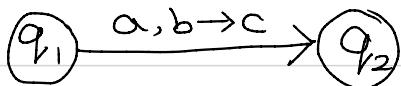


PDA \rightarrow NFA with a stack.



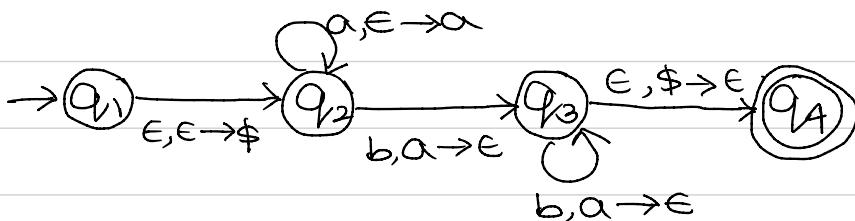
$a, b \rightarrow c$
| |
pop push

a = input symbol

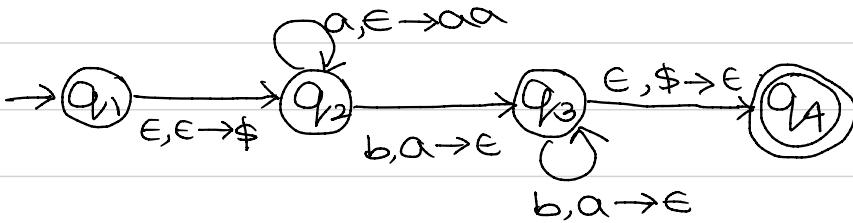
b = stack top \rightarrow this will be popped

c = this will be pushed in stack.

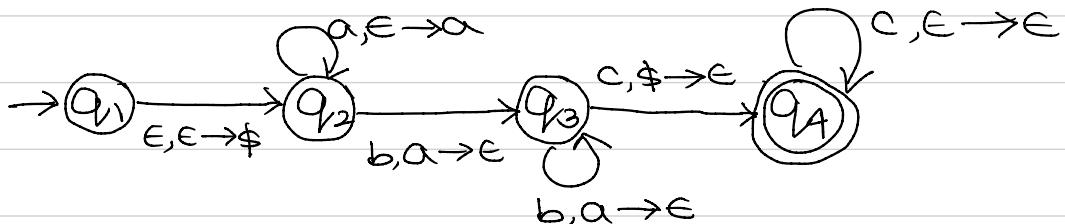
- $L = \{ a^n b^n \mid n \geq 1 \}$



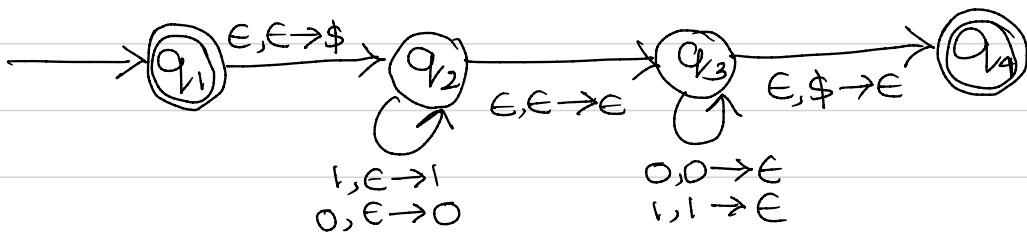
- $L = \{ a^n b^{2n} \mid n \geq 1 \}$



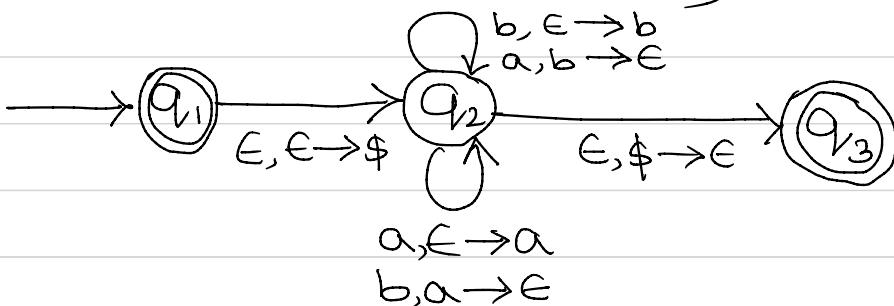
- $L = \{ a^n b^n c^m \mid n, m \geq 1 \}$



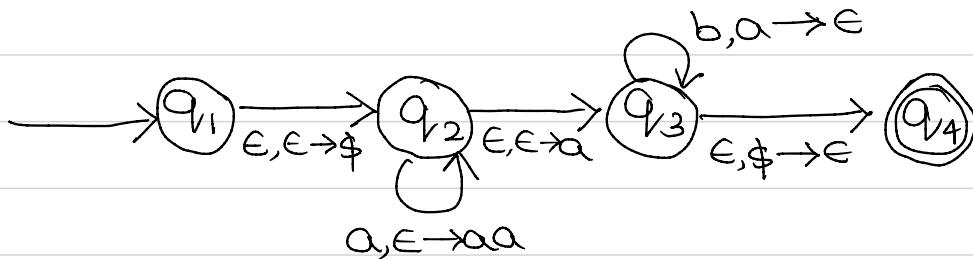
- $L = \{ \omega \mid \omega \text{ is a palindrome} \wedge \omega \in \{0, 1\}^* \}$



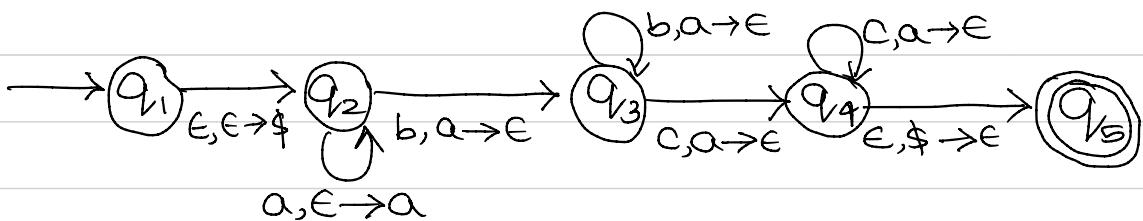
- $L = \{ \omega \mid n_a(\omega) = n_b(\omega) \}$



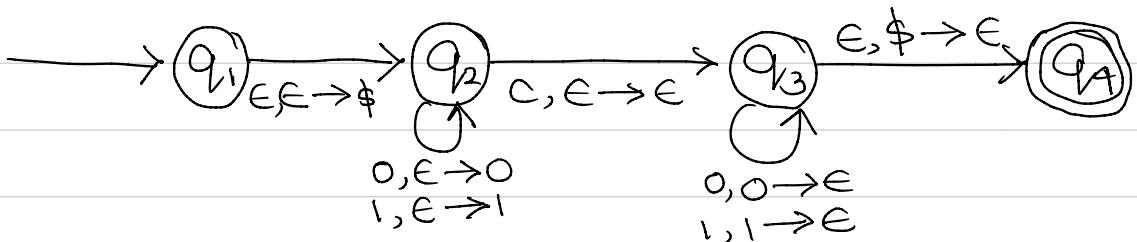
- $L = \{a^n b^{2n+1} \mid n \geq 1\}$



- $L = \{a^{n+m} b^m c^n \mid m, n \geq 1\}$

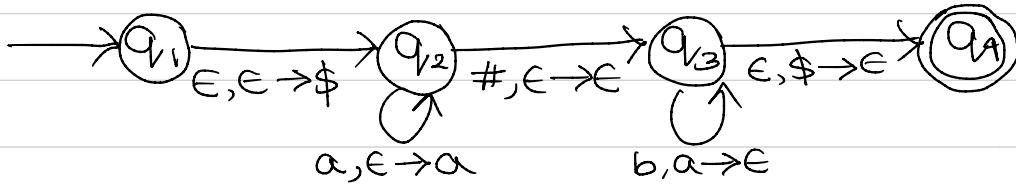


- $L = \{w \in \omega^R \mid w \text{ over } \{0, 1\}\}$

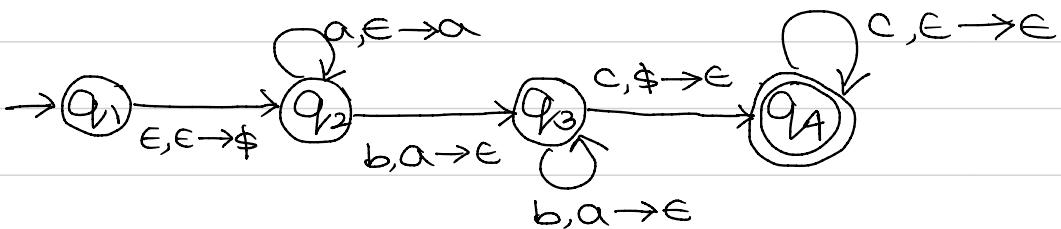


Task

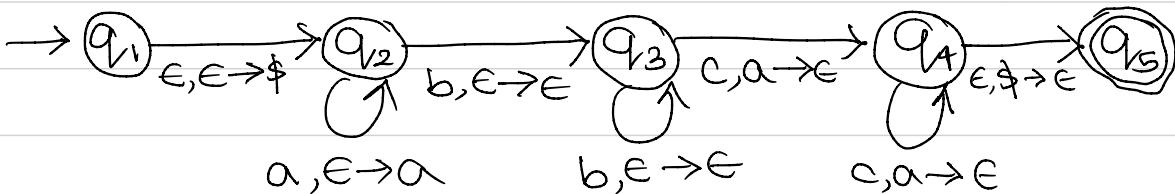
1) $a^n \# b^n ; n \geq 1$



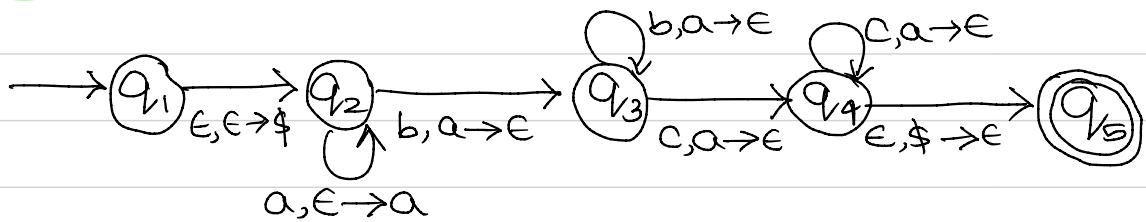
2) $a^n b^n c^m | n, m \geq 1$



3) $a^n b^m c^n | n, m \geq 1$

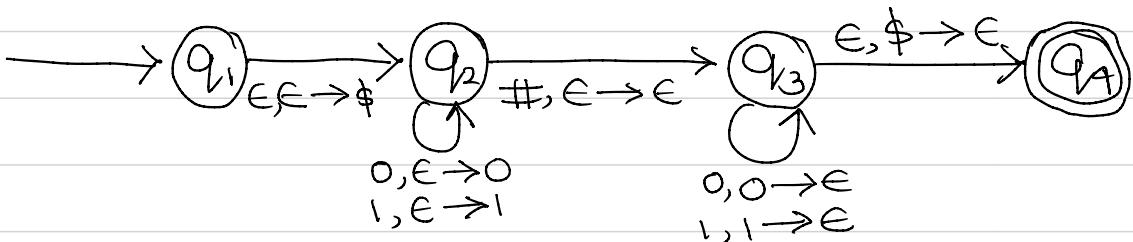


4) $a^{m+n} b^m c^n \mid n, m \geq 1$

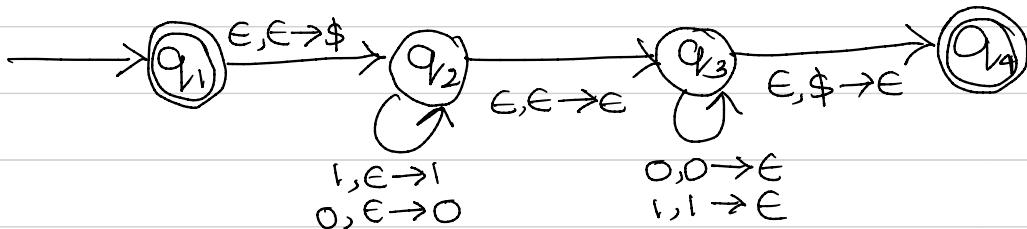


Practice

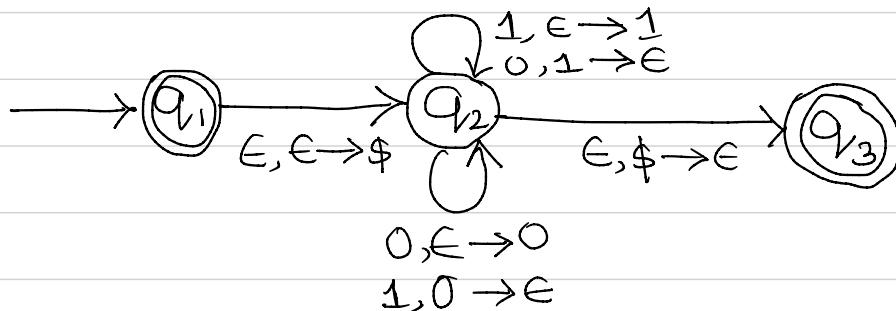
• $L = \{ \omega \# \omega^R : \omega \in \{0, 1\}^* \}, \Sigma = \{0, 1, \#\}$



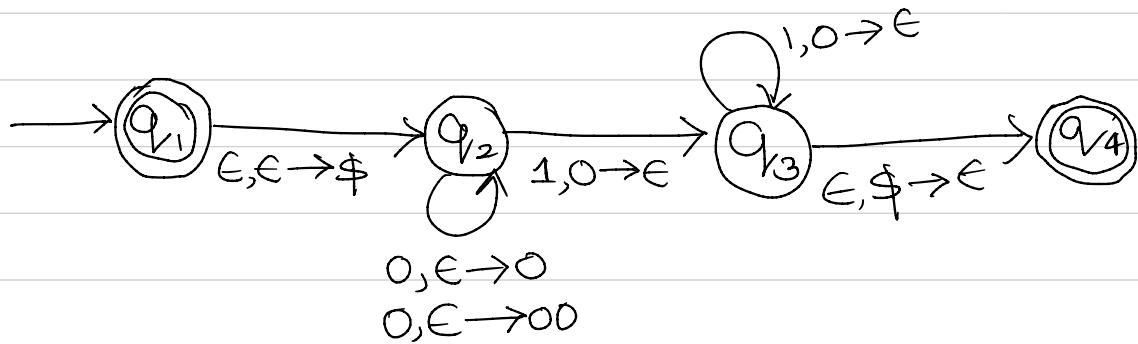
• $L = \{ \omega \omega^R : \omega \in \Sigma^* \}, \Sigma = \{0, 1\}$



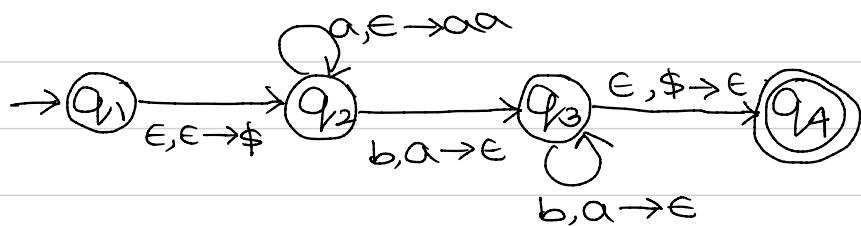
- $L = \{ \omega : \omega \text{ has same number of } 0\text{s and } 1\text{s} \}, \Sigma = \{0, 1\}$



- $L = \{ 0^i 1^j : i \leq j \leq 2i \}, \Sigma = \{0, 1\}$

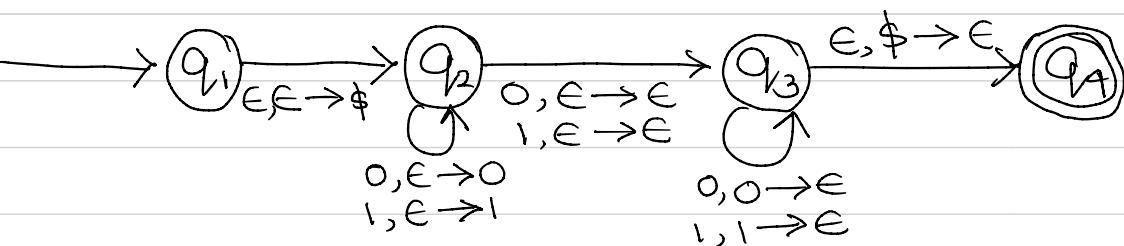


- $a^n b^{2n} \mid n, m \geq 1$

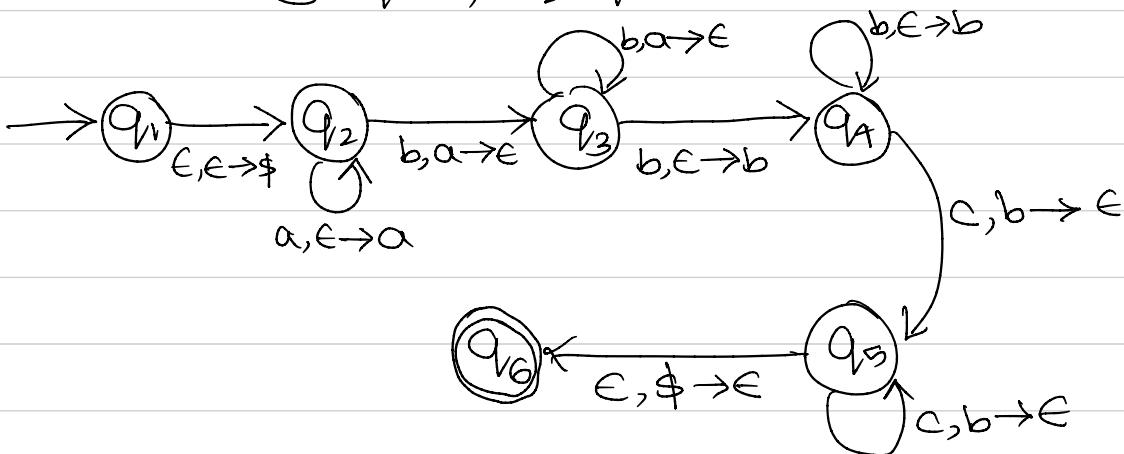


- PDA for odd palindrome

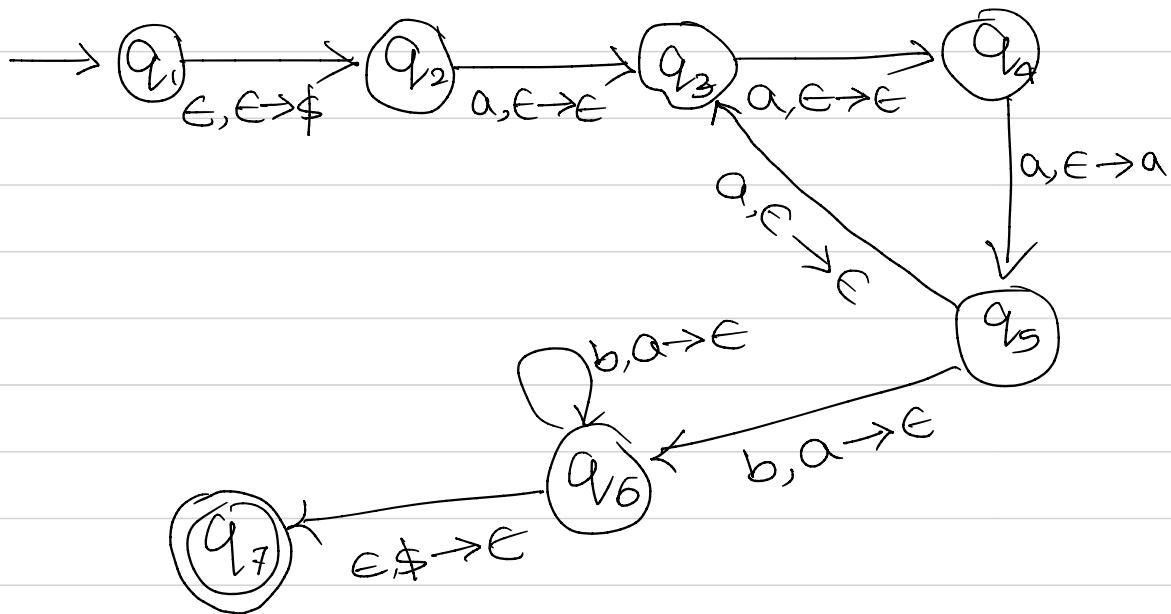
Let $\Sigma = \{0, 1\}$



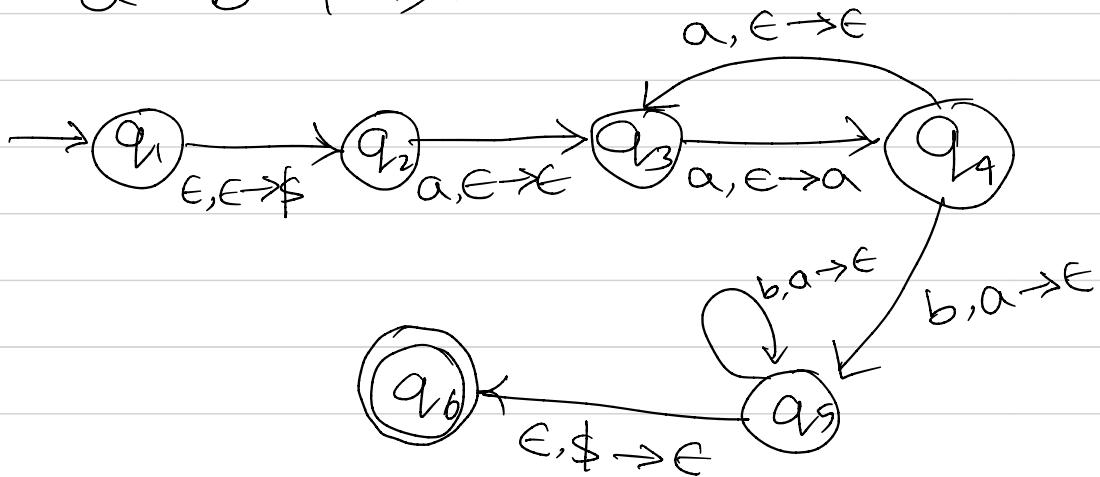
- $a^n b^{n+m} c^m \mid n, m \geq 1$



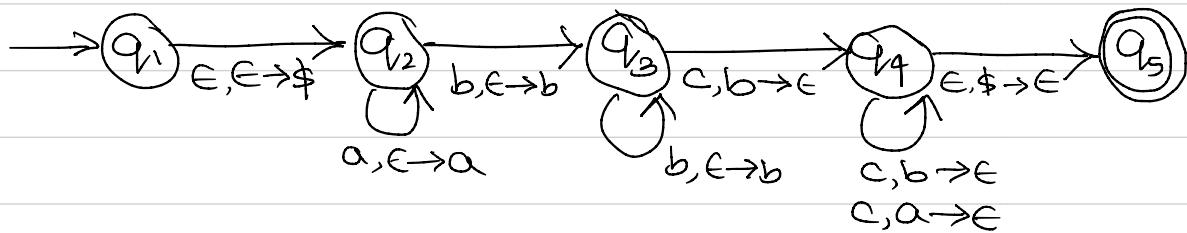
• $a^{3n} b^n \mid n \geq 1$



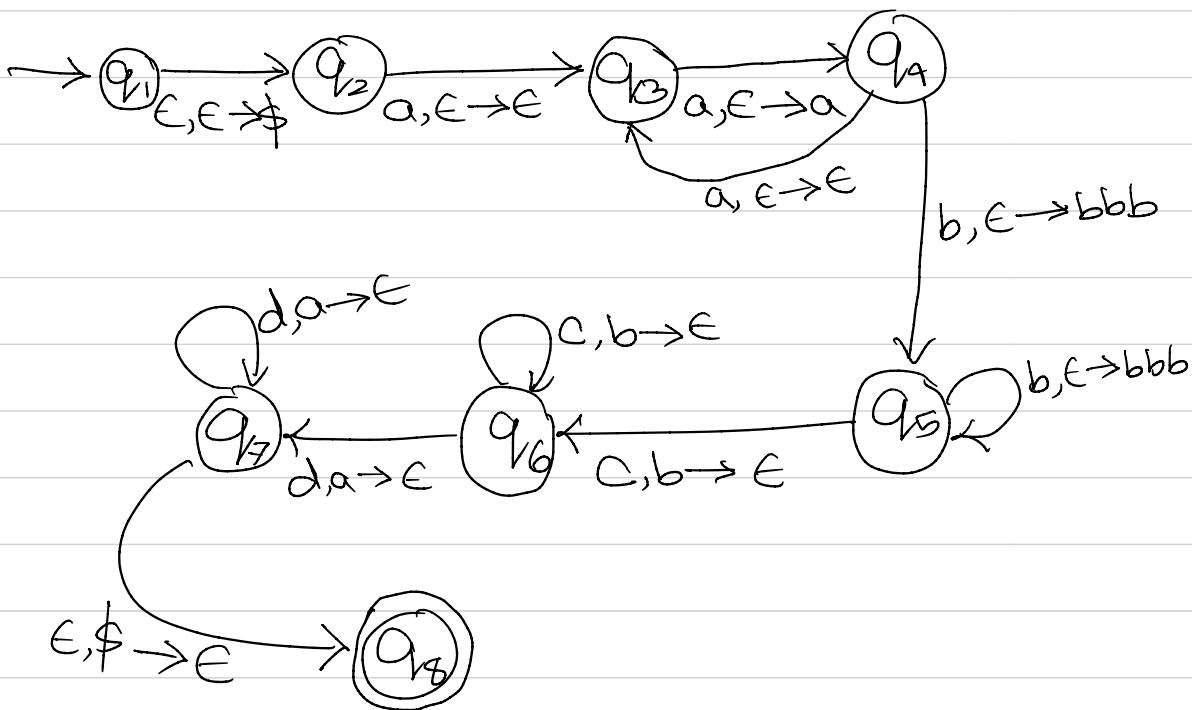
• $a^{2n} b^n \mid n \geq 1$



• $a^n b^m c^{n+m} \mid n, m \geq 1$



• $a^{2n} b^m c^{3m} d^n \mid n, m \geq 1$



• $a^{2n}b^m c^{3m} d^n \mid n \geq 0, m \geq 1$

