计算理论 Homework 2 3190102190 展翼飞

Pbo 2.1.1

$e \in L(M)$ if and only if the initial state is one of the final states

- If $s \in F$ $(s, e) \vdash^*_M (q, e)$ can be $(s, e) \vdash^*_0 (s, e)$ because s is a final state, $e \in L(M)$
- If $s \notin F$, then (s, e) can not transfer to any other states, $e \notin L(M)$

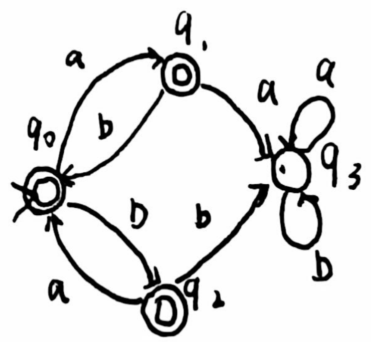
Question 2.1.2

(c) The strings which start by a and ~~have sam~~ have same numbers of a and b. and the continuous a's numbers should not be more than 2

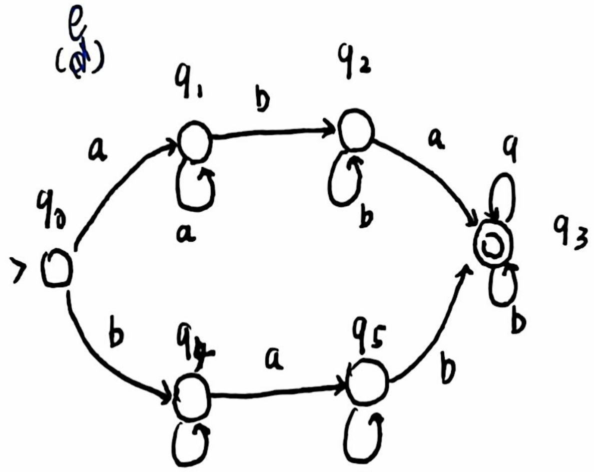
(d) The strings which have same numbers of a and b, and any of which should not be continuous that make a prefix one symbol appears 2 times more than the other

Question 2.1.3

(c)



(~~d~~ e)



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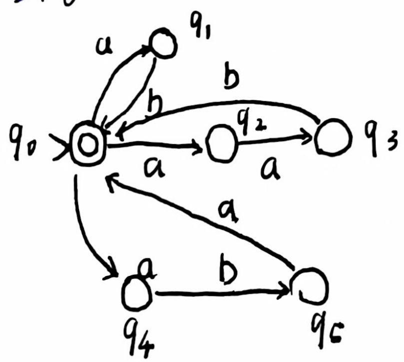
Q 2.2.2

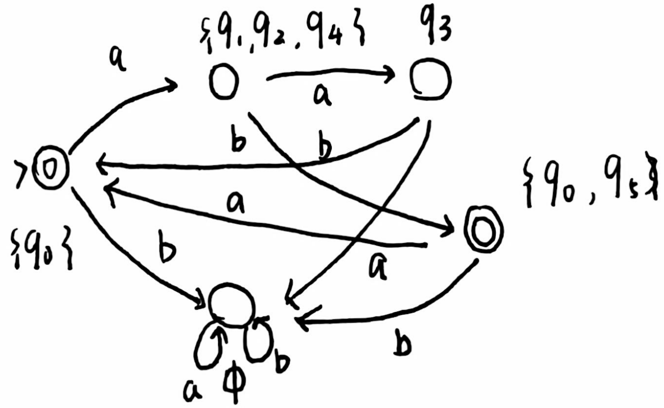
(a) a^* (b) $a(ba \cup baa)^*(b \cup ba)$

Q 2.2.6

(a)



(b) $K = \{\{q_0\}, \{q_1, q_2, q_4\}, \{q_3\}, \{q_0, q_5\}, \phi\}$



Q 2.2.10

we transform state q to $\{q\}$, because they have no equivalent states, there would be a bijection from k to k'. Δ to δ, s to s' and F to F', it will be the same

Q 2.3.4

(b)

Q 2.3.7

(a) $a^*b(ba^*ba^*)^*$

(b) $((a\cup b)(a\cup b))^*$

(c) $(a\cup b)^*abaa(a\cup b)^*$

(d) $(a\cup \emptyset^*)(ba^*a)^*(b\cup a)^*$

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Q 2.4.5

(a) If L is regular, then we can construct a regular $L_1 = L \cap a^*bba^*$

suppose a string Length $L \geq K$ satisfy the pumping theorem

constuct $s = a^kbba^k \in L_1$ $xyz = s$ then y must be a^i $i>$

but $xy^nz = a^{k+(n-1)i}bba^k \notin L_1$ so L is not regular

Q 2.4.8

(a) False, Σ^* is regular

(b) False empty set

(c) True $\bar{L}$ is regular two then so is $L\bar{L}$

(d) False it need to record infinite state

(e) True $L \cap L^R$ is regular

(f) false

(g) false same with (d)