

a)

Those two strings are accepted by  $b^*ab^*ab^*$

b b b abab

ababab

Those two strings are not accepted by  $b^*ab^*ab^*$

abb ab

baabb

Those two strings are accepted by  $(aUb) aUb \Sigma^*$

aaaaa

babbb

Those two strings are not accepted by  $(aUb) aUb \Sigma^*$

b

$\epsilon$

Those two strings are accepted by  $(\epsilon \cup a)b^+$

ab

bbb

Those two strings are not accepted by  $(\epsilon \cup a)b^+$

a

$\epsilon$

b)

$$y^* (xyy \cup yxy \cup yyx) y^*$$

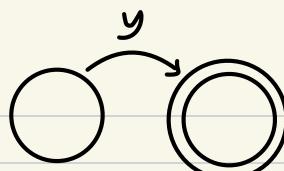
c)

$$L1 = y \Sigma^* x^+$$

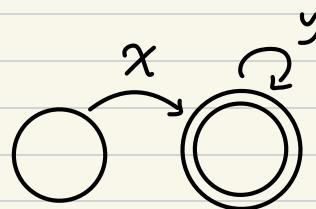
$$L2 = \epsilon \cup \Sigma \cup \Sigma \cup \Sigma \cup \Sigma$$

$$L3 = y(\Sigma \Sigma)^* \cup x \Sigma (\Sigma \Sigma)^*$$

d)  $L_1 = \{ y \}$

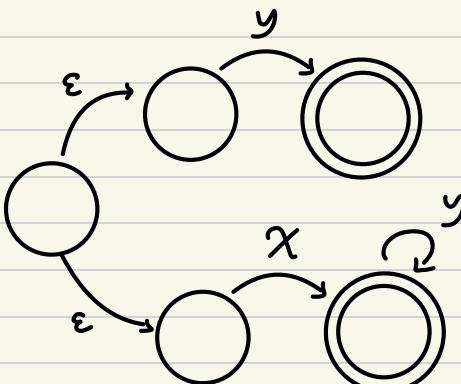


$L_2 = \{ xy^* \}$

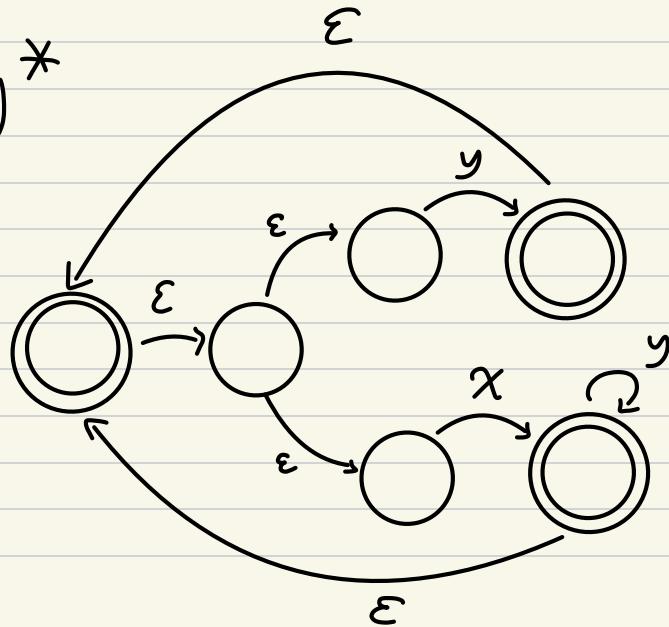


$L_1 \cup L_2$

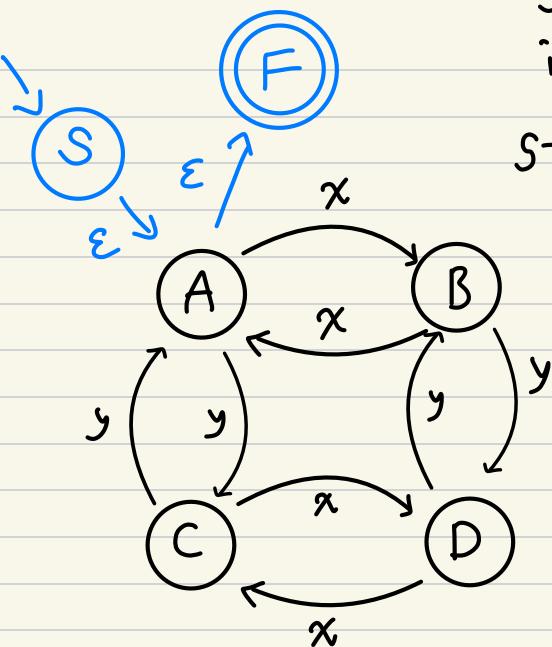
$= y \cup xy^*$



$(L_1 \cup L_2)^*$



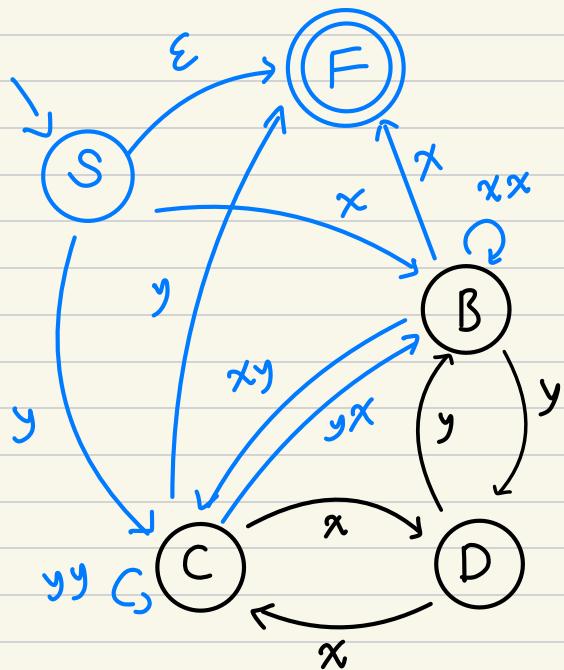
e)



Step 1

insert the start

STATE and FINAL state



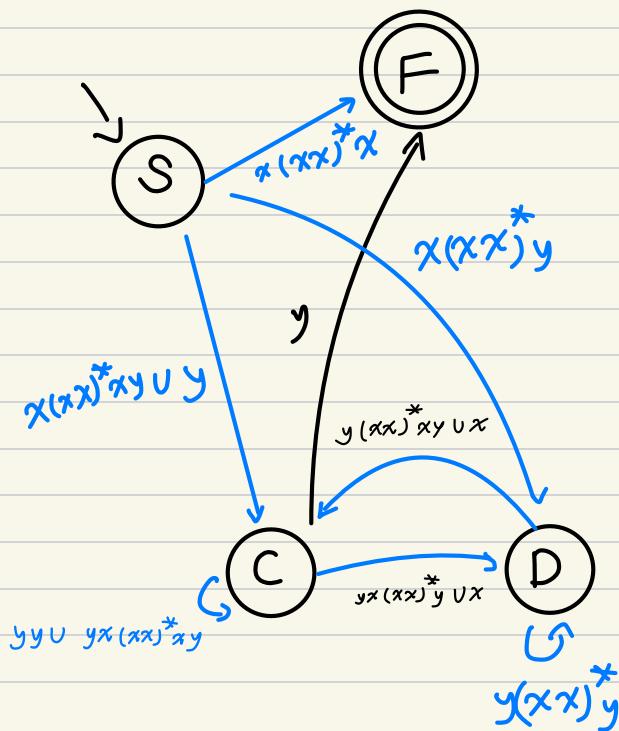
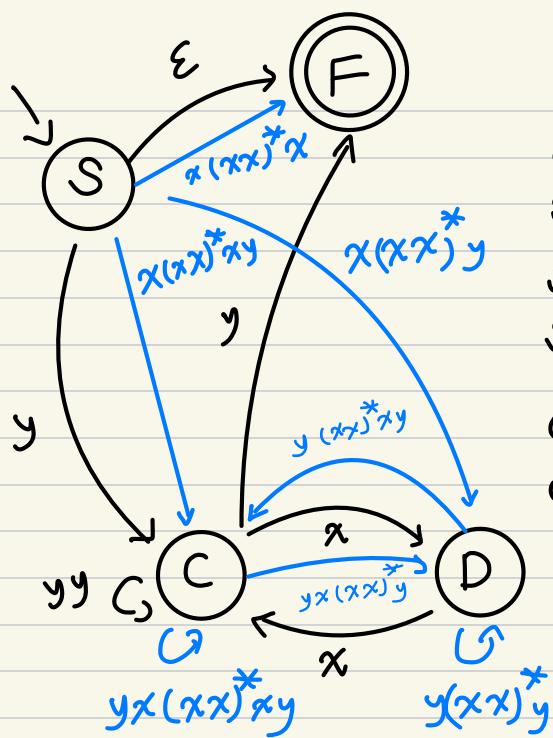
Step 2

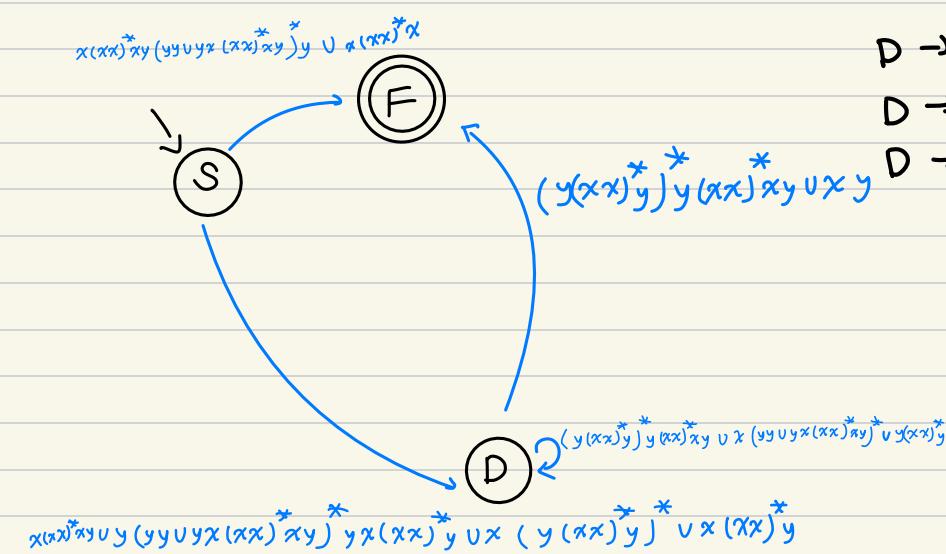
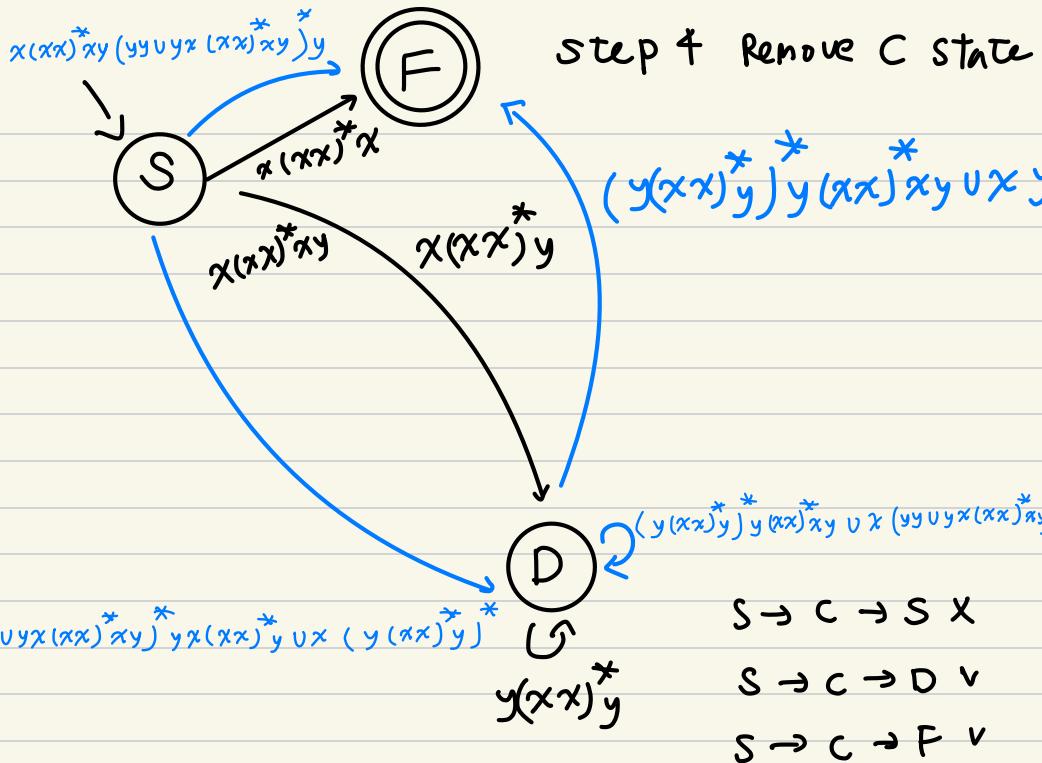
Remove A state

- |  |  |
|--|--|
| $S - A \rightarrow S \ x$                    | $C \rightarrow A \rightarrow C \ \checkmark$ |
| $S - A \rightarrow B \ \vee$                 | $C \rightarrow A \rightarrow S \ x$          |
| $S - A \rightarrow C \ \checkmark$           | $C \rightarrow A \rightarrow B \ \vee$       |
| $S - A \rightarrow D \ x$                    | $C \rightarrow A \rightarrow D \ x$          |
| $S - A \rightarrow F \ \checkmark$           | $C \rightarrow A \rightarrow F \ \checkmark$ |
| $B \rightarrow A \rightarrow B \ \checkmark$ | $D \rightarrow A \rightarrow D \ x$          |
| $B \rightarrow A \rightarrow S \ x$          | $D \rightarrow A \rightarrow S \ x$          |
| $B \rightarrow A \rightarrow C \ \checkmark$ | $D \rightarrow A \rightarrow B \ x$          |
| $B \rightarrow A \rightarrow D \ x$          | $D \rightarrow A \rightarrow C \ x$          |
| $B \rightarrow A \rightarrow F \ \checkmark$ | $D \rightarrow A \rightarrow F \ x$          |

Step 3  
remove B state

$S \rightarrow B \rightarrow Sx$	$D \rightarrow B \rightarrow D \checkmark$
$S \rightarrow B \rightarrow C \checkmark$	$D \rightarrow B \rightarrow S \times$
$S \rightarrow B \rightarrow D \checkmark$	$D \rightarrow B \rightarrow C \checkmark$
$S \rightarrow B \rightarrow F \checkmark$	
$C \rightarrow B \rightarrow C \checkmark$	
$C \rightarrow B \rightarrow Sx$	
$C \rightarrow B \rightarrow D \checkmark$	
$C \rightarrow B \rightarrow F \checkmark$	





# Step 5 Remove D state

$x(x\bar{x})^*xy \cup y(y\bar{y}y\bar{x}(xx)^*\bar{x}y)^*$   
 $y\bar{x}(xx)^*\bar{y} \cup x(y(x\bar{x})^*\bar{y})^* \cup x(xx)^*\bar{y}((y(x\bar{x})^*\bar{y})^*xx)^*\bar{x}y \cup x(yy\bar{y}y\bar{x}(xx)^*\bar{x}y)^* \cup x(xx)^*\bar{x}$   
 $(y(x\bar{x})^*\bar{y})^*y(x\bar{x})^*\bar{x}y \cup x(xx)^*\bar{x}y(yy\bar{y}y\bar{x}(xx)^*\bar{x}y)^*y \cup x(xx)^*\bar{x}$



$S \rightarrow D \rightarrow S \times$

$S \rightarrow D \rightarrow F \checkmark$

$$\left\{ 00 \cup 11 \cup \left[ (01 \cup 10)(00 \cup 11)^*(01 \cup 10) \right] \right\}^*$$