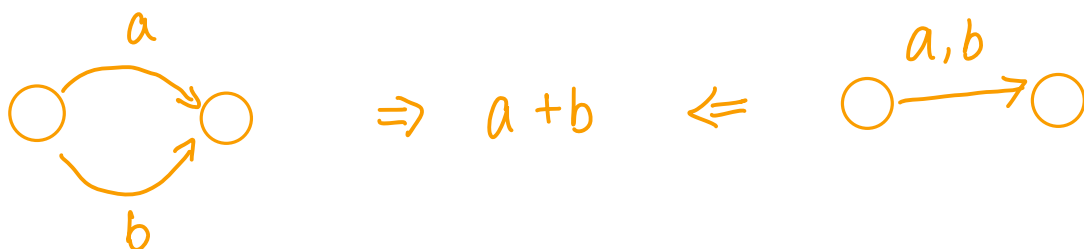


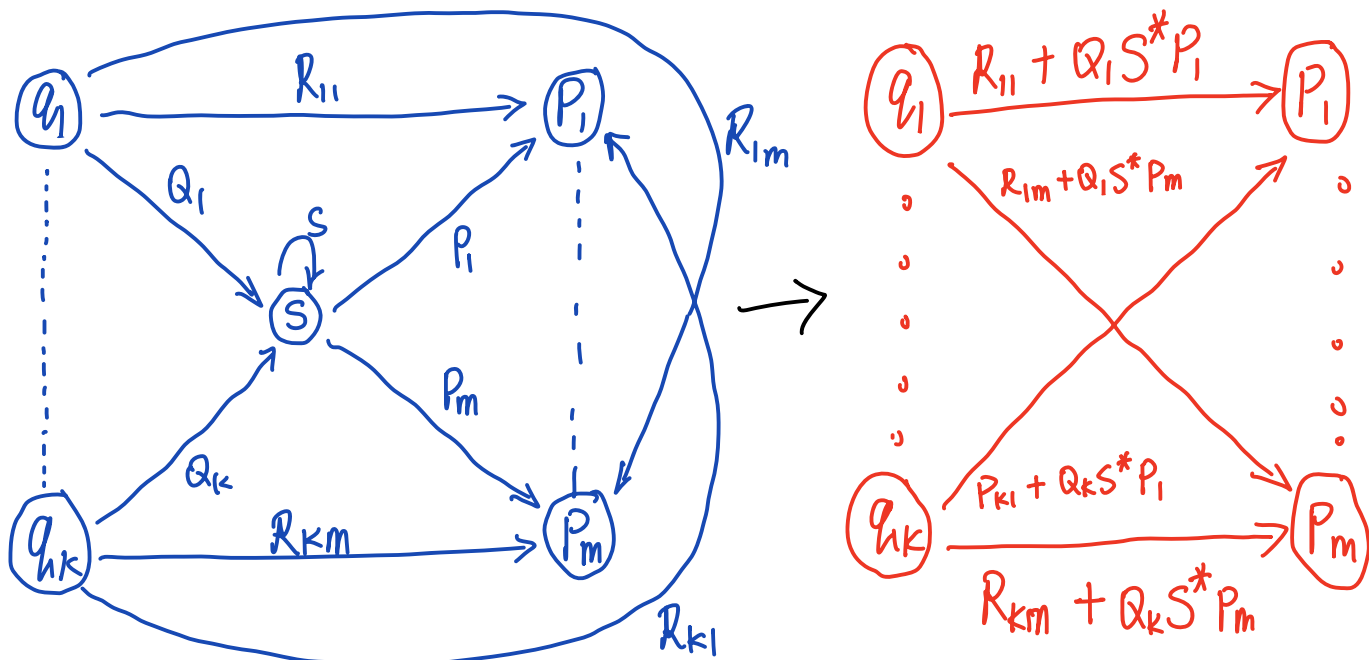
WEEK 4

CONVERSION of DFA to RE (state elimination)

1. Basics



2. An general example - eliminate state S

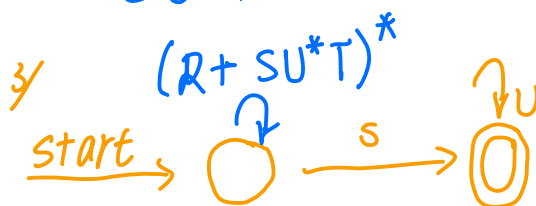
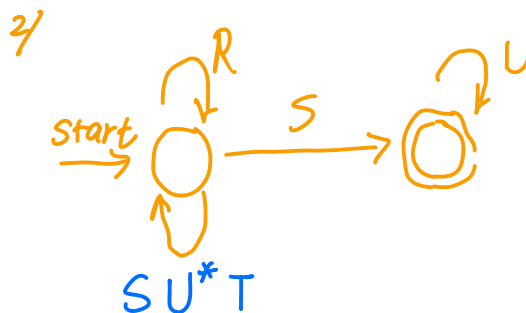
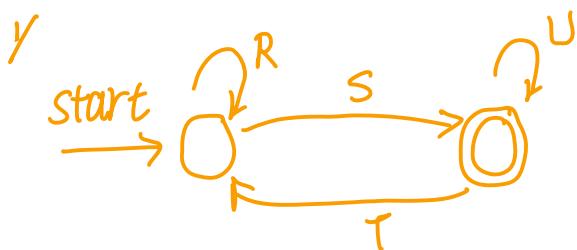


3. Steps

(start) (final state)

Eliminate all states except q_0 and q_f

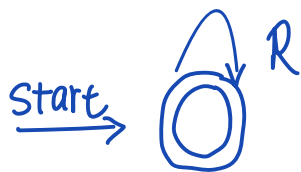
If $q_0 \neq q_f$



$$RE = (R + SU^*T)^*SU^*$$

Just follow the basics above.

If $q_0 = q_f$



$$RE = R^*$$

The desired regular expression is the union of all the expression derived for each accepting state.

4. Simplification

$$\forall \quad \varepsilon R = R\varepsilon = R$$

$$\emptyset R = R\emptyset = \emptyset$$

$$(\varepsilon)^* = \varepsilon \quad \text{and} \quad (\emptyset)^* = \varepsilon$$

$$\emptyset + R = R$$

$$R + R = R$$

$$R^* R = R R^* = R^*$$

$$(R^*)^* = R^*$$

$$\varepsilon + R R^* = \varepsilon + R^* R = R^*$$

$$R^* R^* = R^*$$

$$R^* + \varepsilon = R^*$$

$$(R + \varepsilon)^* = R^*$$

$$(R + \varepsilon) R^* = R^* (R + \varepsilon) = R^*$$

$$(R + \varepsilon) (R + \varepsilon)^* (R + \varepsilon) = R^*$$

$$R^* S + S = R^* S$$

$$\emptyset + \varepsilon = \varepsilon$$