CSC-421 Applied Algorithms and Structures
Fall 2017

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Assignment #5
(Due November 19)

1. Textbook, page 422, exercise 16.1-3.
2. Textbook, pages 427-428, exercise 16.2-4. You do not need to prove the correctness of your algorithm.
3. Textbook, page 436, exercise 16.3-3.
4. An *independent set* in a graph G is a set of vertices I in G such that no two vertices in I are adjacent (neighbors). The *maximum independent set problem* is, given a graph G, to compute an independent set of maximum size (maximum number of vertices) in G. Pinocchio claims that he has a greedy algorithm that solves the maximum independent set problem. Pinocchio's algorithm works as follows. The algorithm initializes the set I to the empty set, and repeats the following steps: Pick a vertex in the graph with the minimum degree, add it to the set I, and remove it and all the vertices adjacent to it from the graph. The algorithm stops when the graph is empty. Does Pinocchio's greedy algorithm always produces a maximum independent set? Prove your answer (if it does, give a proof; if it does not, give a counter example, that is, a graph on which Pinocchio's algorithm does not produce a maximum independent set).
5. Textbook, pages 637-638, exercise 23.2-8.
6. Textbook, page 662, exercise 24.3-1.