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CMPS 130
HW#2
October 11, 2015

HW #2   Chapter 1

1.1, 1.2, 1.3
1.4 a,c,f,g product construction
1.5 c,d,e,f,g,h
1.6 all

1.1 a) q_1 Start
     b) $M_1: \{q_2\}$ $M_2: \{q_1, q_4\}$
     c) $M_1: (q_1, q_2), (q_2, q_3), (q_3, q_1), (q_1, q_1)$ aabb
        $M_2: (q_1, q_1), (q_1, q_1), (q_1, q_2), (q_2, q_4)$ aabb
     d) $M_1:$ no $M_2:$ yes
     e) $M_1:$ no $M_2:$ yes

1.2 $M_1: (\{q_1, q_2, q_3\}, \{a, b\}, \delta, q_1, \{q_2\})$
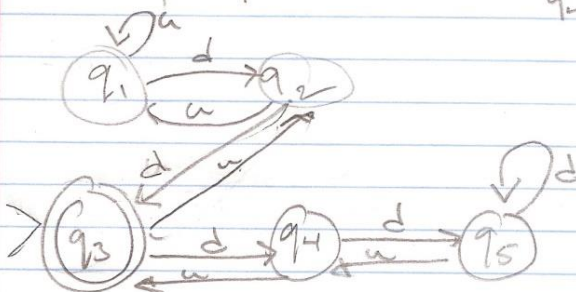 $M_2: (\{q_1, q_2, q_3, q_4\}, \{a, b\}, \delta, q_1, \{q_1, q_4\})$

δ_1

	a	b
q_1	q_2	q_1
q_2	q_3	q_3
q_3	q_2	q_1

δ_2

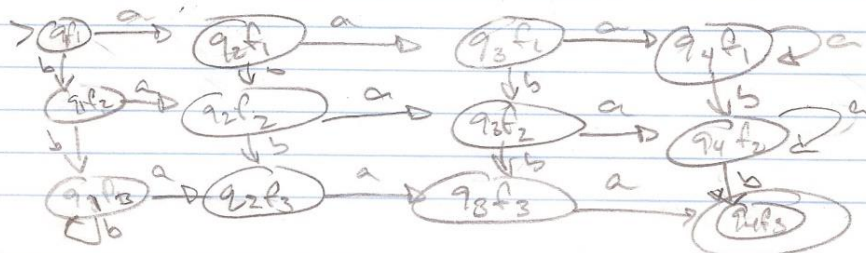|	a	b
q_1	q_1	q_2
q_2	q_3	q_4
q_3	q_2	q_1
q_4	q_3	q_4

1.3
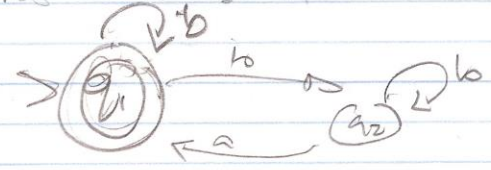

1.4 a) $\{w \mid w$ has at least 3 a's and at least 2 b's$\}$
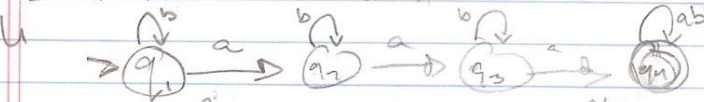
$L_1 = \{w \mid w$ has at least 3 a's$\}$
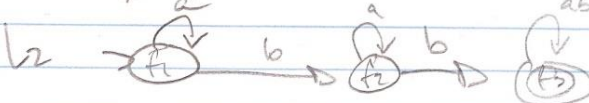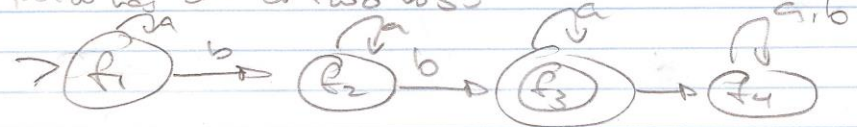
$L_2 = \{w \mid w$ has at least 2 b's$\}$

Combine

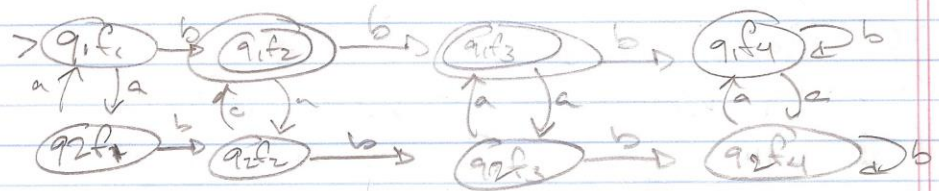c) $\{w \mid w$ has an even number of 'a's and one or two b's$\}$

$L_1 = w$ has an even number of a's

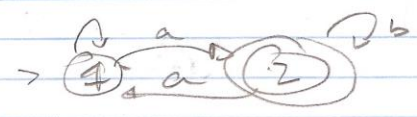$L_2 = \{w \mid w$ has one or two b's$\}$
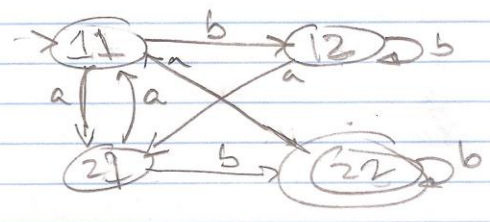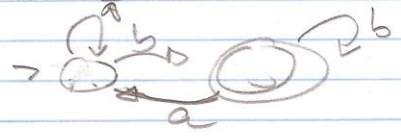

Combined

d) $\{w \mid w$ has an odd number of a's and ends with a b$\}$

$L_1 = \{w \mid w$ has an odd number of a's$\}$

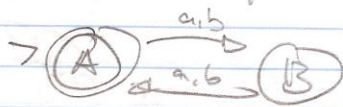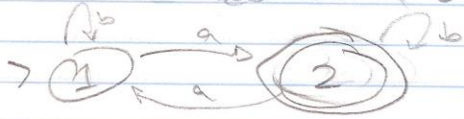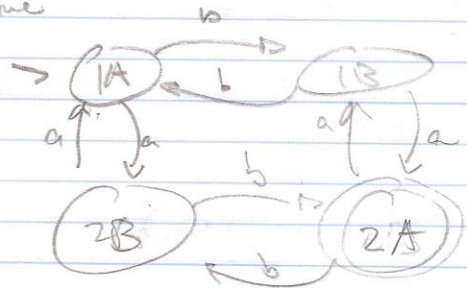$L_2 = \{w \mid w$ ends with a b$\}$

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g) {w | w has even length and odd nmb of a's}

i) w has even length

ii) w has an odd number of a's

iii) Combine

5 c) {w | w does not contain the substring ab nor ba}

w does contain the substring ab or ba
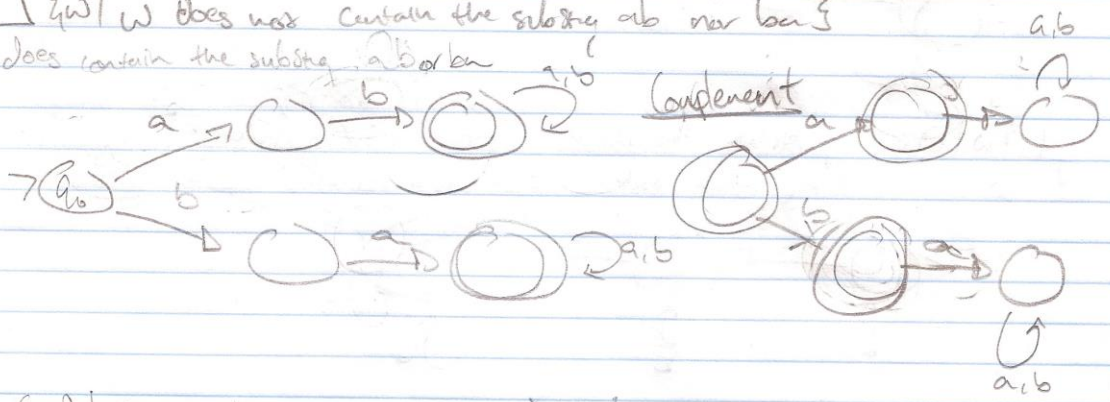
Complement

d) {w | w is not any string in a*b*}

w is a string in a*b*
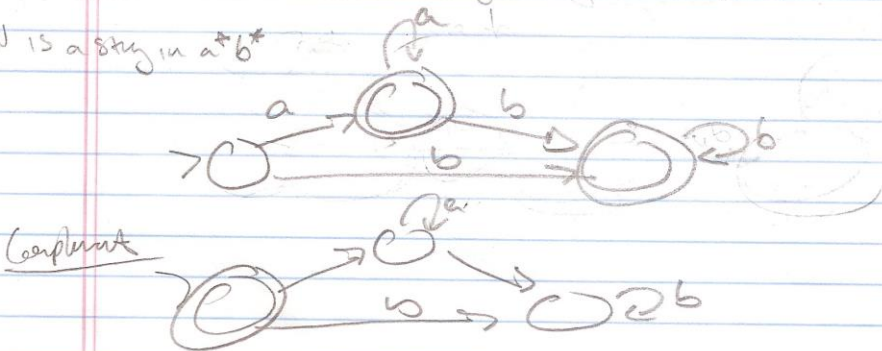
Complement
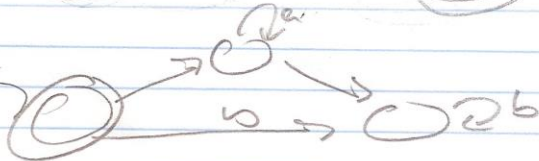
e) $\{w \mid w$ is any string not in $(ab^+)^*\}$

w is in $(ab^+)^*$

Complement
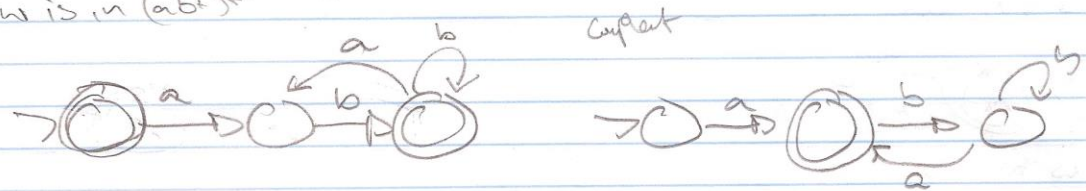
f) $\{w \mid w$ is any string not in $a^* \cup b^*\}$

w is a string in $a^* \cup b^*$

a^*, b^*

Complement
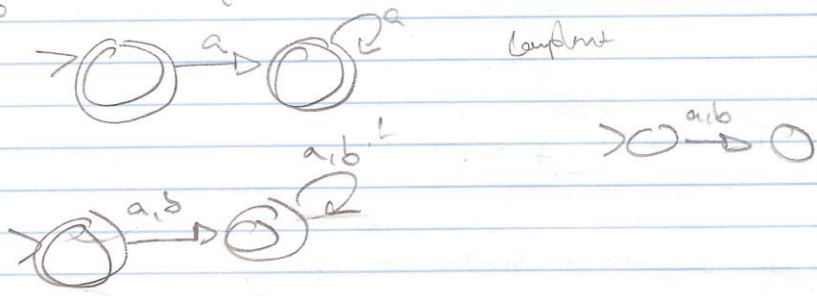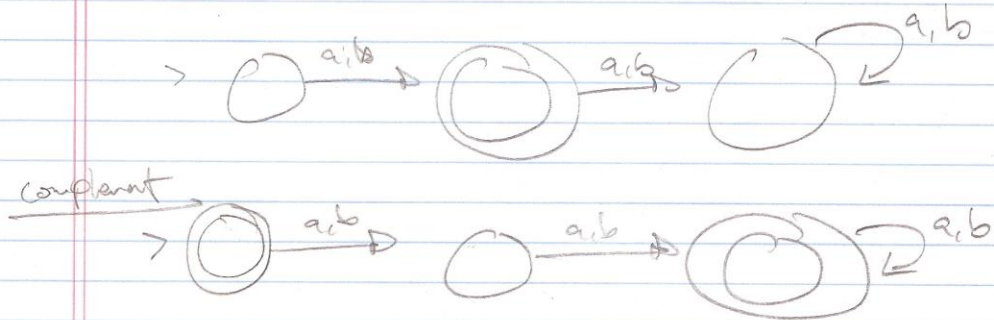
g) $\{w \mid w$ is any string that doesn't contain exactly two a's$\}$

w is a string that contains exactly two a's
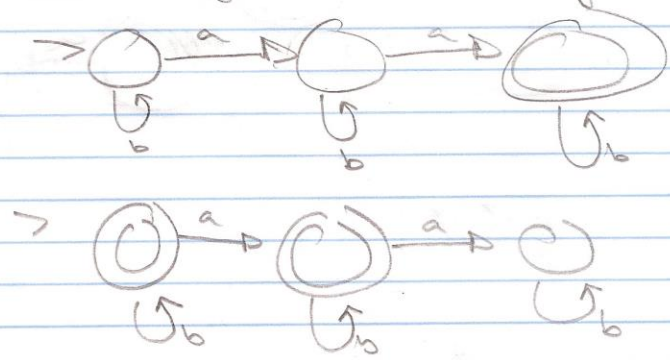
h) {w | w is any string except a and b }

complement

1.6 all

a) {w | w begins with 1 and ends with a 0}
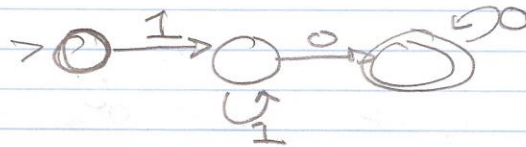
b) {w | w contains at least 3 1's }
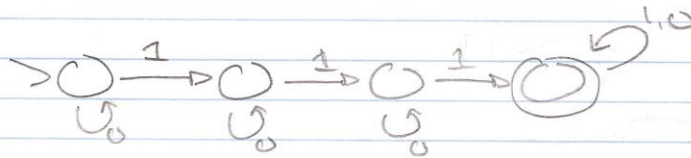
c) {w | w contains the substring 0101}
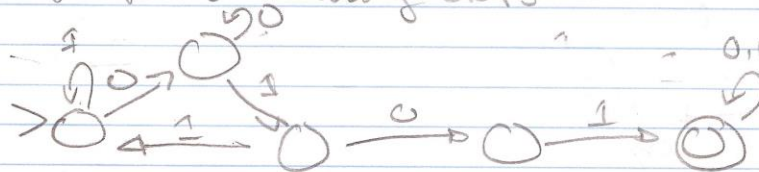
d) {w | w has length at least 3 and its third symbol is 0}
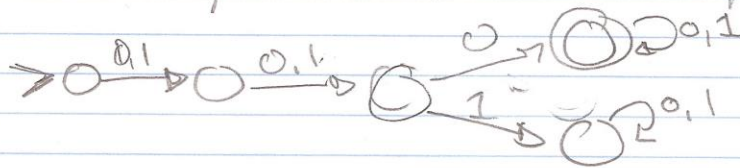
6

e) {w| w starts with 0 has odd length or starts with 1 has even length}
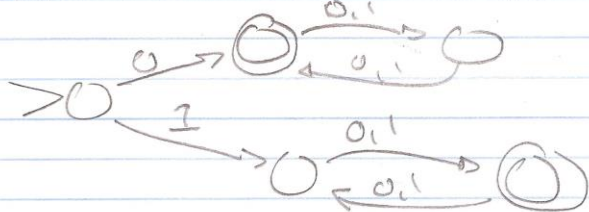
f) {w| w does not contain the substring 110}
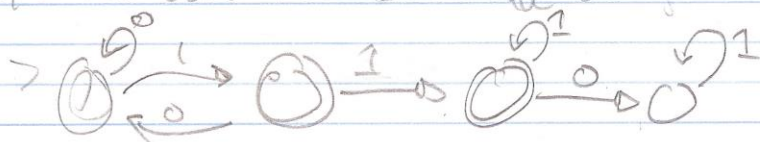
g) {w| the length of w is at most 5}
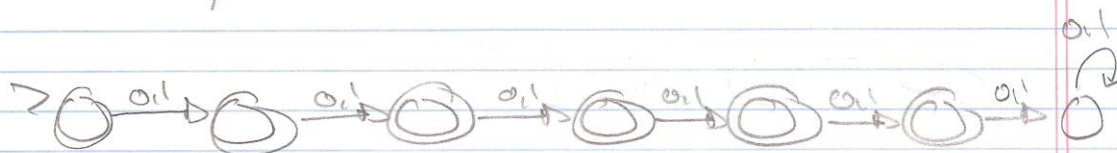
h) {w| w is any string except 11 and 111}
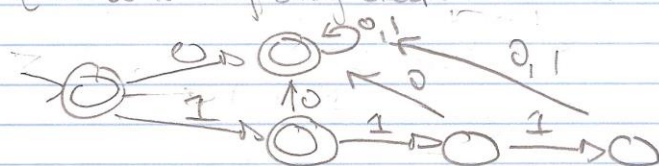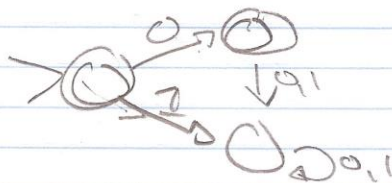

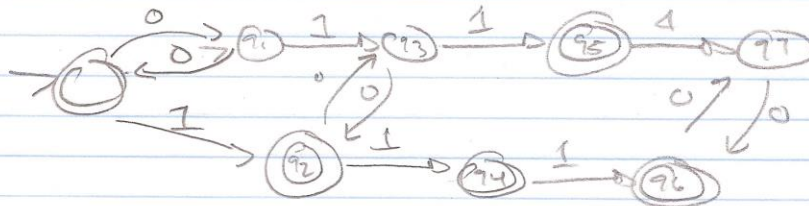
i) {w| every odd position of w is 1}
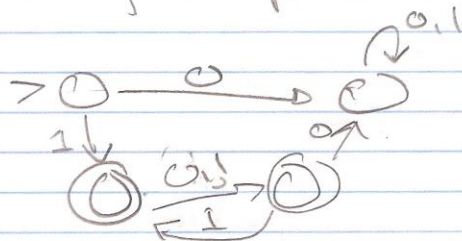
j) $\{w \mid w$ contains at least 2 0's and at most one 1$\}$
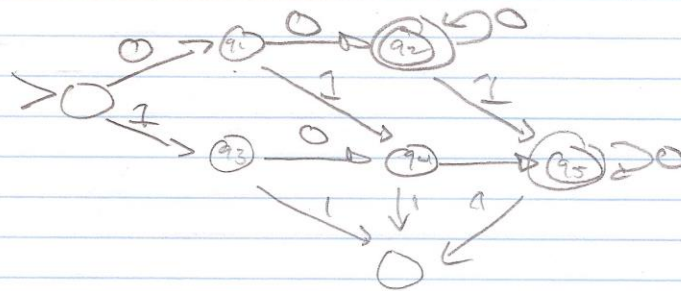
k) $\{\varepsilon, 0\}$

l) $\{w \mid w$ contains an even # of 0's or contains exactly two 1's$\}$

m) the empty set

n) All strings except the empty string