

CS 5633: Analysis of Algorithms

Homework 7

1. In class we considered the activity-selection problem, and we considered a greedy algorithm which iteratively took the activity with the earliest finishing times from the activities which are compatible with our current solution. We proved that the algorithm results in an optimal solution.
 - (a) Another idea for a greedy algorithm would be to take the activity that will be active the least amount of time. That way we have as much of the time remaining as possible. This greedy algorithm, however, does not always result in an optimal solution. Give a counterexample which shows that this algorithm might fail.
 - (b) What is another greedy algorithm (other than the earliest finishing time algorithm) which *will* always compute an optimal solution. Prove that your algorithm is correct.
2. Consider a long, straight road in the country which has n houses sparsely located on the road. Suppose we want to place cell phone towers along the road to service each of the n houses, and a house must have a tower within four miles in order to have cell reception. Give an algorithm which uses the smallest number of towers while providing service to each of the n houses. Show that your algorithm is correct. What is the running time of your algorithm?