Homework Set #6

1. Using Figure 8.2 as a model, illustrate the operation of COUNTING-SORT on the array A = < 9, 2, 13, 9, 1, 2, 9, 26 >. (10 points)

2. Using Figure 8.3 as a model, illustrate the operation of RADIX-SORT on the following list of English words: BEE, BAG, BEG, LEG, TAG, RAG, TEE, TEA. (15 points)

3. Using Figure 8.4 as a model, illustrate the operation of BUCKET-SORT on the array A = < .18, .74, .89, .04, .13, .78, .15, .81, .26>. (15 points)

4. This problem asks you to pick the most efficient sorting algorithm in a variety of cases. Assume that the number of inputs n is large unless otherwise specified. Assume that the algorithms in the textbook are used. Briefly justify each answer. If more than one answer is appropriate, then select multiple choices. If additional pre- or post-processing is needed, briefly describe it. (40 points)

a) Lexicographically sort n distinct, lower-case alphabetic characters.
b) Sort a nonincreasing sequence of n integers into nondecreasing order.
c) Lexicographically sort n upper-case, 4-letter English words.
d) Sort a collection of n integers into nondecreasing order. Each integer is drawn from a uniform random distribution. Each integer is in between 0 and 500.
e) Sort a collection of n integers into nondecreasing order. Each integer is drawn from a uniform random distribution. Each integer is in between 0 and 1.
f) Sort a collection of n integers into nondecreasing order. Each integer is in between 0 and 50.
g) Sort a collection of 5 rational numbers into nondecreasing order. Each rational number is in between 1 and 2 and each numerator and denominator is in between 1 and 10.
h) Sort a collection of n floating-point numbers into nondecreasing order. Each number is drawn from a uniform random distribution and is in between 1 and 10.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
INSERTION-SORT								
MERGE-SORT								
HEAPSORT								
QUICKSORT								
COUNTING-SORT								
RADIX-SORT								
BUCKET-SORT								