CS 577: Introduction to Algorithms 9/28/15

Homework 4 (Rubric)

Instructor: Dieter van Melkebeek TA: Bryce Sandlund

Problem 3 [10 points]

- [3 points] algorithm correctness
- [3 points] $O(n \log n)$ algorithm
- [1 point] runtime argument
- [3 points] correctness argument

There were a number of solutions that tried working from the first arriving kayaker with a set of rules to determine bus schedule. I don't believe any of these assignments got much more than 4 points, because this approach is not correct. In general, if you are trying to devise a greedy algorithm and keep adding cases to fix counterexamples, your algorithm is probably incorrect. Start over and think of a different order for the problem. Most of the solutions we expect you to come up with are fairly simple.

Many of you came up with the right algorithm but struggled with the greedy stays ahead proof. Those of you who just stated your intuition on the problem usually lost a point or so, since we are expecting formal proofs. Among solutions that attempted a formal argument, many stated claims that were false. It is not true that greedy gets every kayaker to the destination in the minimum amount of time. On other assignemnts it was not clear what the induction was actually on. State this!

I highly recommend picking up the model solutions from outside Dieter's office, but for the record the easiest way to show correctness of greedy is to use induction on the latest-arriving kayaker in every bus trip, since greedy gets these kayakers to the destination in minimum time. Then the algorithm is correct because the latest-arriving kayaker in the whole set is the latest-arriving kayaker in the last bus trip.