CNC 2012
Formal Languages
Professor Sherri Shulman
Assignment 8
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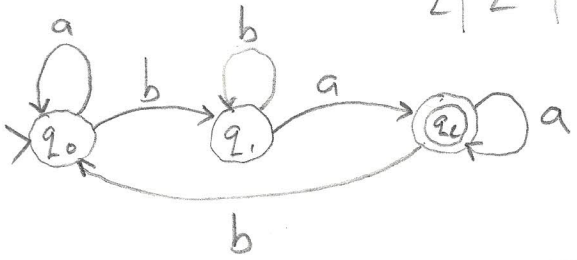
1.) $Q = \{q_0, q_1, q_2\}$
$\Sigma = \{a, b\}$
$F = \{q_2\}$

δ	A	B
0	0	1
1	2	1
2	2	0

a.)



c.) ✓

d.) $(a^*bb^*a)(a \mid ba^*bb^*a)^*$

b.) abaa

$[q_0, abaa]$
$\vdash [q_0, baa]$
$\vdash [q_1, aa]$
$\vdash [q_2, a]$
$\vdash [q_2, \lambda]$
accepted

bbbabb

$[q_0, bbbabb]$
$\vdash [q_1, bbabb]$
$\vdash [q_1, babb]$
$\vdash [q_1, abb]$
$\vdash [q_2, bb]$
$\vdash [q_0, b]$
$\vdash [q_1, \lambda]$
denied

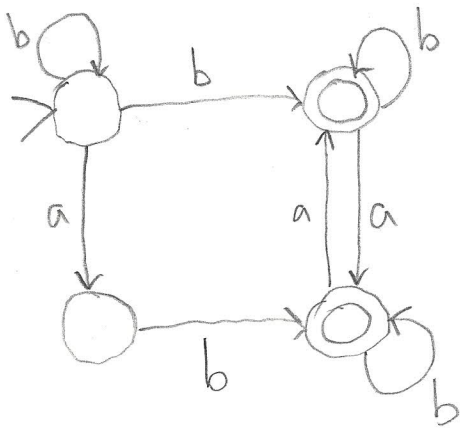
bababa

$[q_0, bababa]$
$\vdash [q_1, ababa]$
$\vdash [q_2, baba]$
$\vdash [q_0, aba]$
$\vdash [q_0, ba]$
$\vdash [q_1, a]$
$\vdash [q_2, \lambda]$
accepted

bbbaa

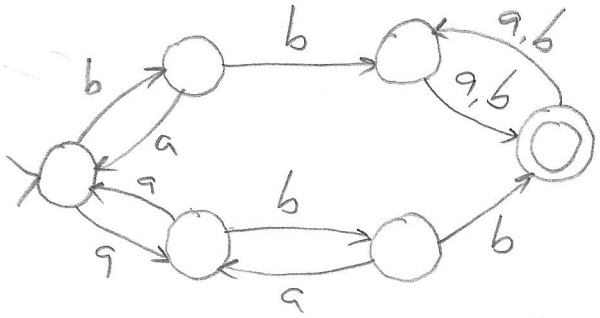
$[q_0, bbbaa]$
$\vdash [q_1, bbaa]$
$\vdash [q_1, baa]$
$\vdash [q_1, aa]$
$\vdash [q_2, a]$
$\vdash [q_2, \lambda]$
accepted

12.) the set of strings over $\{a, b\}$ where every 'a' is immediately preceeded or followed by a 'b'



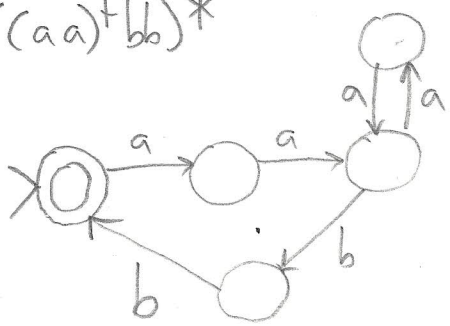
$((b^*ab)(b \mid ab^*a)^* \mid (b^*b)(b \mid ab^*a)^*)$

13.) The set of odd length strings over {a, b} that contains "bb" at least once.



$$\Big(\big((bb(a|b)((a|b)(a|b))^*\big)\,\big|\,\big(((aa)^+|a)((ba)^+|b)b\big)((a|b)(a|b))^*\big)\Big)$$

22.) d.) $((aa)^+|bb)^*$



23.)

δ	a	b
0	0	
1		1,2
2	0,1	

aaabb : yes accepted

$0 \to 0 \to 0 \to 0 \to X$

$0 \to 0 \to 1 \to X$

$0 \to 0 \to 0 \to 1 \to 1 \to 2$ ✓

$0 \to 0 \to 0 \to 1 \to 1 \to 1 \to X$

$(a^+b^+)(ab^+|a^+ab^+)^*$

25.) d.) $(ba|bb)^*|(ab|aa)^*$