Lecture 22

CSE 331

Oct 24, 2018

Grading

Mid-term-1 hopefully by tonight

Mid-term-2 hopefully by Friday

HW 5 hopefully by weekend

Scheduling to minimize lateness

n jobs: ith job (t_i, d_i)

start time: s

Schedule the n jobs: ith job gets interval $[s(i), f(i)=s(i)+t_i)$

Algo picks s(i)

GOAL: Minimize MAXIMUM lateness

Lateness of job i, $l_i = \max(0, f(i)-1-d_i)$

The Greedy Algorithm

(Assume jobs sorted by deadline: $d_1 \leq d_2 \leq \ldots\ldots \leq d_n$)

f=s

For every i in 1..n do

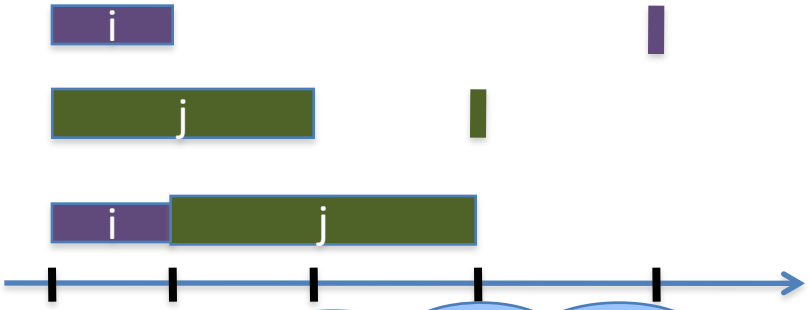
Schedule job i from s(i)=f to f(i)=f+t_i

f=f+t_i

Two definitions for schedules

Idle time — Max "gap" between two consecutively scheduled tasks

Inversion — (i,j) is an inversion if i is scheduled before j but $d_i > d_j$

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f=1

For every i in 1..n do

    Schedule job i from s_i=f to f_i=f+t_i

    f=f+t_i
```

0 idle time and 0 inversions for greedy schedule

Proof structure

Any two schedules with 0 idle time and 0 inversions have the same max lateness

Greedy schedule has 0 idle time and 0 inversions

There is an optimal schedule with 0 idle time and 0 inversions

Today's agenda

"Exchange" argument to convert an optimal solution into a 0 inversion one