University of Nevada, Las Vegas Computer Science 477/677 Spring 2015

Assignment 7: Due Thursday, April 30, 2015

Name:____

You are permitted to work in groups, get help from others, read books, and use the internet. But the handwriting on this document must be your own. You may attach extra sheets, using a stapler.

"Designing" an algorithm does not mean writing code. In fact, explicit hand-written pseudo-code can be hard to grade (and you don't want to upset the grader, do you?) You should describe your algorithm in English, although you can use **small** bits of hand-written pseudo-code to clarify, as needed.

Of course, you may actually wish to encode and then execute your algorithm. This does not relieve you of the obligation to completely explain your algorithm in your own handwriting.

1. Draw a treap with six nodes, which hold the following data. The name is the datum, and the number is the "random" key.

   (a) Ann, 3
   (b) Bob, 8
   (c) Cal, 9
   (d) Sue, 4
   (e) Ted, 7
   (f) Tom, 2

2. In class, we discussed a "tournament" algorithm which finds the maximum of an array of size n in $O(\log n)$ time, using n parallel processors. However, that algorithm is is "wasteful," in the sense that most of the processors are idle most of the time.

   Describe a parallel algorithm which finds the maximum of an array of size n in $O(logn)$ time using only $n/(\log n)$ processors.