CS 141: Advanced Topics in Algorithms
Spring 2006
Assignment 8b

Assignment Jon and Garret
Due: Tuesday, April 4

1. [10 Points] Offline Scheduling

Remember the problem given in class: Given finite jobs $J_1 \ldots J_k$, where job $J_i = (r_i, d_i, w_i)$, with $r_i$ being defined as the release time of $J_i$, $d_i$ the deadline, and $w_i$ the weight of the job.

Each job takes a unit time to complete, and we can only begin a job once it has been released and before the deadline, and the release times and deadlines are given as non-negative integers.

We can only work on one job at a time, so the goal of this problem is to maximize the total weight $w_i$ of all of the jobs completed.

(a) Devise an offline polynomial-time algorithm that solves this scheduling problem.
(b) Briefly, prove the correctness of your algorithm.
(c) Analyze the runtime of your algorithm and show that it is indeed polynomial in the size of the problem instance.