Computer Science I – Fall 2010
Recitation #10: Quick Select

Part 1

Your TA will spend about 10 minutes going over Quick Select.

Part 2

Using the idea of Quick Select, solve the following problem:

You are given a large box of n nuts and n bolts, which are all mixed up together. Each nut matches with exactly one bolt…but as of now, they are all mixed up. The goal: match up the nuts and bolts in the most efficient way.

Note:
You do not have the ability to compare two nuts to each other to see if one is bigger than the other. You also do not have the ability to compare two bolts to each other to see if they match. But, given one nut and one bolt, you can compare the two of them and determine whether or not they match, or if the nut is too small, or if the nut is too big.

Your goal will be to determine an efficient algorithm that takes an array of nuts and an array of bolts, and matches all of the nuts to all of the bolts. (Note: Your final answer need not be in sorted order. It must simply have all of the nuts and bolts correctly matching.)

Give pseudocode for your algorithm, which should take as input an array of nuts and an array of bolts. Your algorithm should make function calls to a compare function that takes in one nut and one bolt and returns whether they match, the nut is too small, or too big.