WIA2005 Algorithm Design & Analysis
Semester 2, 2016/17
Tutorial 5

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1. Write (pseudocode) an iterative version of RANDOMIZED-SELECT.

2. Suppose we use RANDOMIZED-SELECT to select the minimum element of the array A = (3, 2, 9, 0, 7, 5, 4, 8, 6, 1). Describe a sequence of partitions that results in a worst-case performance of RANDOMIZED-SELECT.

3. How quicksort can be made to run in O(n lg n) time in the worst case, assuming that all elements are distinct.

4. Professor Olay is consulting for an oil company, which is planning a large pipeline running east to west through an oil field of *n* wells. The company wants to connect a spur pipeline from each well directly to the main pipeline along a shortest route (either north or south), as shown in Figure 5.1 Given the x- and y-coordinates of the wells, how should the professor pick the optimal location of the main pipeline, which would be the one that minimizes the total length of the spurs? Show how to determine the optimal location in linear time.

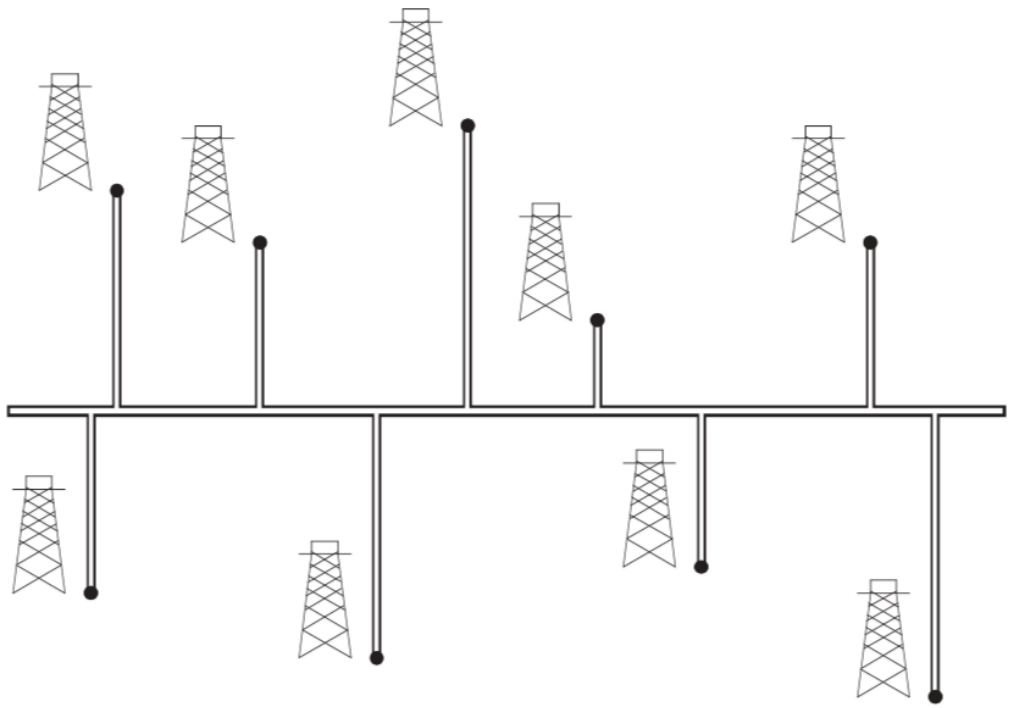

Figure 5.1