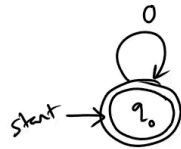
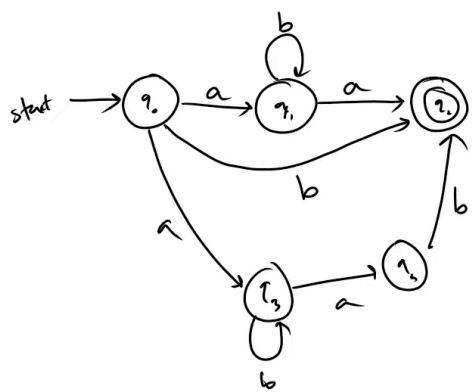


"State Elimination"

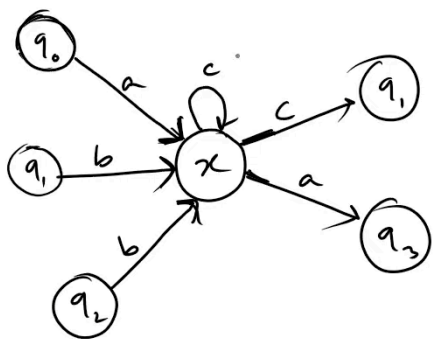
DFA to RegEx



RegEx a^*



RegEx $ab^*a \mid b \mid ab^*ab$



$$\underline{3 \times 2 = 6}$$

$q_0 \rightarrow q_1 \quad ac^*c$

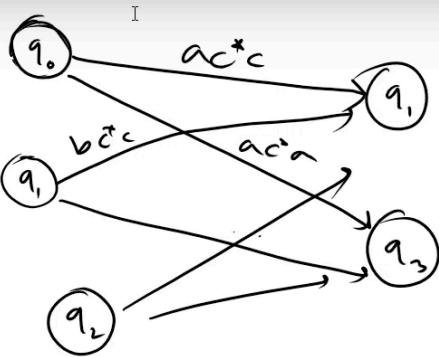
$q_0 \rightarrow q_3 \quad ac^*a$

$q_1 \rightarrow q_1 \quad bc^*c$

$q_1 \rightarrow q_3 \quad bc^*a$

$q_2 \rightarrow q_1 \quad bc^*c$

$q_2 \rightarrow q_3 \quad bc^*a$



$$\underline{3 \times 2 = 6}$$

$$q_0 \rightarrow q_1 \quad ac^*c$$

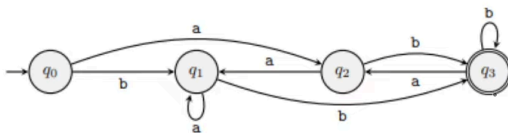
$$q_0 \rightarrow q_3 \quad aca$$

$$q_1 \rightarrow q_1 \quad bc^*c$$

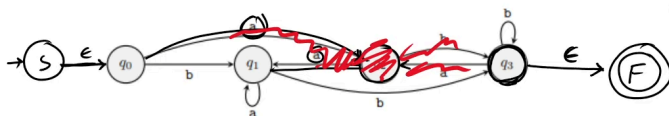
$$q_1 \rightarrow q_3 \quad bc^*a$$

$$q_2 \rightarrow q_1 \quad bc^*c$$

$$q_2 \rightarrow q_3 \quad bc^*a$$



eliminate q_2 first & then q_1, q_3



eliminate q_2 first & then q_1, q_3

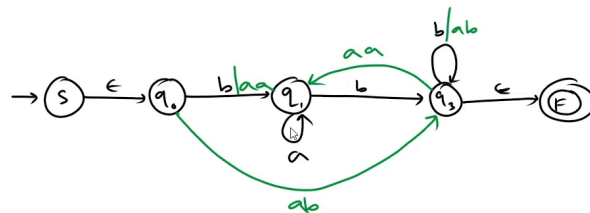
$$\begin{array}{l} q_0 \rightarrow q_1 \\ q_3 \rightarrow q_2 \end{array}$$

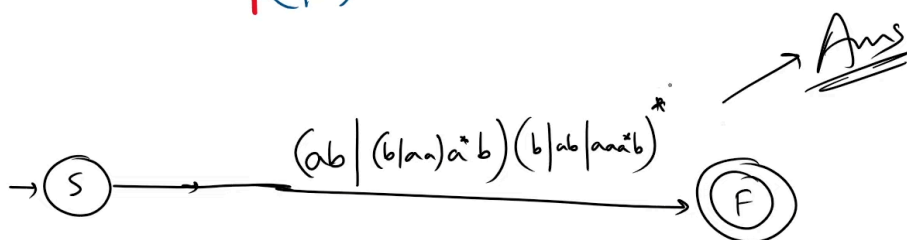
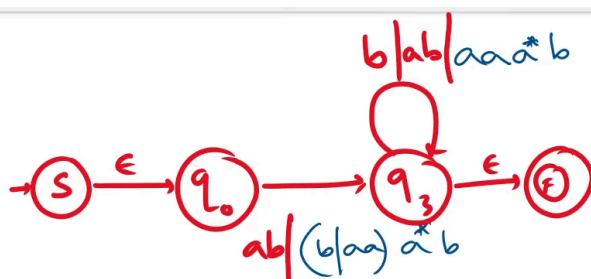
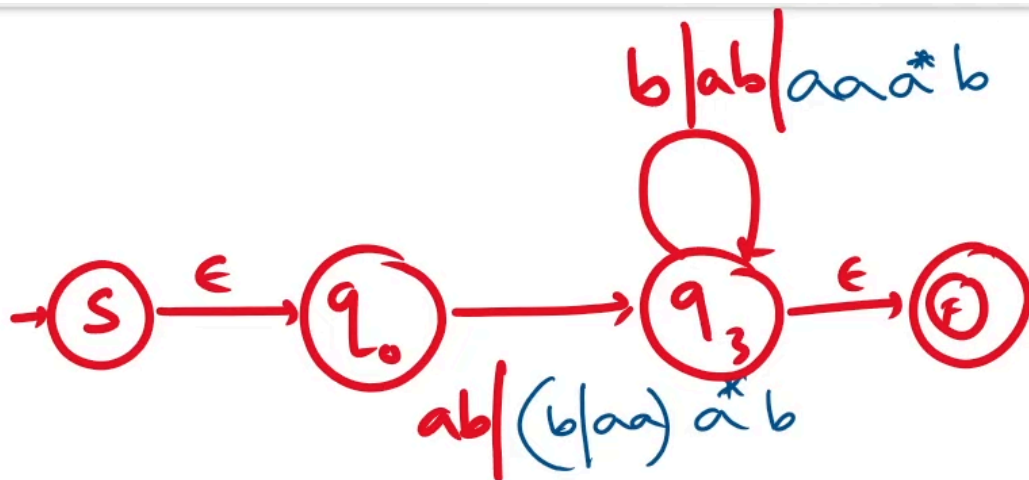
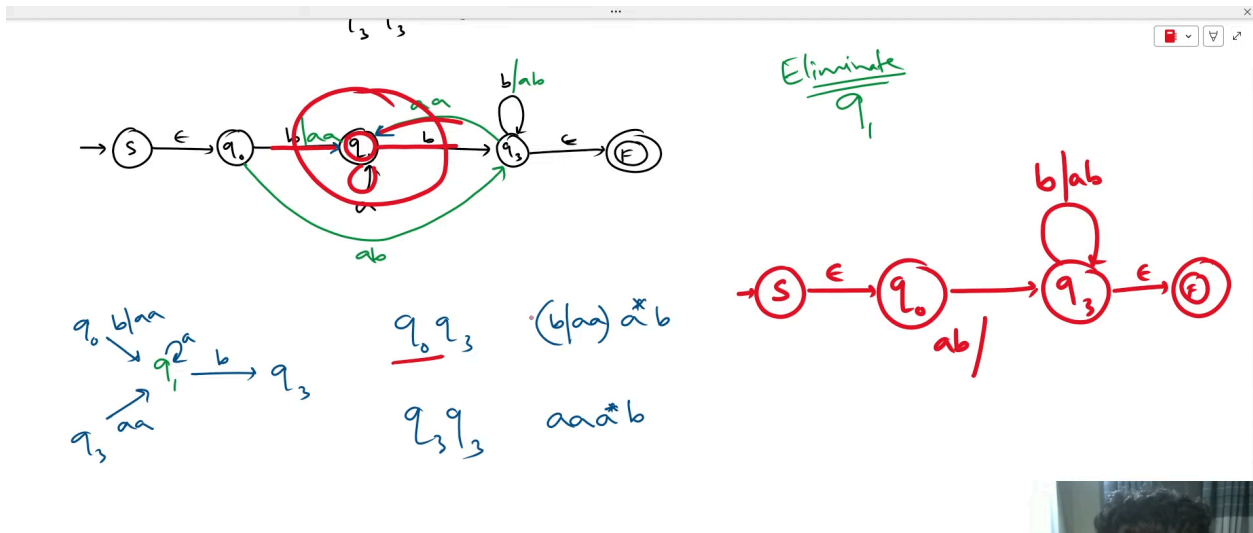
$$q_0 q_1 \quad aa$$

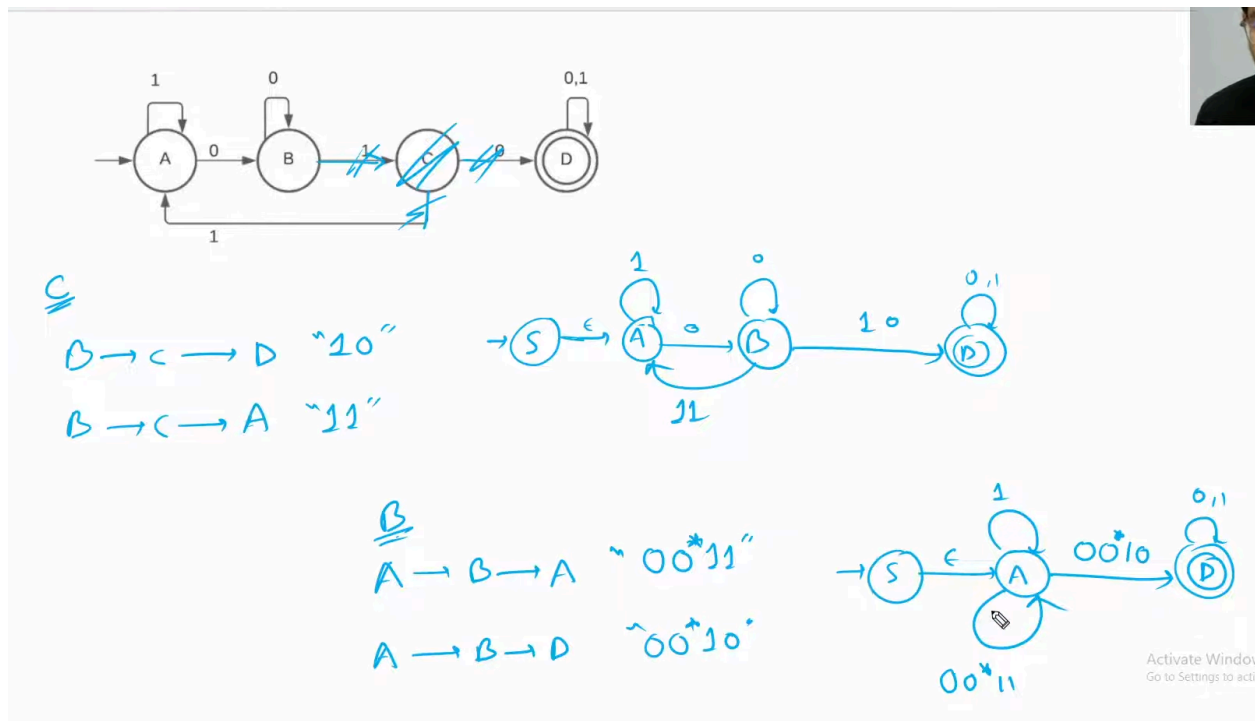
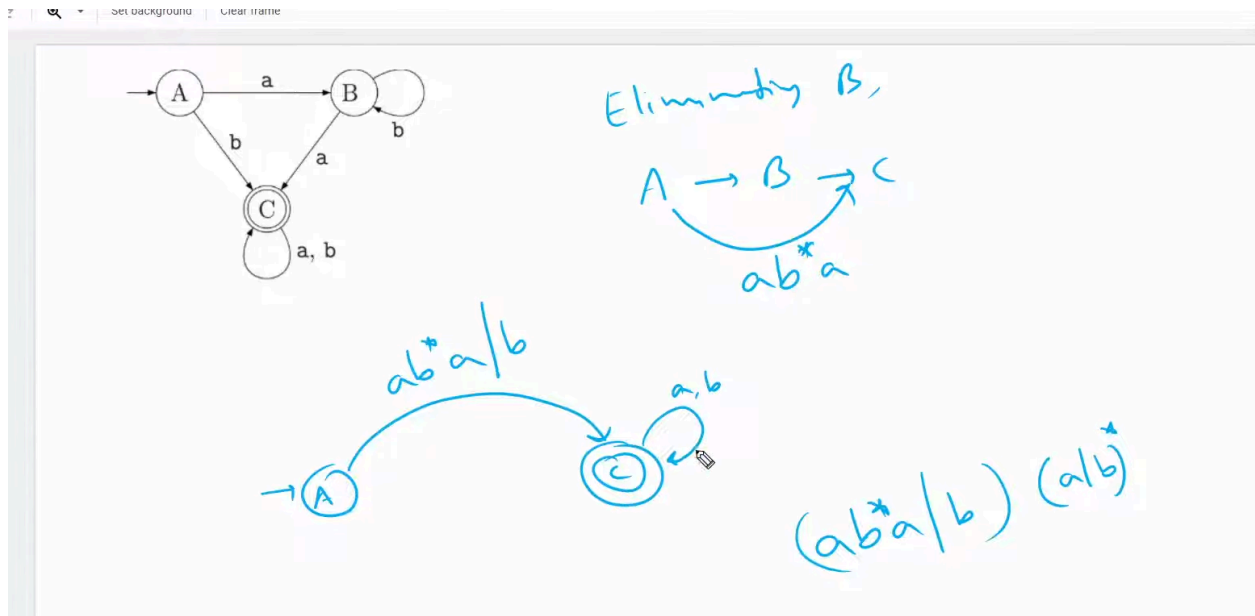
$$q_0 q_3 \quad ab$$

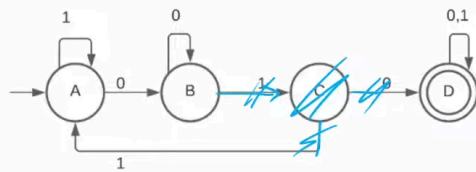
$$q_1 q_1 \quad aa$$

$$q_1 q_3 \quad ab$$





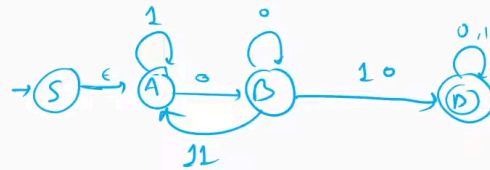




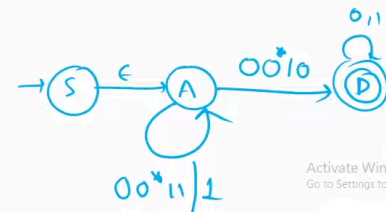
C

$B \rightarrow C \rightarrow D$ "10"

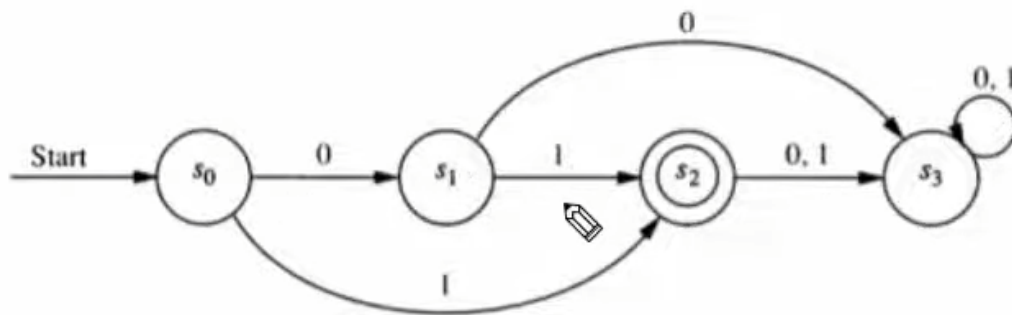
$B \rightarrow C \rightarrow A$ "11"

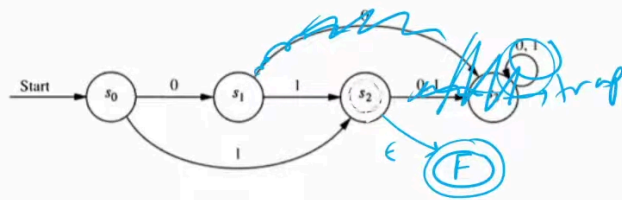


$(00^*11 \mid 1)^* 00^*10 (0 \mid 1)^*$

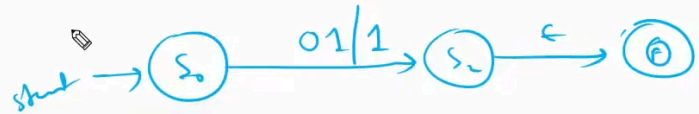


Activate Windows
Go to Settings to activate Windows

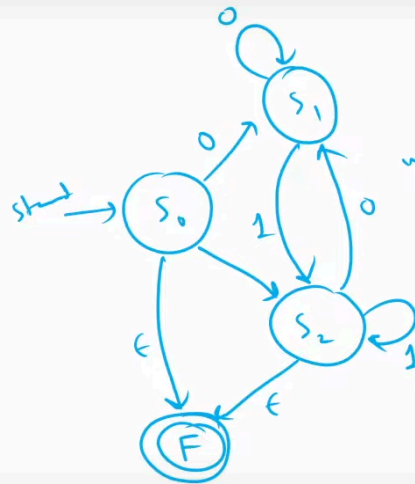
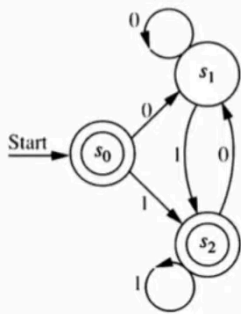




Elim. s_1 ,
 $s_0 \rightarrow s_1 \rightarrow s_2$

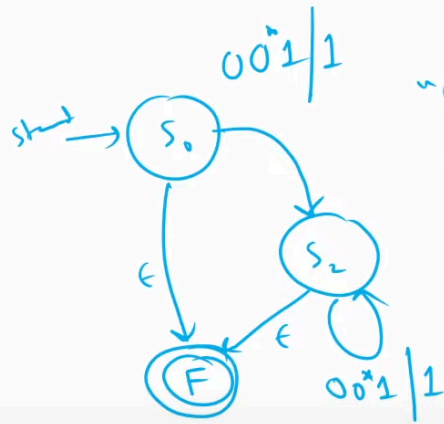
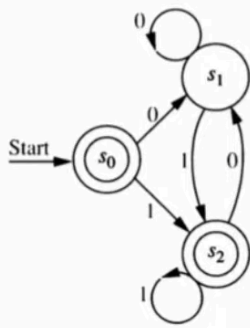


01/1



s_1

"00*1" $s_0 \rightarrow s_1 \rightarrow s_2$
 "00*1" $s_2 \rightarrow s_1 \rightarrow s_2$

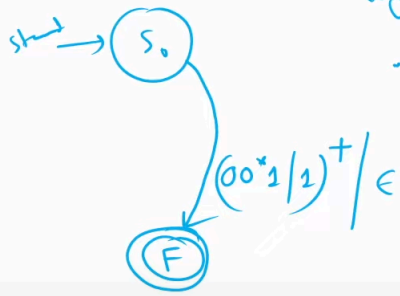
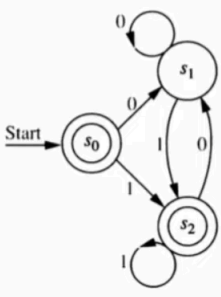


(s1)
 $\sim 00^*1'' \underline{s_0} \rightarrow s_1 \rightarrow \underline{s_2}$
 $\sim 00^*1'' \underline{s_2} \rightarrow s_1 \rightarrow \underline{s_2}$

(s2)

$s_0 \rightarrow s_2 \rightarrow f$

$(00^*1/1) (00^*1/1)^*$



(s1)
 $\sim 00^*1'' \underline{s_0} \rightarrow s_1 \rightarrow \underline{s_2}$
 $\sim 00^*1'' \underline{s_2} \rightarrow s_1 \rightarrow \underline{s_2}$

(s2)

$s_0 \rightarrow s_2 \rightarrow f$

$(00^*1/1) (00^*1/1)^*$

Problem 1: Regular Languages and DFAs (10 points)

Let $\Sigma = \{0, 1\}$.

$$L_1 = \{w \in \Sigma^* : w \text{ starts with odd number of 1's}\}$$

$$L_2 = \{w \in \Sigma^* : w \text{ starts and ends with same character}\}$$

- Write down all strings in L_2 which are of length 3. (2 points)
- Give the state diagram for a DFA that recognizes L_1 . (3 points)
- Give the state diagram for a DFA that recognizes L_2 . (3 points)
- Give the state diagram for a DFA that recognizes $L_1 \cap L_2$. (2 points)

Student ID: _____ Duration: 30 minutes
You have to use the designated spaces for your answers. No extra pages will be provided.

Problem 1: Regular Languages and DFAs (10 points)

Let $\Sigma = \{0, 1\}$.

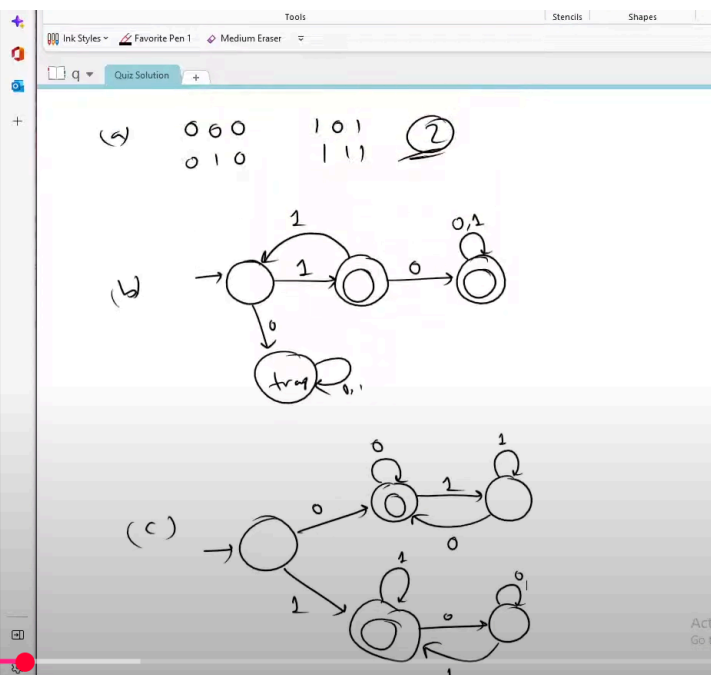
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(a)

(b)



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(a)

(b)

