Biostatistics 615/815
Problem Set 5
Due October 27, 2004

Divide and Conquer Sorting Algorithms

1. Consider three implementations of Quicksort:

    a) A recursive version uses an arbitrary element as the partitioning element.

    b) A recursive version that uses median of three partitioning.

    c) A non-recursive version that handles smaller sub-arrays first (using an explicit stack).

    For each of these alternatives, what is the average maximum stack depth when sorting a random array with 1000 elements?

2. Quicksort and Mergesort can perform noticeably faster when insertion sort is used to handle small sub-arrays. Find a good cut-off M for the size of arrays that should be handled by insertion sort in your computer. Present timings or total number of comparisons that result for different settings of M to justify your answer.