PSO #7

Week 9

Greedy Proof

Consider m conference rooms with capacities D1, D2, . . . , Dm. You receive n requests for rooms of size k1, k2, . . . , kn. Once a room is allocated additional requests cannot be put there.

Develop a greedy algorithm to handle the requests and prove its correctness and runtime.

Greedy

Consider a graph G. Devise a scheme to assign colors to the nodes of G s.t. no node has the same color as a node adjacent to it (Graph coloring heuristic).

You are given a list of colors to use that is guaranteed to be in length at least greater than or equal to one more than the maximum degree of any vertex in G, as well as a corresponding ”dictionary” structure which lists the index of a color in the list.

Graphs

Given an undirected graph G represented with adjacency lists, design and analyze an algorithm that determines if G is bipartite.

Note: we say an undirected graph G is bipartite if the vertices can be divided into two disjoint sets U, V such that each edge connects a vertex in U to a vertex in V

Graphs

Prove that an m-ary tree of height h has at most m^h leaves

A rooted tree is m-ary if each non-leaf node has no more than m children, e.g., if m is 2, we call it a binary tree.

Graphs

Let G be an undirected graph with n vertices, where each vertex has a degree of at least n/2.

Prove that G is connected.