

Lecture 17

CSE 331

Oct 7, 2022

Quiz 1– 11:00-11:10am

Lecture starts at 11:15am

Quiz 1 timelines

Solutions: posted by today evening

Grading: finished by Saturday

Please do fill in the feedback

note 0221

stop following 1 view

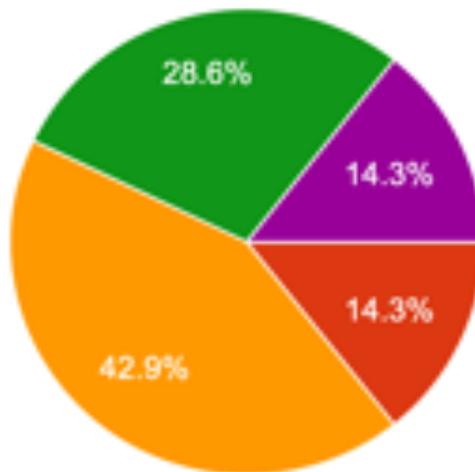
Actions

Feedback on CSE 331

Every year, I ask y'all to give feedback on CSE 331, so here is the feedback form for this year:

Overall your feeling about CSE 331

7 responses



- Very Happy
- Challenged and happy
- Challenged and meh
- Challenged and unhappy
- Challenged and very unhappy
- I'm bored!

Mid-terms next week

Mon, Oct 10 **Mid-term exam: I**

Tue, Oct 11

(HW 4 out)

Wed, Oct 12 **Mid-term exam: II**

I still have more apples 😊

note @255    stop following 1 view Actions ▾

I still have apples in my office!

Following up on @248: I still have apples in my office (though they are now two more days older but still very very nice to eat). So feel free to stop by my OH tomorrow at 12:30pm and grab an apple!

office_hours

Edit good note | 0 Updated 31 seconds ago by Atri Rudra

Rachael OH only on Mondays

note @254 stop following 2 views Actions

Rachael's Tue 11am OH dropped for the rest of the semester

Apologies for this but starting from next week, Rachael will only have office hours on Monday. I.e. she will no longer hold her Tue 11-11:50am office hours. However, that OH overlapped with James' OH so the OH coverage will not change and so I do not anticipate this causing any issues.

BTW since there was a comment on this in the feedback [[@221](#)], note that the TA during their in-person OH are also on zoom and you can talk with them there assuming there is no one present in-person (which given how sparsely attended OHs have been in general should not be an issue...)

office_hours

Edit good note 0 Updated 3 minutes ago by Atri Rudra

Questions?



Runtime analysis of Greedy Algo.

R : set of requests

$O(1)$

Set S to be the empty set

Repeated at most n times

While R is not empty

$O(n)$

$O(1)$

Choose i in R with the earliest finish time

Add i to S

$O(n)$

Remove all requests that conflict with i from R

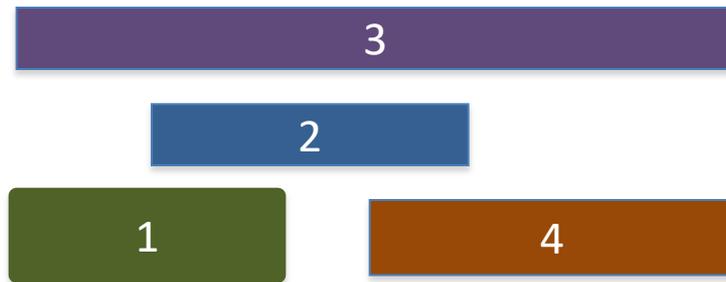
Return $S^* = S$

$O(n)$

Overall:
 $O(n) +$
 $n * O(n) =$
 $O(n^2)$

Algorithm implementation

Go through the intervals in order of their finish time



Check if $s[i] < f(1)$

with 1:

In general, if j th interval is the last one chosen

Pick smallest $i > j$ such that $s[i] \geq f(j)$. . .

$O(n \log n)$ run
time

The final algo

$O(n \log n)$ time sort intervals such that $f(i) \leq f(i+1)$

$O(n)$ time build array $s[1..n]$ s.t. $s[i]$ = start time for i

Add 1 to A and set $f = f(1)$

For $i = 2 .. n$

 If $s[i] \geq f$

 Add i to A

 Set $f = f(i)$

Return $A^* = A$

Reading Assignment

Sec 4.1 of [KT]



The “real” end of Semester blues

There are deadlines and durations of tasks



Write up a term paper

Party!

Exam study

331 HW

Project

Friday

Saturday

Sunday

Monday

Tuesday

The “real” end of Semester blues

There are deadlines and durations of tasks



Write up a term paper

Exam study

Party!

331 HW

Project

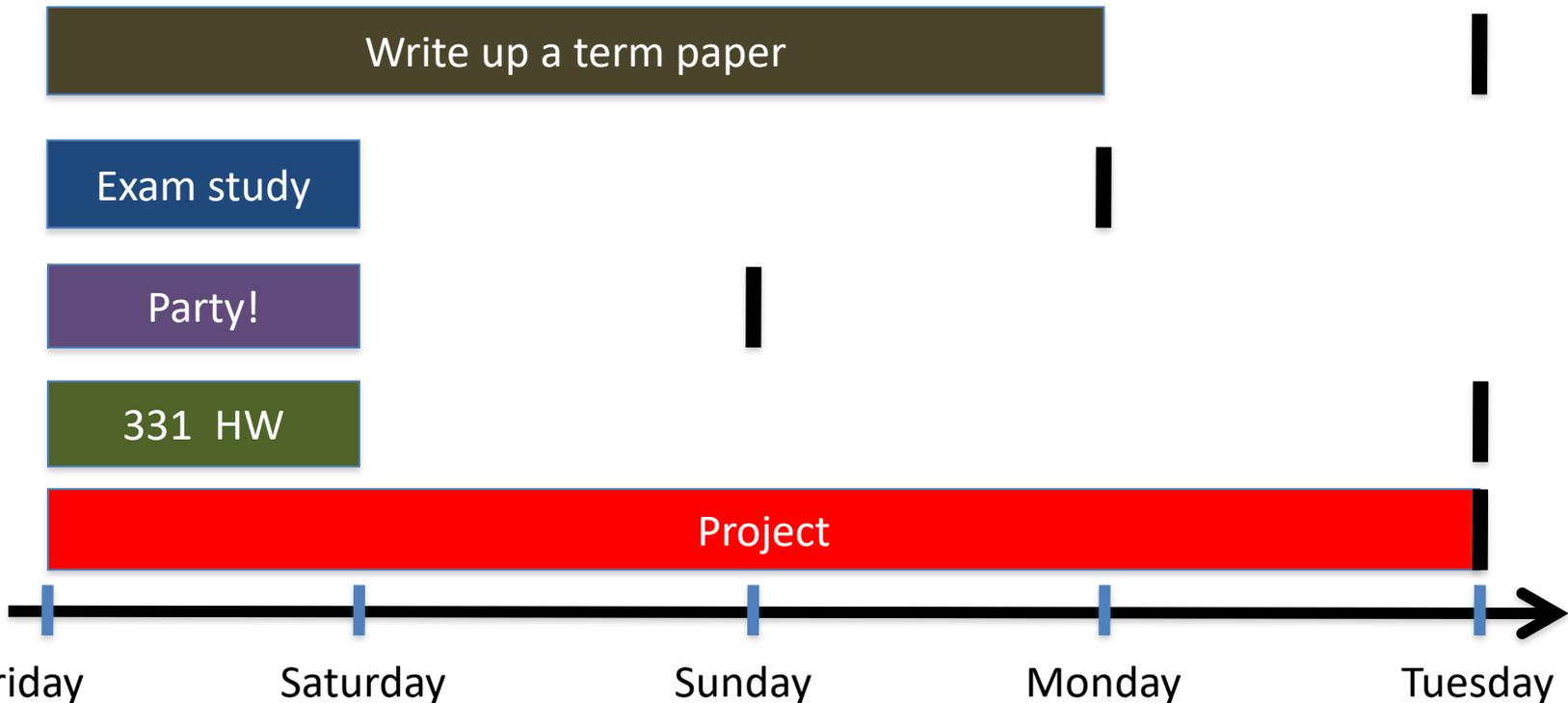
Friday

Saturday

Sunday

Monday

Tuesday



The algorithmic task

YOU decide when to start each task



Write up a term paper

Exam study

Party!

331 HW

Project

You have to do
ALL the tasks

Friday

Saturday

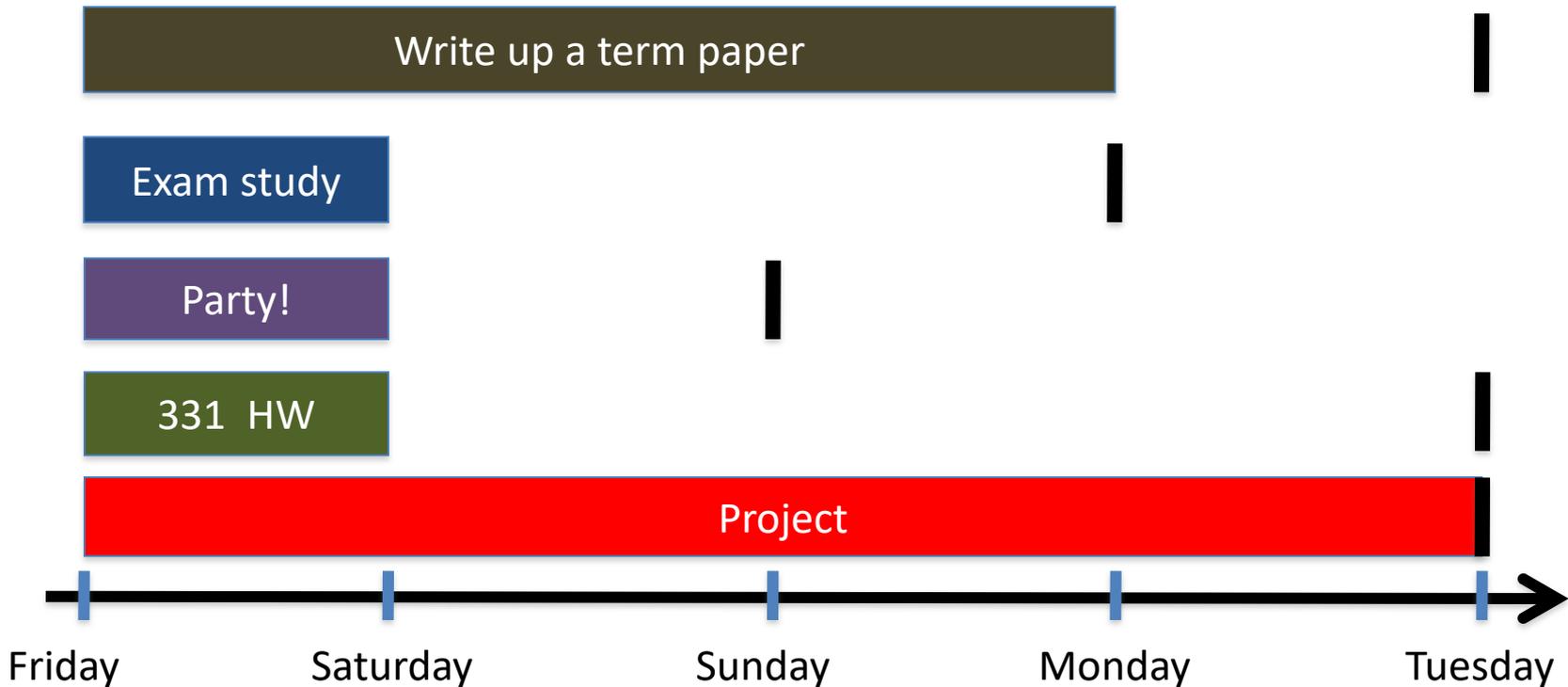
Sunday

Monday

Tuesday

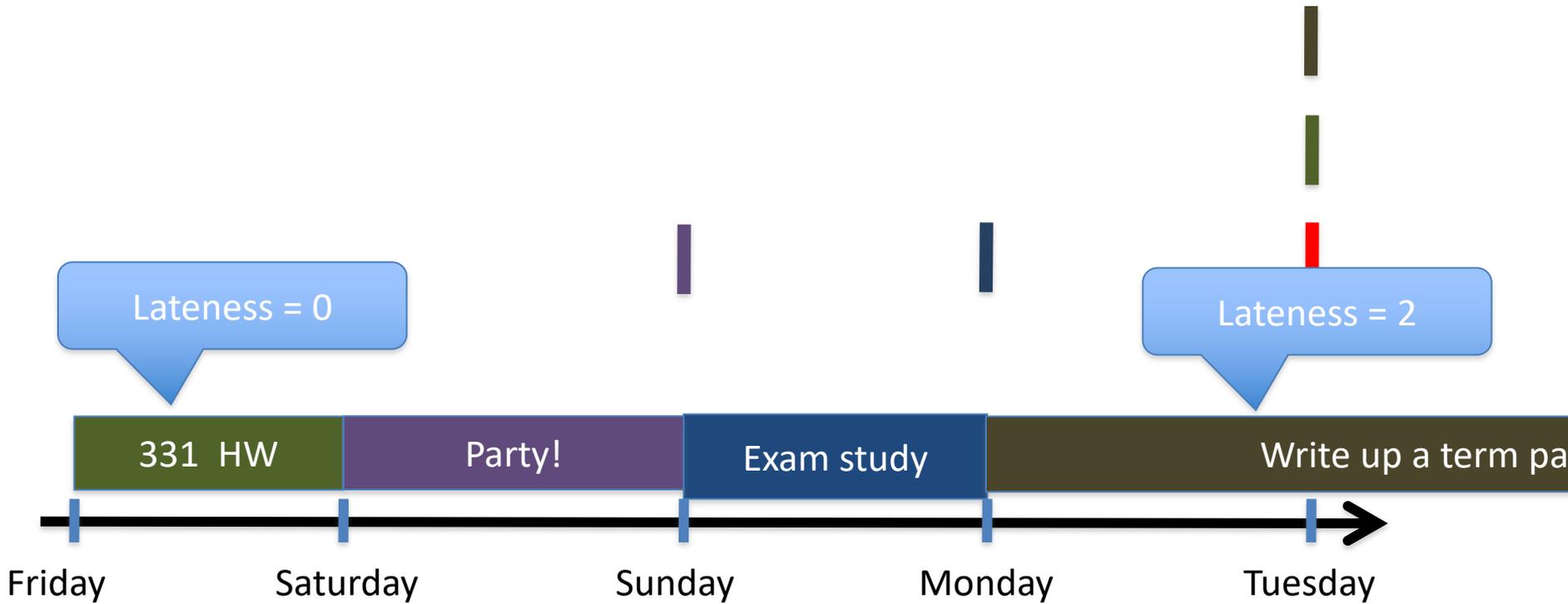
Scheduling to minimize lateness

All the tasks have to be scheduled
GOAL: minimize maximum lateness



One possible schedule

All the tasks have to be scheduled
GOAL: minimize maximum lateness



Minimizing Max Lateness

Minimizing Maximum Lateness

This page collects material from previous incarnations of CSE 331 on scheduling to minimize maximum lateness.

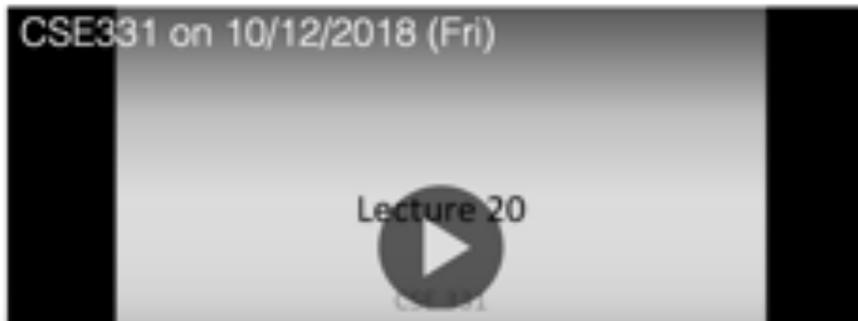
Where does the textbook talk about this?

Section 4.2 in the textbook has the lowdown on the problem of scheduling to minimize maximum lateness.

Fall 2018 material

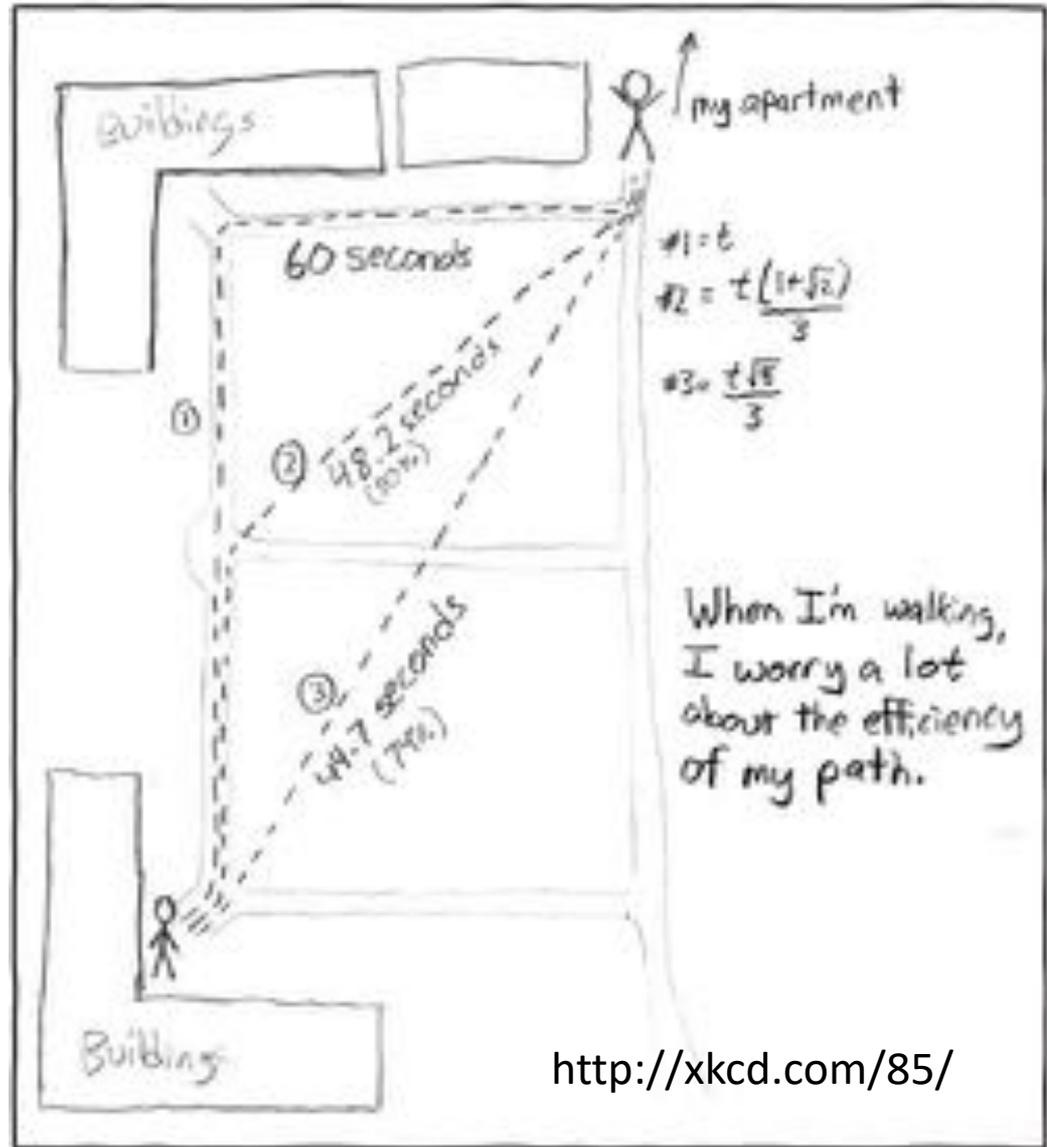
First lecture

Here is the lecture video:



Rest of today

Shortest Path Problem



Reading Assignment

Sec 2.5 of [KT]

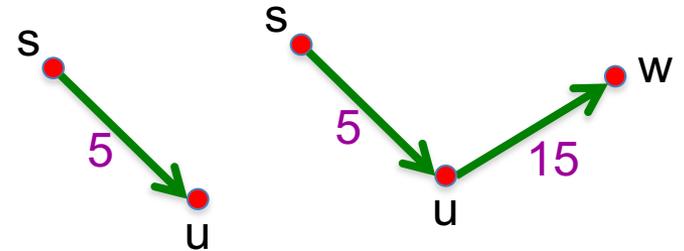
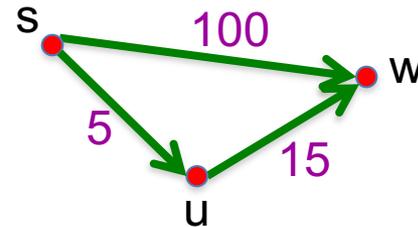


Shortest Path problem

Input: *Directed* graph $G=(V,E)$

Edge lengths, l_e for e in E

“start” vertex s in V



Output: All shortest paths from s to all nodes in V

Naïve Algorithm

$\Omega(n!)$ time

Dijkstra's shortest path algorithm

