# Problem Set 7 — Due Friday, November 22

**Problem 6–1.**

**(a)** Do Exercise 24.2-4 (page 510).

**(b)** Do Exercise 24.2-5 (page 510).

**Problem 6–2** Write careful pseudocode which answers the following questions about an undirected graph $G = (V, E)$ in linear time.

**(a)** Does $G$ contain a cycle?

**(b)** Is $G$ bipartite?

**Problem 6–3** You are given a string $x$ in which each character is either a positive integer or the letter $E$. Moreover, you are told that each integer between 1 and $n$ occurs exactly once in the string. Starting with the given string, the following operation is repeated until all the occurrences of $E$ have been deleted:

*Delete the leftmost $E$ and the smallest integer, if any to its left.*

For example, if the original string $264E5E3E1E$ then the strings occurring after each successive deletion would be $645E3E1E$, $653E1E$, $651E$ and 65.

Let $e$ be the number of $E$'s in the string $x$. Give the most efficient algorithm you can find which accepts such a string and computes the string that remains after all deletions. Compute the running time of your algorithm. *Hint: this is a job for the union/find data structure (which you can treat as a "black box"). My algorithm runs in $O(n\alpha(3n, n) + e)$ steps.*