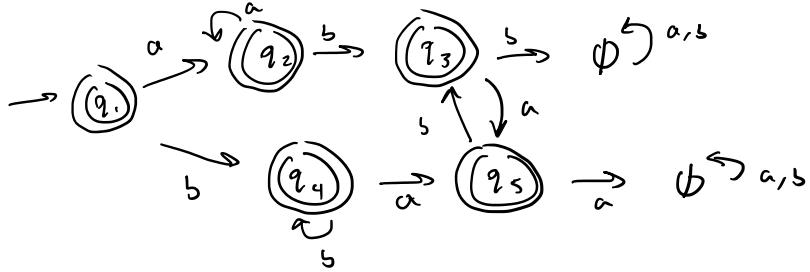


Homework 4

Tuesday, September 17, 2024

3:13 AM

1.



Ex.

<u>a b b a a</u>	reject ✓
<u>a b a b a a</u>	reject ✓
<u>a b a a a</u>	reject ✓
ab ab ab a	accept ✓

2. M' s.t. $F' \subseteq q_0 \bar{S}$, or, M' accepts the stl state of M , and $S'(q_0, \epsilon) = F$, or, M' 's stl state is M 's accept state.

$$S'(q, x) = \{q' \text{ in } Q \mid q = S(q', x) \text{ for some } q' \text{ in } Q\}.$$

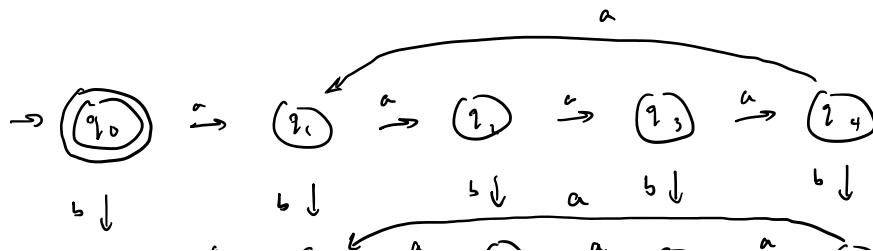
Thus, a transition $S'(q, x) = q'$ corresponds to M 's transition $S(q', x) = q$.

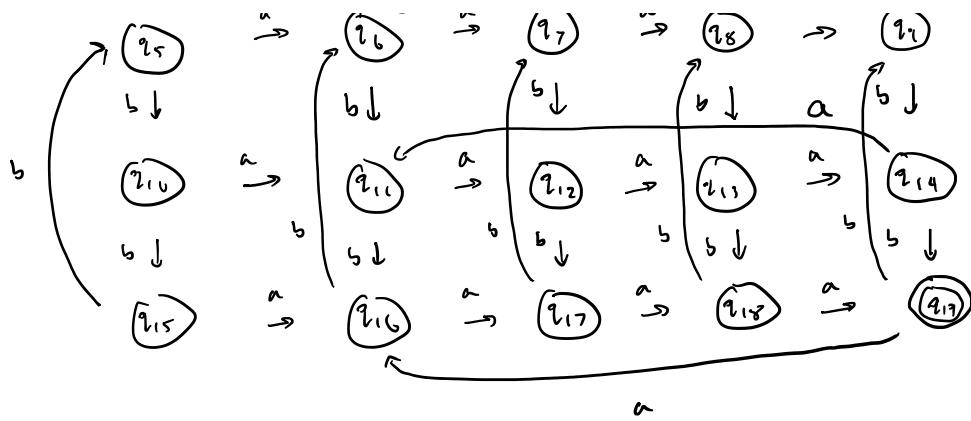
Thus, given a transition $S(q', x) = q$ in M , M' has the inverse transition $S'(q, x) = q'$.

M' accepts strings that start w/ M accept string and end w/ M stl string, and it's transition function is the inverse of M .

Thus, the strings M' accepts, $L(M')$ is equal to the reverse of strings M accepts, $L(M)^R$.

3.

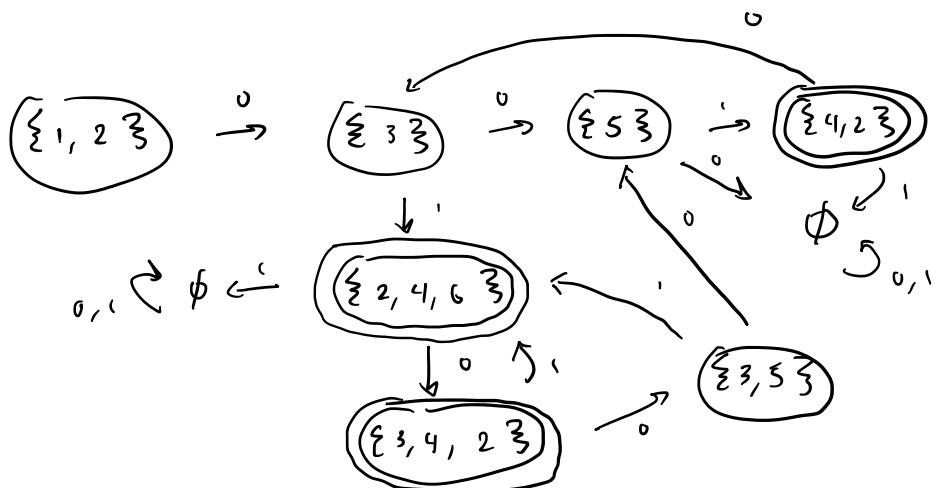




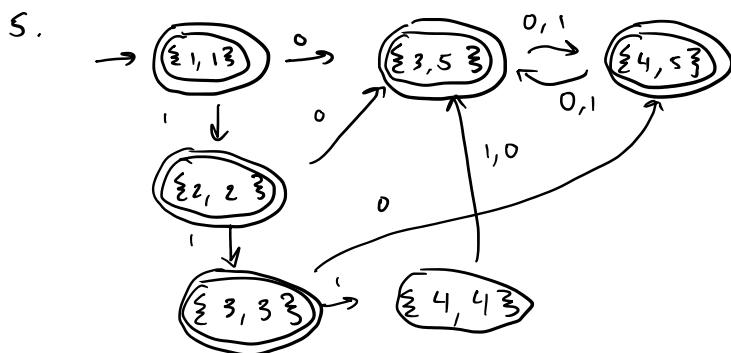
Ex. $abababa$ accept ✓
 $abababababababa$ accept ✓
 $aaaaaaaabbba$ reject ✓

4.

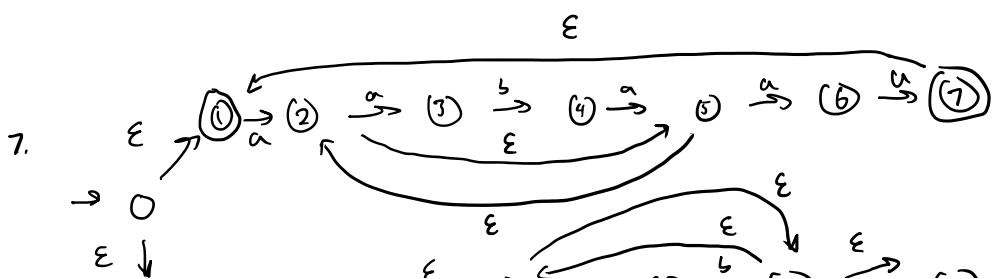
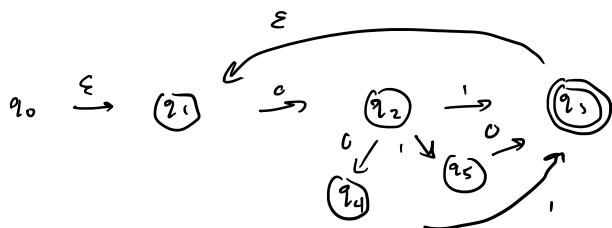
$\{\emptyset, 2\}$	0	1	ϵ
$\{\emptyset, 3\}$	$\{\emptyset, 3\}$	\emptyset	$\{\emptyset, 2\}$
$\{\emptyset, 3\}$	$\{\emptyset, 5\}$	$\{\emptyset, 2, 4, 6\}$	\emptyset
$\{\emptyset, 5\}$	\emptyset	$\{\emptyset, 4, 2\}$	\emptyset
$\{\emptyset, 4, 2\}$	$\{\emptyset, 3\}$	\emptyset	\emptyset
$\{\emptyset, 2, 4, 6\}$	$\{\emptyset, 3, 4, 2\}$	\emptyset	$\{\emptyset, 2\}$
$\{\emptyset, 2, 3, 4\}$	$\{\emptyset, 3, 5\}$	$\{\emptyset, 2, 4, 6\}$	$\{\emptyset, 2\}$
$\{\emptyset, 3, 5\}$	$\{\emptyset, 5\}$	$\{\emptyset, 2, 4, 6\}$	$\{\emptyset, 2\}$

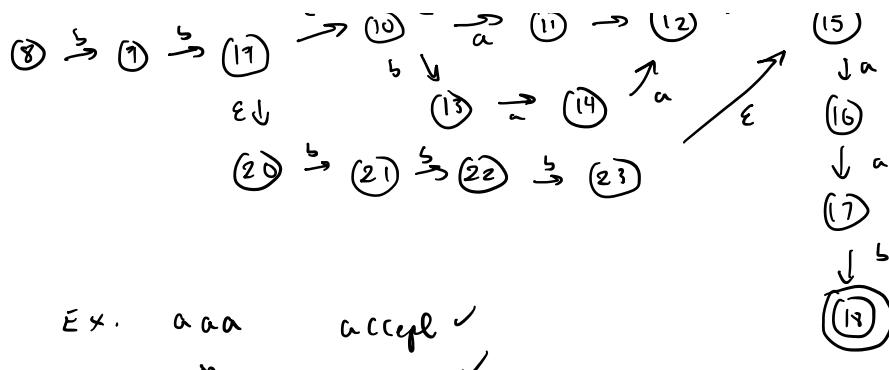


Ex. 011	reject	✓
000	reject	✓
0011	reject	✓
01	accept	✓
010	accept	✓
01001	accept	✓
001	accept	✓



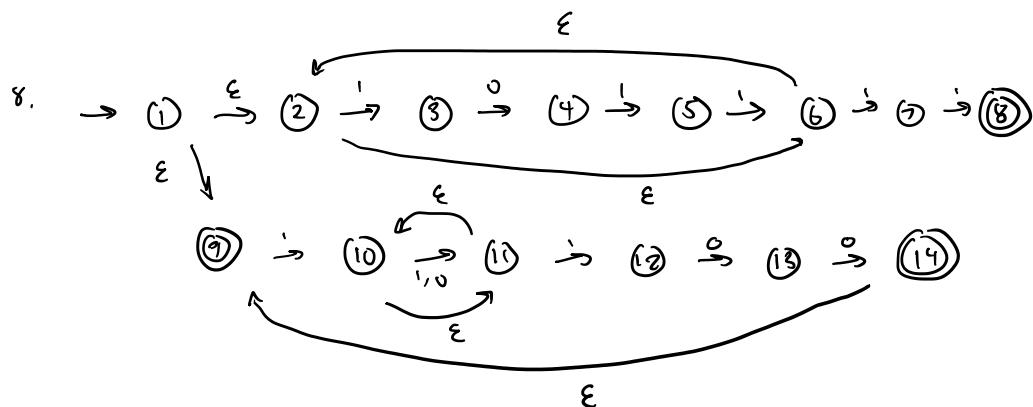
Ex.	1 1 1	reject ✓
	0 0	accept ✓
	1 1 1	accept ✓





Ex. aaa accept ✓
a accept ✓

a ab a ab a aa accept ✓
bb b bb a ab accept ✓
bb a ab accept ✓
bb ab ba a ba a as ab accept ✓



Ex. ϕ accept ✓
1100 accept ✓

1100 1000111001100 accept ✓
Conj*

11 accept ✓
1011 1011 1011 11 accept ✓

q. 1.20 a. Accept Reject
aaa aba

abbbb ba

1.20 b Accept Reject
ab ba

a bababab ababba

10. 136

Let M accept A , s.e. $M = (Q, A, S, q_0, F)$, $L(M) = A$

$$A^R = \{w^R \mid w \in A\}$$

Let $M' = (Q, A, S', q_0', q_f)$, s.e. $S'(q_0', \epsilon) = F$, or,

M' state state is in M accept state, and

$S'(q, x) = q'$ s.e. $q' = S(q, x)$, i.e. it is the inverse function.

Thus, M' accepts the reverse strings accepted by

$$A, \text{s.e. } L(M) = A, A^R = L(M')$$

Therefore, A^R is regular.