CONCORDIA UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE AND SOFTWARE ENGINEERING

COMP 6651: Algorithm Design Techniques

Fall 2015

Quiz # 3

First Name	Last Name	ID#

Question 1

Propose a greedy algorithm that solves exactly the following location problem for mobile phone stations. Provide the complexity of your algorithm, and <u>sketch</u> the proof of why your algorithm is optimal.

Input: the locations of n houses along a straight line We want to place cell phone base stations along the road so that every house is within 4 miles of one of the base stations.

Output: a minimal set of base stations.

Assumption: No pair of two successive house locations are more than 8 miles apart.

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Description of the Greedy Algorithm

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Complexity of the Greedy Algorithm

Proof that your Greedy Algorithm provides an optimal solution

Question 2

Let $G = (V, E)$ a directed graph. Provide the detail of Dijkstra's algorithm, as well as the complexity analysis under the assumption that you use adjacency lists in order to represent the graph. Provide additional detail of the used data structures if needed for the complexity analysis

Description of Dijkstra's algorithm

Complexity of Dijkstra's algorithm

Justification of the Complexity of Dijkstra's algorithm