

Vu Nguyen

1a. $aac \rightarrow 1$ accept

$bb \rightarrow 3$ reject

$bbb \rightarrow 3$ reject

b. $bbba \neq abaa$

$abab \rightarrow 2$ accept

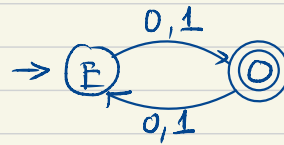
$bb \dots aaa \rightarrow 1$ accept

$\epsilon \rightarrow 0$ reject

$aa \dots bbbb \rightarrow 3$ reject

2.

	0	1
$\rightarrow \text{Even}$	0	0
$\neq \text{Odd}$	1	1



3.

	0	1
$\rightarrow A_0$	A_0	B_1
A_1	A_2	B_0
A_2	A_1	B_2
$\neq B_0$	A_0	B_1
B_1	A_2	B_0
B_2	A_1	B_2

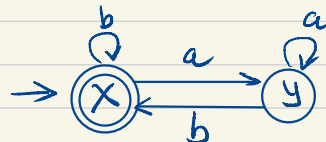
4.

	a	b	c
$\rightarrow 0$	A	B	C
A	A	A'	A'
$\neq A$	A	A'	A'
B	B'	B	B'
$\neq B$	B'	B	B'
C	C'	C'	C
$\neq C$	C'	C'	C

5. $\{a, b\}$

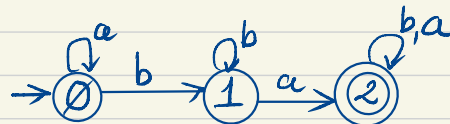
a.

L_1	a	b
$\rightarrow X$	Y	X
Y	Y	X



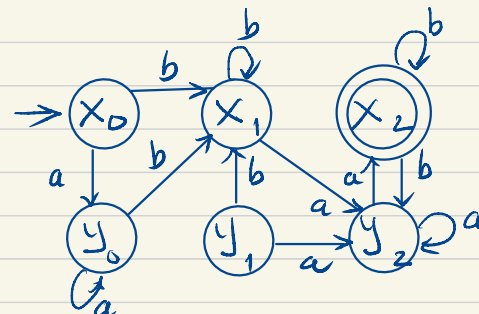
L_2

	a	b
$\rightarrow 0$	0	1
1	2	1
$\neq 2$	2	2



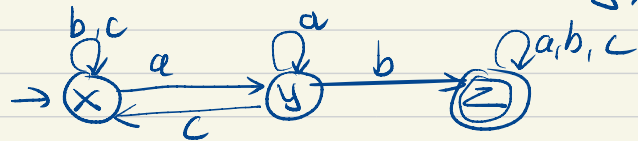
b. $L_1 \cap L_2$

L_1	a	b
$\rightarrow X_0$	Y_0	X_1
X_1	Y_2	X_1
$\neq X_2$	Y_2	X_2
Y_0	Y_0	X_1
Y_1	Y_2	X_1
Y_2	Y_2	X_2

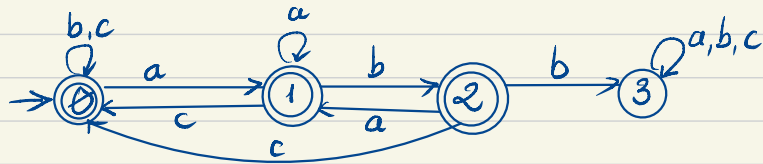


6. DFA $A := \{w \mid w \text{ contains } ab \text{ as substring}\}$
 $B := \{w \mid w \text{ does not contain } abb \text{ as substring}\}$

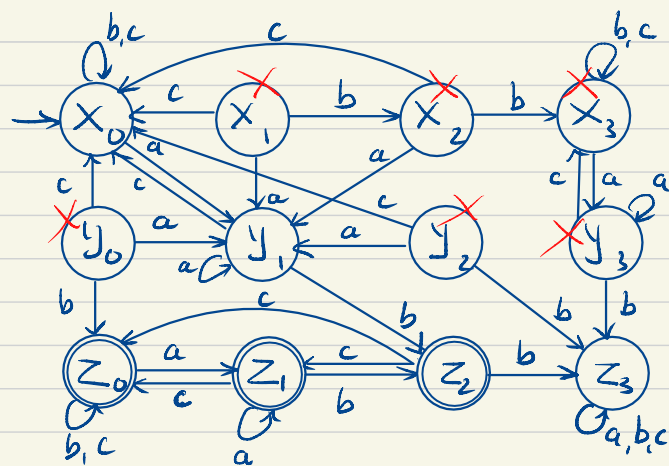
A	a	b	c
$\rightarrow X$	Y	X	X
Y	Y	Z	X
*Z	Z	Z	Z



B	a	b	c
$\rightarrow *0$	1	0	0
*1	1	2	0
*2	1	3	0
3	3	3	3



$A \cap B$	a	b	c
$\rightarrow X_0$	Y_1	X_0	X_0
X_1	Y_1	X_2	X_0
X_2	Y_1	X_3	X_0
X_3	Y_3	X_3	X_3
Y_0	Y_1	Z_0	X_0
Y_1	Y_1	Z_2	X_0
Y_2	Y_1	Z_3	X_0
Y_3	Y_3	Z_3	X_3
* Z_0	Z_1	Z_0	Z_0
* Z_1	Z_1	Z_2	Z_0
* Z_2	Z_1	Z_3	Z_0
Z_3	Z_3	Z_3	Z_3



Reachable nodes from X_0
 $X_0, Y_1, Z_2, Z_1, Z_0, Z_3$
 Unreachable nodes:
 $X_1, X_2, X_3, Y_0, Y_2, Y_3$

\rightarrow	$A \cap B$	a	b	c
$\rightarrow X_0$	Y_1	X_0	X_0	
Y_1	Y_1	Z_2	X_0	
* Z_0	Z_1	Z_0	Z_0	
* Z_1	Z_1	Z_2	Z_0	
* Z_2	Z_1	Z_3	Z_0	
Z_3	Z_3	Z_3	Z_3	