1. (a) Illustrate the operation of radix sort on the following list of twelve English words. Note that a blank comes before all of the letters.

   radix, digits, bases, shell, sorts, presto, count, bucket, quick, heaps, merge, bubble

   (b) Use a noun version of the word "quick" and one of the two words "prestidigitator" or "prestidigitation" in one English sentence that shows that you understand the meaning of both words (that you use). (Do NOT write two sentences. Do NOT define the words. Do NOT pass GO. Do NOT collect $200.)

2. (a) When is time for Radix Sort better than (actually at least as good as) the time for Bubble Sort? Do your calculations as we did in class when comparing Radix Sort to Quicksort. Show your work.

   (b) What does this tell us and why?

3. Consider the area enclosed by the x-axis, the line $x = 1$, and the curve $y = \sqrt{x}$. Assume that n points are uniformly distributed randomly inside it. (The n points can be represented by n pairs of real numbers $(x_1, y_1), (x_2, y_2), \ldots, (x_n, y_n)$.)

   (a) Show that you can sort the points by their distance to the y-axis in average-case linear time. You can assume that bucket sort works in average-case linear time.

   (b) Give the pseudo-code for your algorithm.