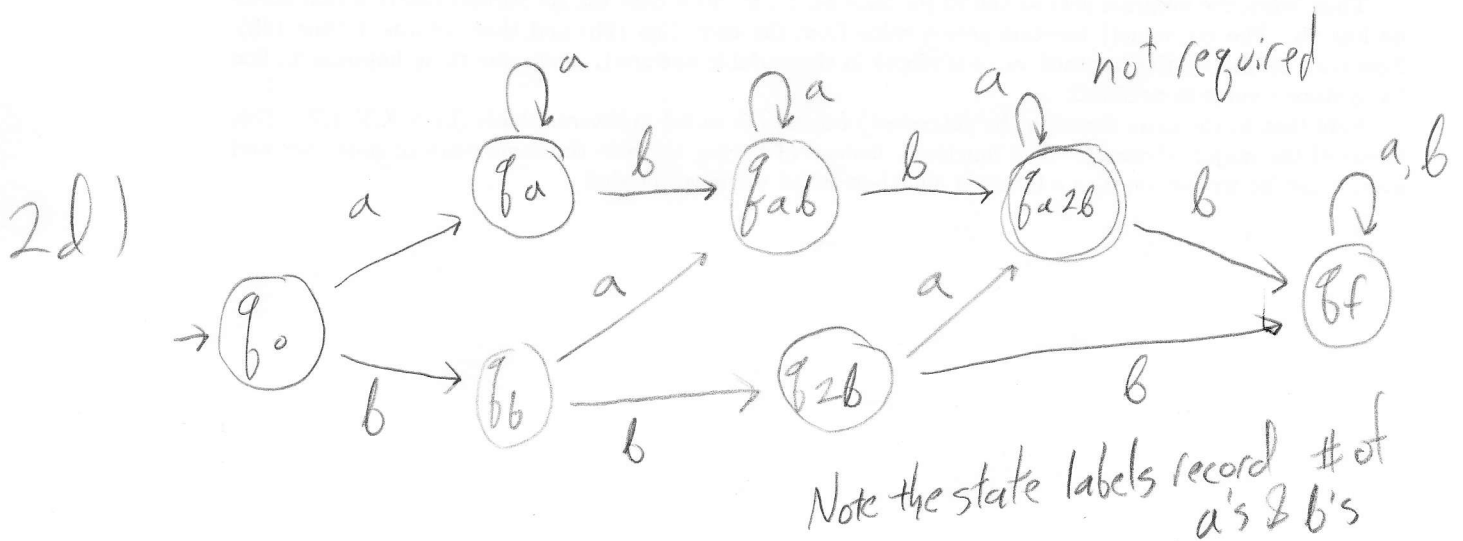
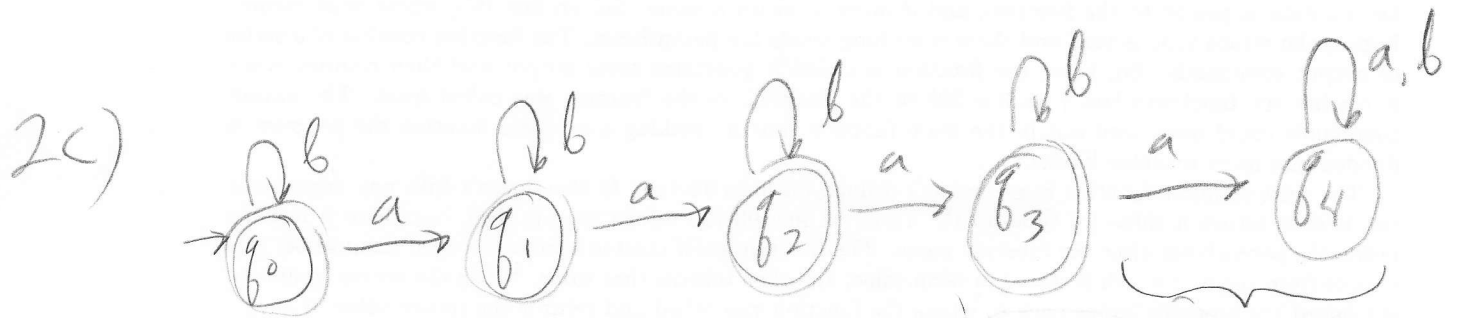
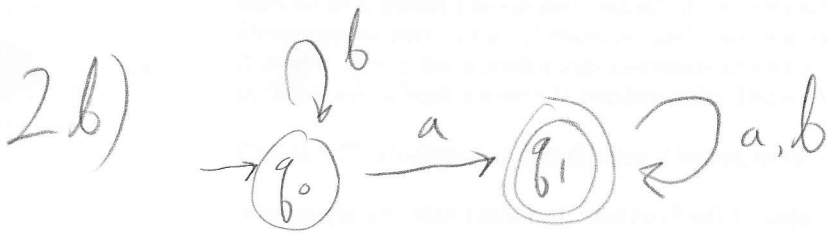
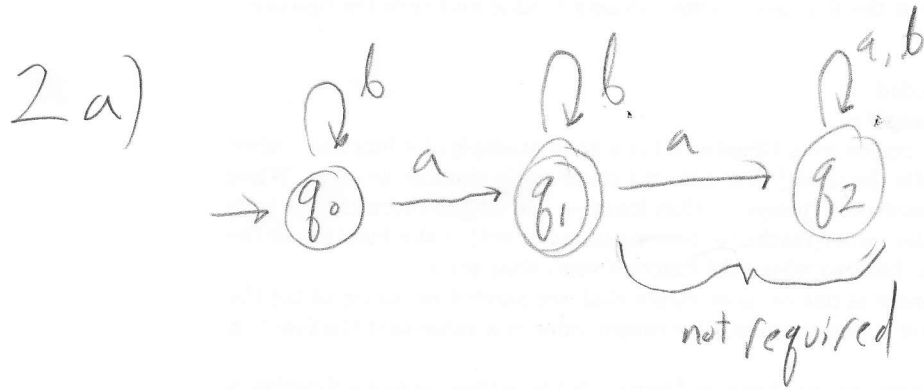


Answer key #2

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- 1) 0001 accepted
- 01001 accepted
- 0000110 rejected





17) Show that if  $L$  is regular then so is  $L - \{\lambda\}$

$L$  is regular  $\Rightarrow$  there exists a DFA  $M$  such that  $L(M) = L$

Case 1:  $\lambda \notin L \Rightarrow L - \{\lambda\} = L$  so the same DFA  $M$  also accepts  $L - \{\lambda\}$   
 $\lambda$  is not an element of  $L$

Case 2:  $\lambda \in L$

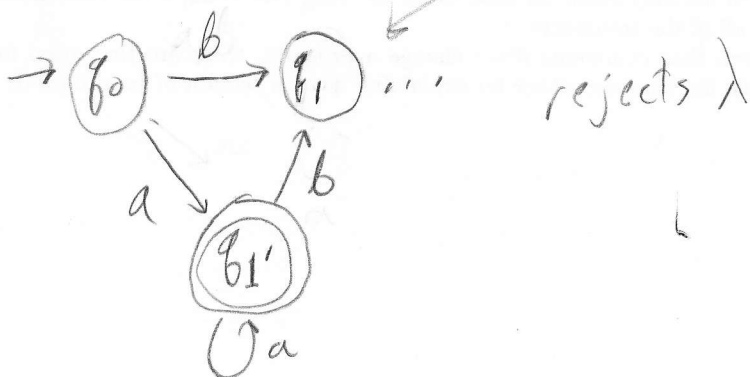
Two subcases:

(a)  $M$  looks like  $\rightarrow q_0 \xrightarrow{a} \dots$  (accepts  $\lambda$ )  
or

(b)  $M$  looks like  $\rightarrow q_0 \xrightarrow{b} q_1 \dots$  (accepts  $\lambda$ )  
 $q_1$  may or may not accept

(a) rewrite the DFA as  $\rightarrow q_0 \xrightarrow{a} \dots$  rejects  $\lambda$

(b) rewrite the DFA as

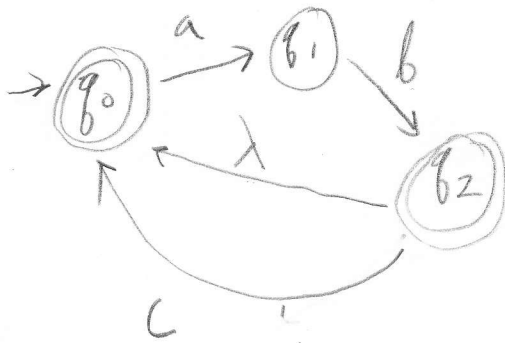


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$$4) \delta^*(q_0, 1011) = \{q_2\}$$

$$\delta^*(q_1, 01) = \{q_1\}$$

$$8) \{ab, abc\}^* = \{\lambda, ab, abc, abab, ababc, abcab, \dots\}$$



and back  
to start  
ab accept then either c and still accept  
or  $\lambda$  back to start

- 12) 00 - reject  
01001 - accept  
10010 - reject  
000 - accept  
0000 - reject