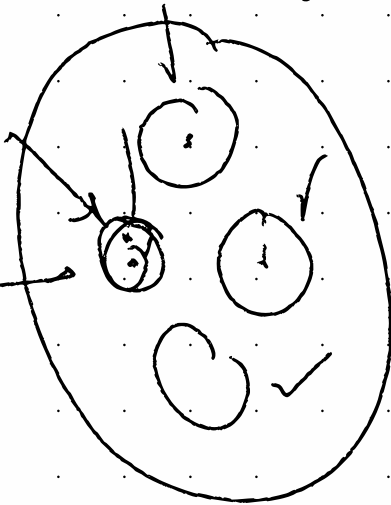
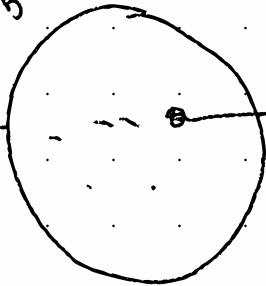


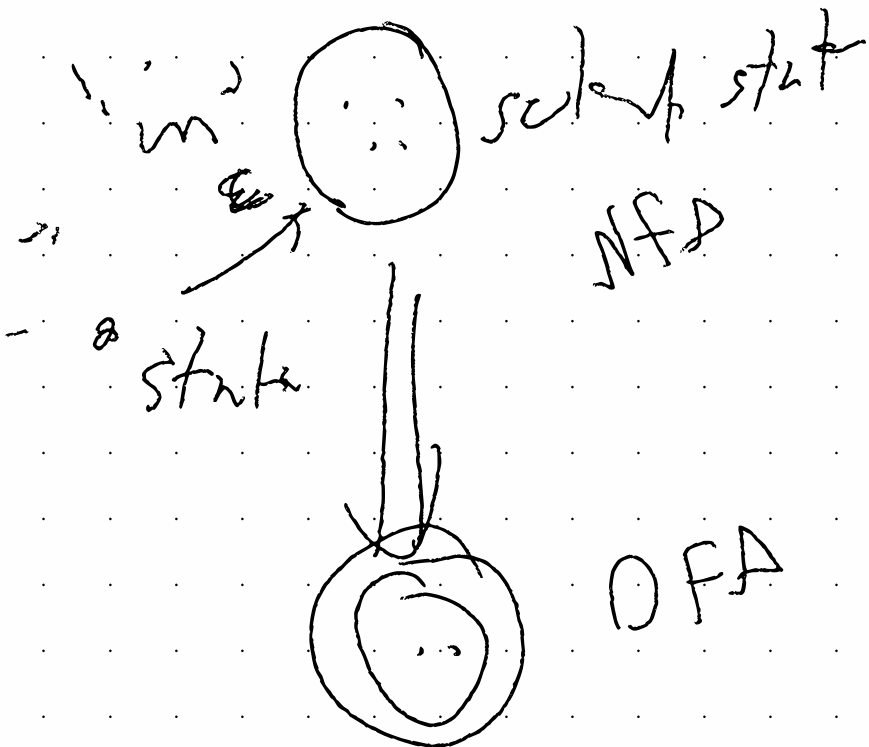
NFA  $\rightarrow$  DFA  $\rightarrow$  sub $\rightarrow$

Possible  
state

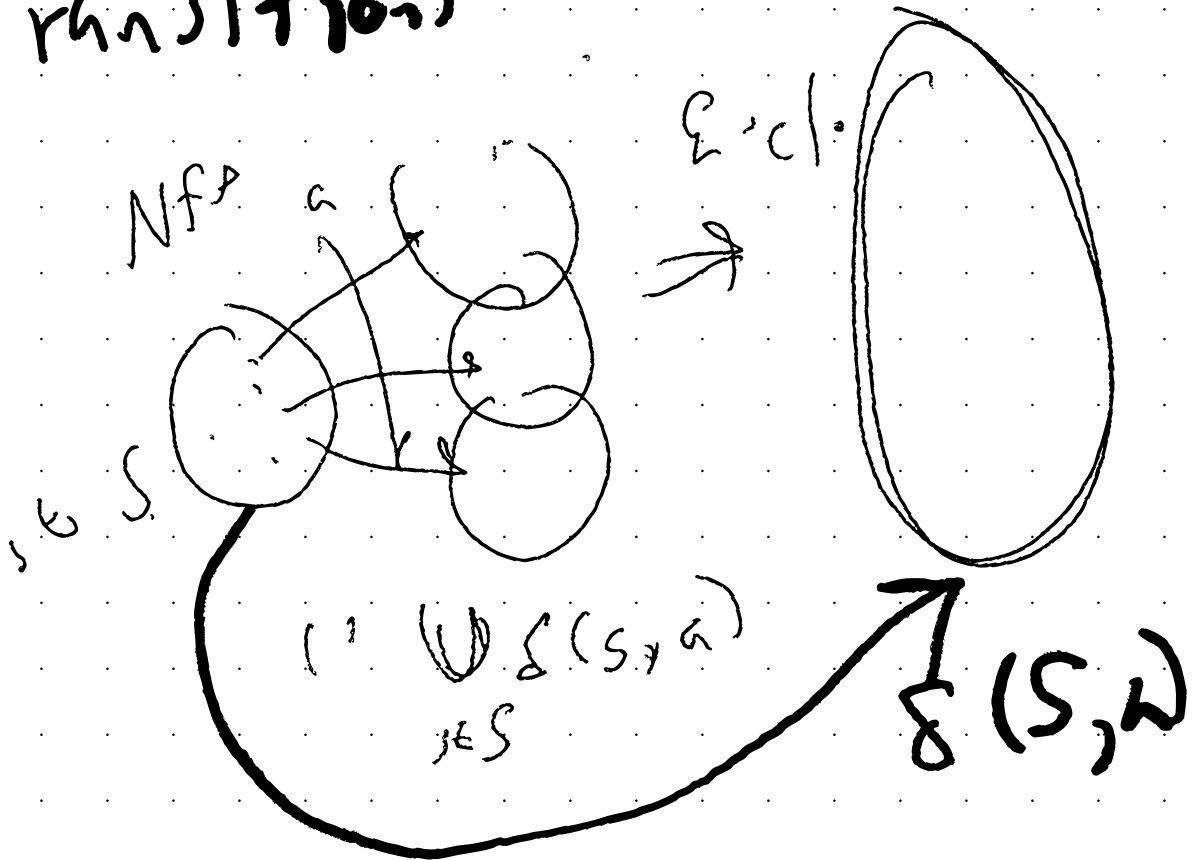


Final state

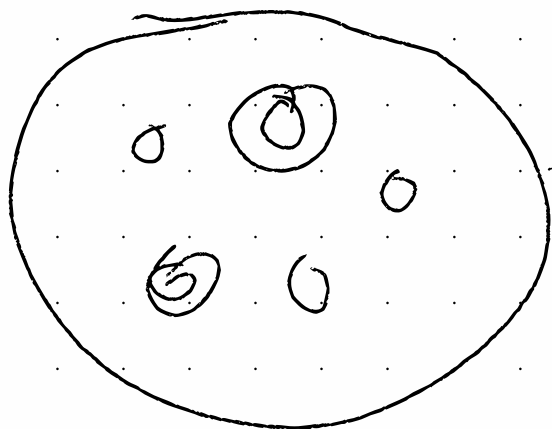
precompute  
the answer



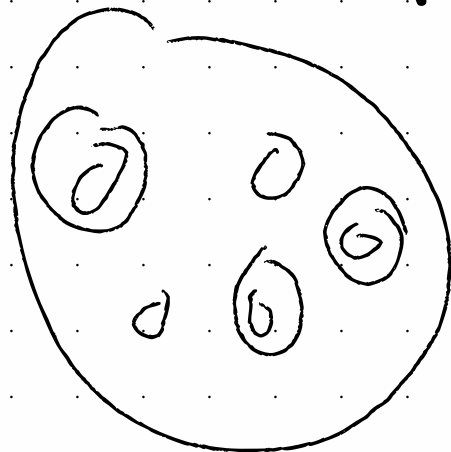
# Transitions



Reg. Lang. Closed by Complement



$L$



$\bar{L}$

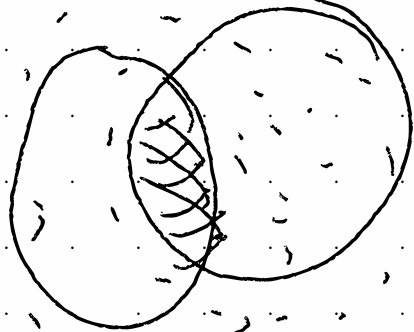
de Morgan's Law

$$L_1 \cap L_2 =$$

$$\overline{L_1 \cup L_2}$$

de Morgan

$$L_i \in \text{Pow}(\Sigma^*)$$



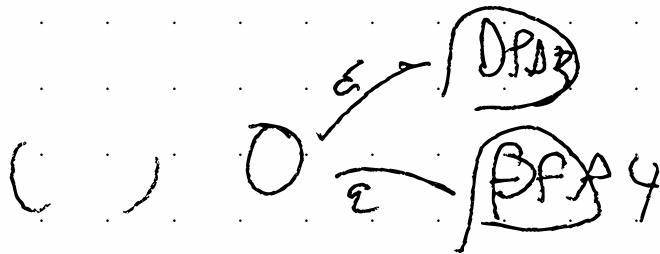
Using de Morgan's to construct intersection

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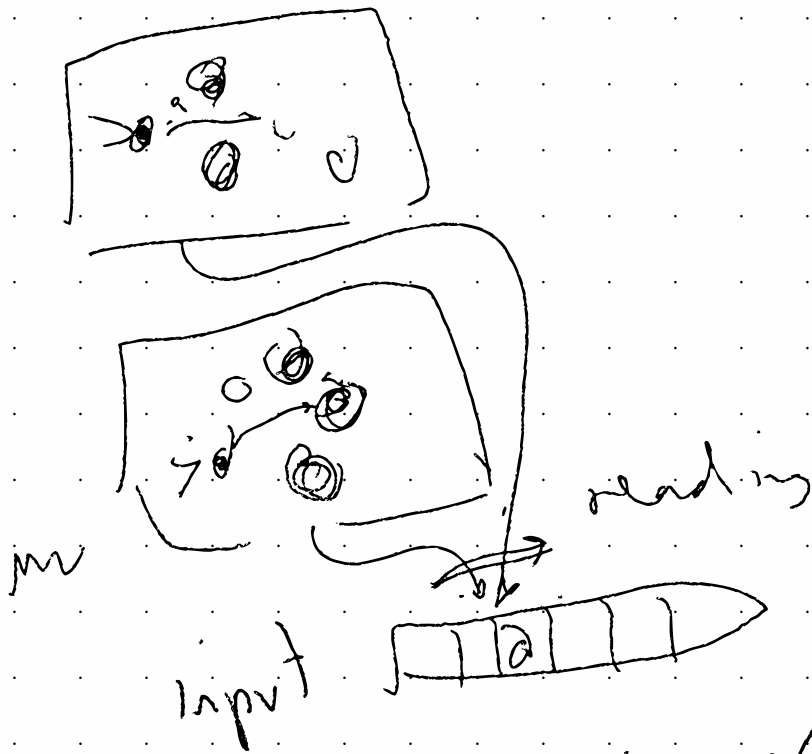
$L_1 \rightarrow \text{DFA}_1 \xrightarrow{\text{Compl.}} \text{DFA}_3$

$L_2 \rightarrow \text{PFA}_2 \xrightarrow{\text{Compl.}} \text{PFA}_4$

$\cup (\text{DFA}_3, \text{PFA}_4) \xrightarrow{\text{Union}} \text{NFA}_1 \xrightarrow{\text{Compl.}} \text{PFA}_5 \rightarrow \text{DFA}_6$



M1



$$Q_1 \times Q_2 = \{ (q_1, q_2) \mid q_1 \in Q_1, q_2 \in Q_2 \}$$

$$\left\{ \begin{array}{l} \delta((q_1, q_2), a) \longrightarrow \\ (\delta(q_1, a), \delta(q_2, a)) \end{array} \right\}$$

$$\forall (q_1, q_2) \in Q_1 \times Q_2, a \in \Sigma$$



Start of  $M_1 \cap M_2$

$$M_1 = \langle Q_1, \Sigma, \delta_1, q_1, F_1 \rangle$$

$$M_2 = \langle Q_2, \Sigma, \delta_2, q_2, F_2 \rangle$$

$$\text{start} = (q_1, q_2)$$

$$F = F_1 \times F_2$$

for the UNION machine

ditto & almost all

the formula for  $F$   
presented was wrong.  
Exercise to get the correct  
one.