

Correction to Solution to Problem Set 2

2.3 The given context-free grammar G is

$$\begin{aligned} R &\mapsto XRX \mid S \\ S &\mapsto aTb \mid bTa \\ T &\mapsto XTX \mid X \mid \epsilon \\ X &\mapsto a \mid b \end{aligned}$$

k. $T \rightarrow^* XXX$: true.

2.7 a). The language of strings over the alphabet $\{a, b\}$ with twice as many a 's as b 's.

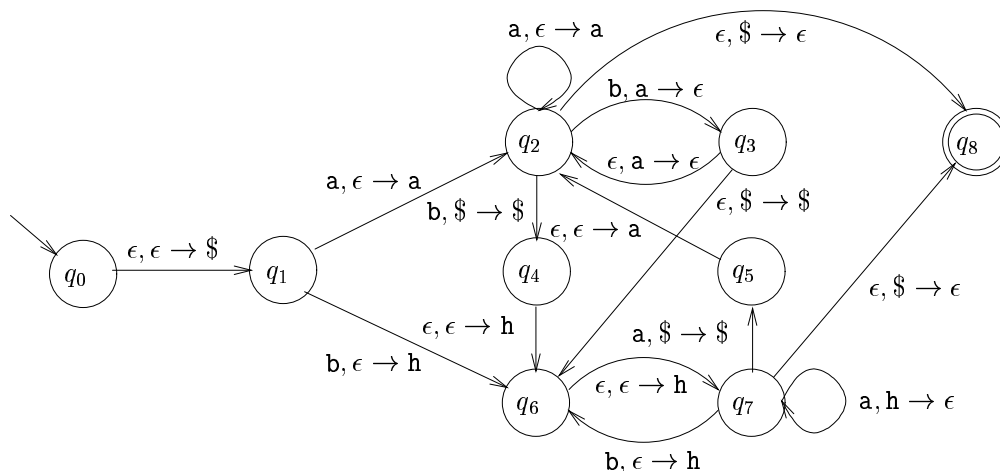


Figure 1: 2.7 (a)

Remark 1 The only correction from the previously posted solution is the addition of a transition from state q_3 to q_6 with label $\epsilon, \$ \rightarrow \$$.

2.13 Given the grammar G :

$$\begin{aligned} S &\mapsto TT \mid U \\ T &\mapsto 0T \mid T0 \mid \# \\ U &\mapsto 0U00 \mid \# \end{aligned}$$

a). The language generated by $L = L(G)$ is the set of strings that either are composed by the concatenation of 3 arbitrary-length strings of zeroes (delimited by the symbol $\#$) or strings of the form $0^k \# 0^{2k}$ for $k \geq 0$. More formally, a word w in L is of the form $w = 0^{k_1} \# 0^{k_2} \# 0^{k_3}$ (where $k_1, k_2, k_3 \geq 0$) or of the form $w = 0^k \# 0^{2k}$ for $k \geq 0$.