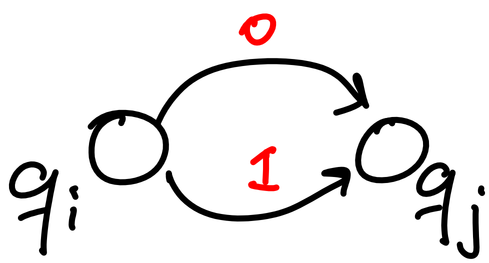
$R_{ij}^{(k)}$: All string from state i to state j without using any intermediate state numbered larger than k

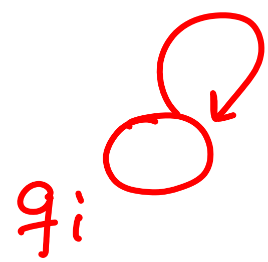
not including i, j

for n states

$R_{ij} = R_{ij}^{(n)}$

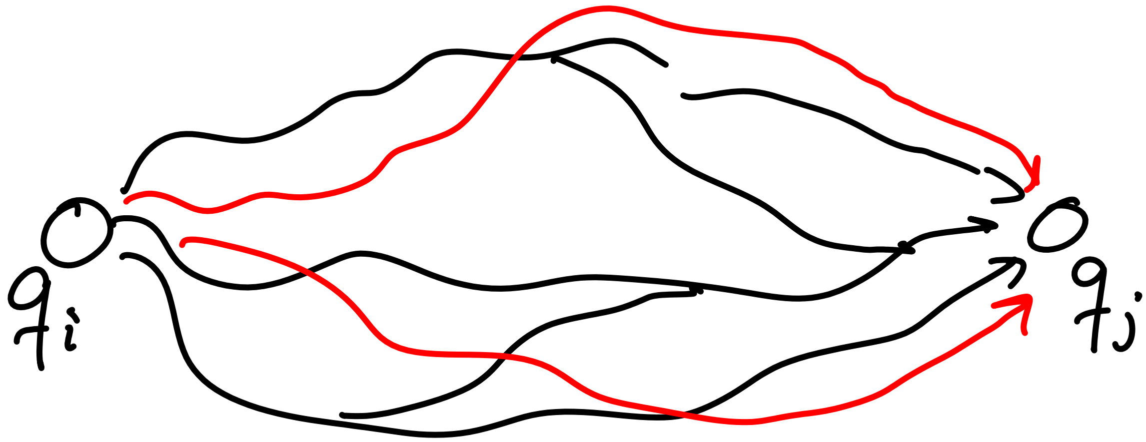
Base case R_{ij}^{0} : no intermediate states are allowed





R_{ii} will always include ε

	0	1	2	.	n
R_{11}					
R_{12}					
R_{13}					
.					
R_{nn}					



Suppose R_{ij}^{k-1} is done $\forall\ i, j$

To R_{ij}^{k} we can safely include the r.e. for R_{ij}^{k-1}