CURTIN UNIVERSITY (CRICOS number: 00301J)
Faculty of Engineering and Science
Department of Computing
Data Structures and Algorithms

Practical 7

Aims: Sorting, Part II
- To implement and test QuickSort

Before the Practical:
- Read this practical sheet fully before starting.

Activity 1: Implementing QuickSort

Add QuickSort to your Sorts.java. QuickSort requires the following broad steps:
- Select a pivot
- Re-organise the array so that all values to the left of the pivot are smaller than the pivot and all values to its right are larger than the pivot. This is called *partitioning*.
- If the array is of size more than 1, for each side (left and right) perform a recursive call to quickSort(). As with mergeSort(), define the left array via indexes and similarly for the right array. Do not include the pivot in either of the arrays – it's already in the right position.
- Else, (the array is of size 1 or less) you can return immediately because it is now sorted (base case). In your implementation, do not include this - it is a do nothing step, and is included here for clarity.

For an alternative pivot partitioning algorithm to that in the lectures, have a look at the book (LaFore). The way it works is that it starts from both sides of the array and searches inwards for any values that are on the 'wrong' side of the pivot. Upon finding one from each side, it swaps the two. However, note that LaFore selects the rightmost as the pivot – you may want to use the middlemost (just swap it with the rightmost and the rest of the algorithm is the same) to avoid the worst-case problem with rightmost (or leftmost) pivots and sorted arrays.

Activity 2: Run Some More Sorting Tests

Spend some time running all the sorting algorithms and various array variants together.
See if you can work out how to "time" your algorithms.

Submission Deliverable:

Your completed `sorts.java` class is <u>due at the beginning of your next</u> <u>tutorial</u>.

SUBMIT ELECTRONICALLY VIA BLACKBOARD, under the *Assessments* section.

If you finish early, use the rest of the practical to start the next worksheet, because that will be due later on.