Homework 5

Due: 5:00pm, April 10, 2009 (Late deadline: 5:00pm, April 13, 2009)

Total Points: 40

You may submit your solution via email to holder@wsu.edu (preferred), or you may submit hardcopy in class or to my office (EME 227) by the above deadline. If you submit via email, please use PDF or other common electronic format.

1. (10 points) Exercise 7.19 in Weiss book. You should use the code from Figures 7.14-7.16 in the book, except in line 11 of Figure 7.16, replace the 10 by a 3. For each call (initial or recursive) to quicksort in Figure 7.16, show the array upon entry to the procedure, the chosen pivot, and the array after partitioning.

2. (10 points) Exercise 7.48, parts (a) and (b), in Weiss book. For each part give pseudocode for your solution, an explanation for why your solution is correct, and a justification for the running time.

3. (20 points) Show the resulting disjoint set after each of the following union operations using union-by-rank and path compression. You should draw the disjoint sets using the forest-of-trees representation. You should assume that each call to union(x,y) first does a find(x) and a find(y). The initial disjoint set contains ten elements 1-10.

   a. Show the initial disjoint set.
   b. union(1,2)
   c. union(3,4)
   d. union(3,5)
   e. union(1,7)
   f. union(3,6)
   g. union(8,9)
   h. union(1,8)
   i. union(3,10)
   j. union(1,3)