

Project 1

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Q1 For each of the following languages, find a grammar that generates it.

$$L = \{a^n b^{2n} : n \geq 0\}$$

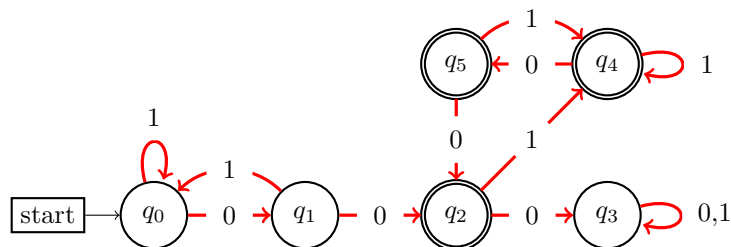
$$G = (\{S\}, \{a, b\}, S, \{ S \rightarrow \lambda \mid aSbb \})$$

$$L = \{a^m b^n : m \geq n \geq 0\}$$

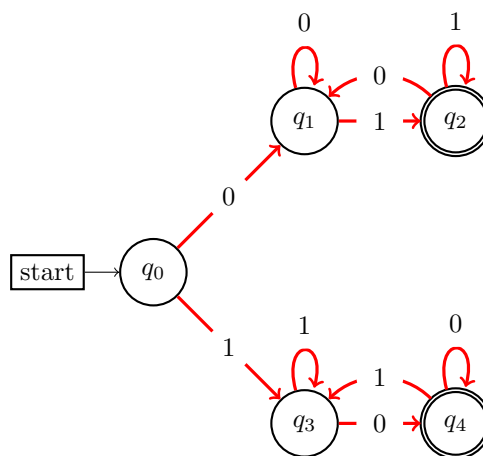
$$G = (\{S\}, \{a, b\}, S, \{ S \rightarrow \lambda \mid aS \mid aSb \})$$

Q2 Construct an accepting DFA for each of the requirements below:

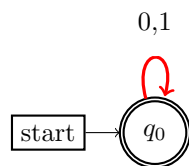
All strings on $\{0, 1\}$ containing 00 but not 000



All strings on $\{0, 1\}$ with the leftmost symbol differing from the rightmost one

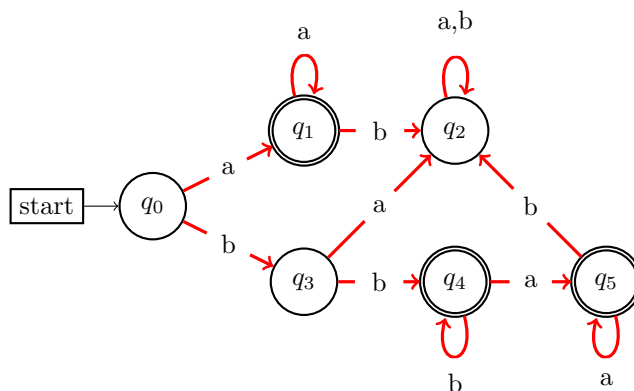


Q3 Equivalent DFA



Q4 Prove that language $L = \{a^n : n \geq 1\} \cup \{b^m a^k : m \geq 2, k \geq 0\}$

As the following DFA accepts language L , it is therefore regular.



Q5

Find a regular expression for the set $\{a^n b^m : n \geq 3, m \text{ is even}\}$

$$aaa (a)^* (bb)^*$$

Give a regular expression for language on $\Sigma = \{a, b, c\}$: all strings containing exactly one a .

$$(b + c)^* a (b + c)^*$$

Just thought I'd leave this in because I had already completed it.

