Divide-And-Conquer – Kth Element

**Purpose**

This lab was designed to teach you how to use the divide and conquer problem solving paradigm by modifying an existing algorithm. Find the kth element in an array without sorting. This can be done remarkably in linear time! The sample data tests the kth smallest element.

**Description**

Take a list of data and an integer that represents the kth smallest starting at zero and print out the kth element without sorting. The key idea is to utilize quick sort and only conquer one side of the divide depending on the index of what you’re looking for and the pivot location. If you were looking for the 15th smallest element and the pivot index was 10, you would only need to make a recursive call on the right-hand side.

**Program Shell**

KthElement.java

**Sample Execution**

Input:

new Comparable[]{9,5,3,2,1},2

new Comparable[]{19,52,3,2,7,21}, 0

new Comparable[]{68,66,11,2,42,31}, 5

new Comparable[]{90,40,20,30,10,67,100},3

new Comparable[]{3,15,61,11,7,9,2}, 3

Output:

3

2

68

40

9