

$A \rightarrow BC$   
 $A \rightarrow a$   
 $S \rightarrow \lambda$

question from the sample exam

Nov. 14, 2012  
 CS3311  
 Wednesday ①

$S \rightarrow AACD$   
 $S \rightarrow A T_1$   
 $T_1 \rightarrow A T_2$   
 $T_2 \rightarrow CD$

$A \rightarrow aAb \mid ab$   
 $A \rightarrow A'AB' \mid A'B'$   
 $A' \rightarrow a$   
 $B' \rightarrow b$

$A \rightarrow A' T_3 \mid A'B'$   
 $T_3 \rightarrow AB'$   
 $A' \rightarrow a$   
 $B' \rightarrow b$

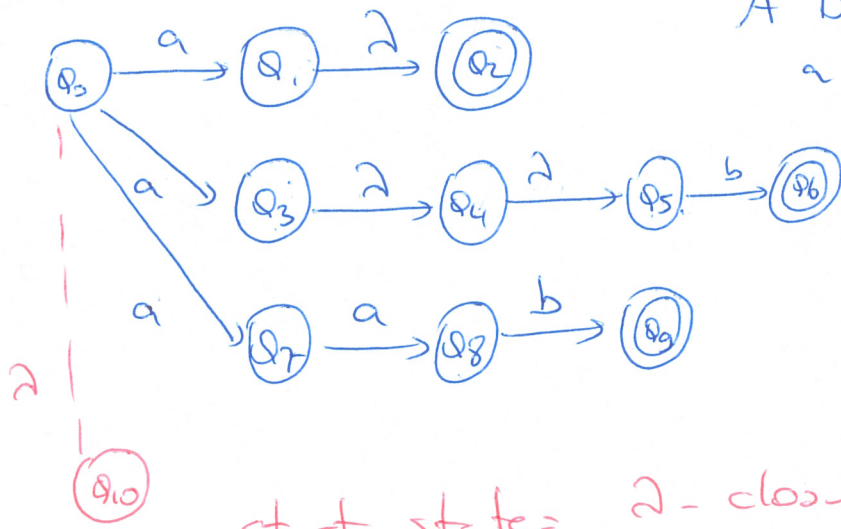
$C \rightarrow aC \mid a$   
 $C \rightarrow A'C \mid a$

$D \rightarrow aDa \mid bDb \mid a \mid b$

NFA  $\rightarrow$  DFA

NFA -  $\lambda$   $\rightarrow$  DFA conversion

A DFA cannot contain a  $\lambda$ -transition.



start state =  $\lambda$ -closure of original start state

$\{q_0, q_{10}\}$

	a	b
$\{q_0, q_{10}\}$		

(2)

	a	b	$\lambda$ -closure
$Q_0$	$\{Q_1, Q_3, Q_7\}$	$\emptyset$	$\{Q_0\}$
$Q_1$	$\emptyset$	$\emptyset$	$\{Q_1, Q_2\}$
$Q_2$	$\emptyset$	$\emptyset$	$\{Q_2\}$
$Q_3$	$\emptyset$	$\emptyset$	$\{Q_3, Q_4, Q_5\}$
$Q_4$	$\emptyset$	$\emptyset$	$\{Q_4, Q_5\}$
$Q_5$	$\emptyset$	$\{Q_6\}$	$\{Q_5\}$
$Q_6$	$\emptyset$	$\emptyset$	$\{Q_6\}$
$Q_7$	$\{Q_3\}$	<del><math>\emptyset</math></del>	$\{Q_7\}$
$Q_8$	$\emptyset$	$\{Q_9\}$	$\{Q_8\}$
$Q_9$	$\emptyset$	$\emptyset$	$\{Q_9\}$

$Q_1$	$Q_2$	$Q_3$	$Q_4$	$Q_5$	$Q_7$
$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$Q_8$
$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$Q_6$	$\emptyset$

	a	b
$\{Q_0\}$	$\{Q_1, Q_3, Q_7\}$	$\emptyset$
$\{Q_1, Q_2, Q_3, Q_4, Q_5, Q_7\}$	$\{Q_1, Q_2, Q_3, Q_4, Q_5, Q_7\}$	$\{Q_6\}$
$\{Q_8\}$	$\emptyset$	$\{Q_9\}$
$\{Q_6\}$	$\emptyset$	$\emptyset$
$\{Q_9\}$	$\emptyset$	$\emptyset$

take  $\lambda$ -closure of  $\{Q_0\}$

$$= \{Q_0\}$$

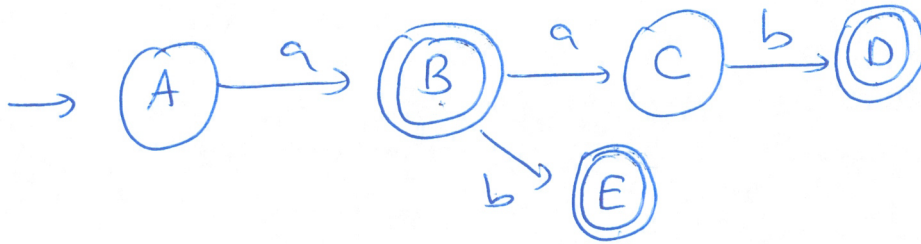
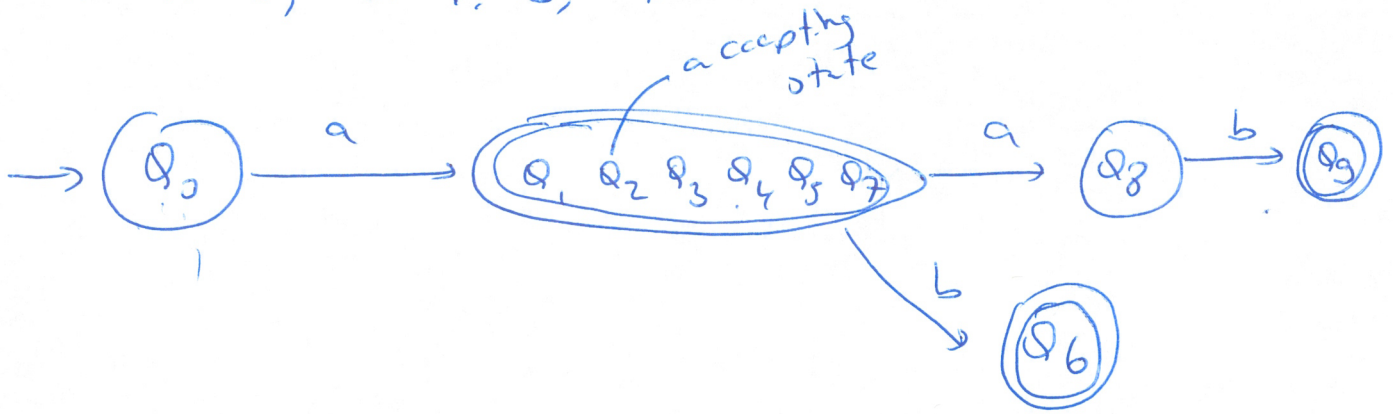
find every state the machine can go from  $Q_0$

$$\{Q_1, Q_3, Q_7\}$$

$$\{Q_1, Q_2, Q_3, Q_4, Q_5, Q_7\}$$

$\{q_1, q_2, q_3, q_4, q_5, q_7\}$

3



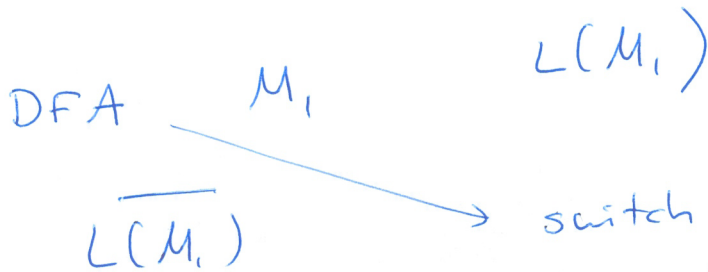
$$r_1 = (a \cup b)^* cd$$

(4)

$aabcd \in r_1$ ?

convert  $r_1$  to an NFA-2

convert NFA-2 into DFA

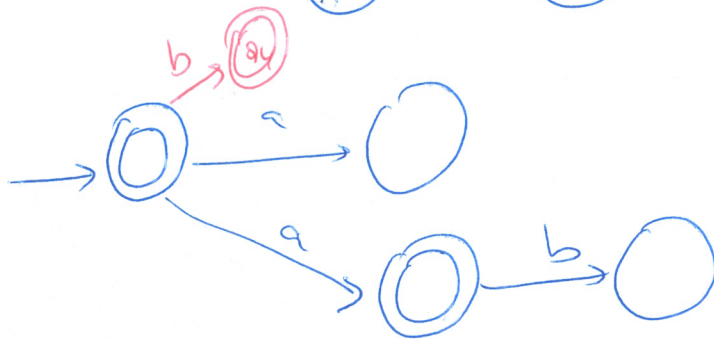
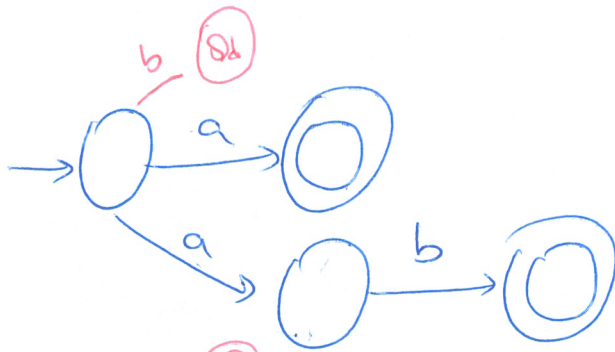


switch accepting states to non-accepting states and non-accepting states to accepting states.

does this technique work for NFAs?

No

$\{a, ab\}$  counter example.



$\{a, a^2\}$  ...