1. Exercise 7.1.
2. Exercise 7.4.
4. Exercise 7.7.
5. Exercise 7.8.
7. Exercise 7.10.

12. Let $A$ be the language $\{w \in \{a, b\}^* | w$ has twice as many $a$'s as $b$'s$\}.

   (a) Give an implementation-level description of a one-tape Turing machine that decides the language $A$ in time $O(n^2)$. Give a brief explanation of why your Turing machine runs in time $O(n^2)$.

   (b) Give an implementation-level description of a multi-tape Turing machine that decides $A$ in time $O(n)$.