

Due in class: Due date: Apr 11.

- (1) Develop a polynomial time algorithm for broadcast scheduling for minimizing the sum of response times. Assume that the number of pages of information is a constant  $c$ . (The problem is *NP*-hard when we have  $n$  pages, where  $n$  is unbounded.)
- (2) Consider the broadcast scheduling algorithm we discussed to minimize the maximum response time. We showed a 2 approximation algorithm for this problem using the idea of “request clearing” followed by a “matching” phase. Show that the matching phase can be replaced by a greedy EDF policy.
- (3) Formulate the min-sum of response times problem for broadcast scheduling as an Integer Program. Now consider the fractional relaxation. Show an example where the LP fractional solution is actually cheaper (lower cost) than the integral optimal solution.
- (4) Consider the broadcast scheduling problem with deadlines (jobs have arrival times and deadlines). The goal is to maximize the number of jobs that satisfy their deadlines. Show that there are cases when a fractional solution to the LP relaxation might exist but no integral solution exists.