

Due at the start of class, Wednesday, July 1.

**Problem 1.** Assume you have a list of  $n$  elements where the first  $n/k$  elements are the smallest (but not sorted), the next group of  $n/k$  elements are the next smallest (but not sorted), ..., and the last  $n/k$  elements are the largest (but not sorted). You may assume  $k$  divides  $n$ .

- (a) Give an algorithm that sorts this list with as few comparisons as possible (as a function of  $n$  and  $k$ ). Just get the high order term right. How many comparisons does your algorithm use?
- (b) Show that your algorithm is optimal using a decision tree argument on the *entire* list. (I.e., do not argue that you must solve  $k$  independent sorting problems.)

**Problem 2.** Do Exercise 8.2-4 on page 170 of CLRS.

**Problem 3.**

- (a) Illustrate the operation of radix sort on the following list of English words: RUTS, TOPS, SUNS, SPOT, TONS, OPTS, TORS, SOTS, ROOT, OUTS, SUPS, PUTT
- (b) Write an English sentence using both “tor” and “sot” (that indicates you understand the meanings of both words).