

1. (a)

$$S \rightarrow aA$$

$$A \rightarrow aAb$$

$$A \rightarrow \lambda$$

(b)

$$S \rightarrow aAbb$$

$$A \rightarrow aAbb$$

$$A \rightarrow \lambda$$

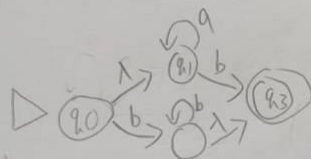
(c)

$$S \rightarrow aaA$$

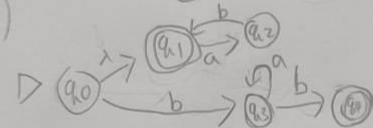
$$A \rightarrow aaaA$$

$$A \rightarrow \lambda$$

2. (a)



(b)

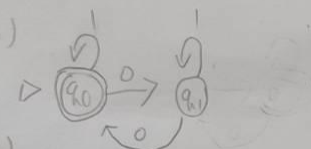


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3.

(a)



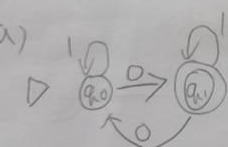
(b)

$$S \rightarrow 1S \mid 0A \mid \lambda$$

$$A \rightarrow 1A \mid 0S$$

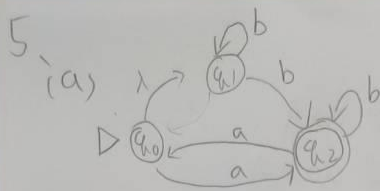
4.

(a)



(b)

$$L(1^*0(1^*01^*01^*)^*)^*$$



(b) NFA DFA

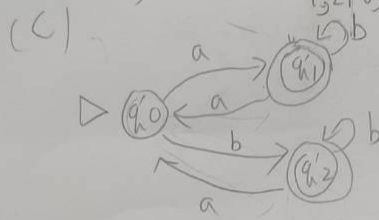
	a	b	λ
q_0	q_2	\emptyset	q_1
q_1	\emptyset	q_1, q_2	\emptyset
q_2	q_0, q_1, q_2	\emptyset	\emptyset

	a	b
2	0, 1, 2	2
0, 1	2	1, 2
1, 2	0, 1, 2	2

$$q'_0 = q_0, q_1$$

$$q'_1 = q_2$$

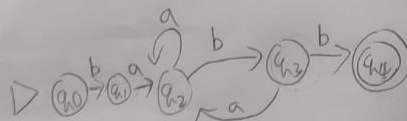
$$q'_2 = q_1, q_2$$



6.

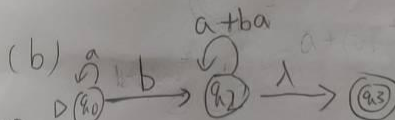
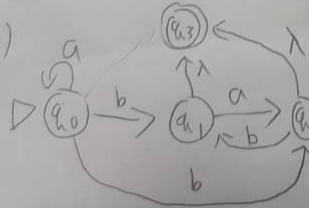
(a) Yes

(b)

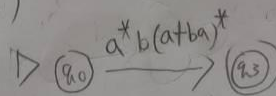


7.

(a)



(c)



(d)

$$L = (a^* b (a+ba)^*)$$

8.

(a)

Q	
1	\square
2	$x_0 x_0$
3	$x_0 x_0 \square$
4	$x_0 x_0 \square \square$
5	$x_1 x_1 x_0 x_0 x_0$
	0 1 2 3 4

(b)

