# Lecture 19

CSE 331

Oct 10, 2016

Quiz starts at 1pm and ends at 1:10pm

In 1(b), IGNORE time taken to initialize data structures

Lecture starts at 1:15pm

# Pitch grading half done

## CSE 331 Mini project choices

### Fall 2016

Please check the table below before submitting your mini project pitch to make sure your case study is not being used by another group. Case studies are assigned on a first come first serve basis.

| Group | Societal Aspect | Case Studies |
|---|---|---|
| Anand Balakrishnan, Vikram Garu and Veronica Ng | Cryptography | Enigma<br>Public key cryptography |
| Hank Lin, Michael Tobio and Miaomiao Zhang | | |
| Devashish Agarwal, Jacob Fijas and Kevin Rathbun | Social Media in Politics | DeepDrumpf<br>Facebook determines your political leanings |
| Sravanika Doddi, Anne Izydorczak and Simran Singh | Women | Google autocomplete stereotypes<br>Gender bias in job ads |

Please wait for grading rubric before asking grading questions

# Interval Scheduling Problem

**Input:** n intervals $[s(i), f(i))$ for $1 \leq i \leq n$

**Output:** A *schedule* S of the n intervals

No two intervals in S conflict

|S| is maximized

# Analyzing the algorithm

R: set of requests

Set S to be the empty set

While R is not empty

Choose i in R with the earliest finish time

Add i to S

Remove all requests that conflict with i from R

Return S* = S

S* has no conflicts

S* is an optimal solution

# Greedy “stays ahead”

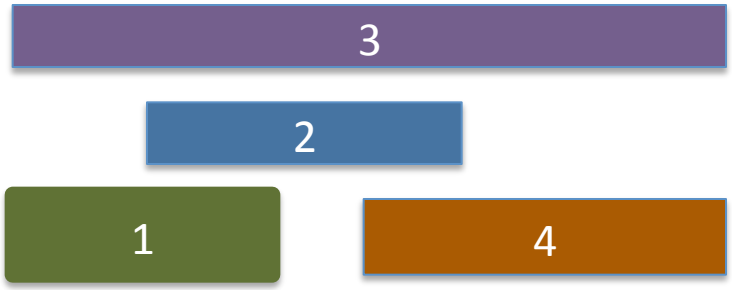
# Today's agenda

Prove the correctness

Analyze run-time of the greedy algorithm

# Algorithm implementation

Go through the intervals in order of their finish time




Check if s[i] < f(1)

In general, if jth interval is the last one chosen

Pick smallest i>j such that s[i] ≥ 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 $A^* = A$

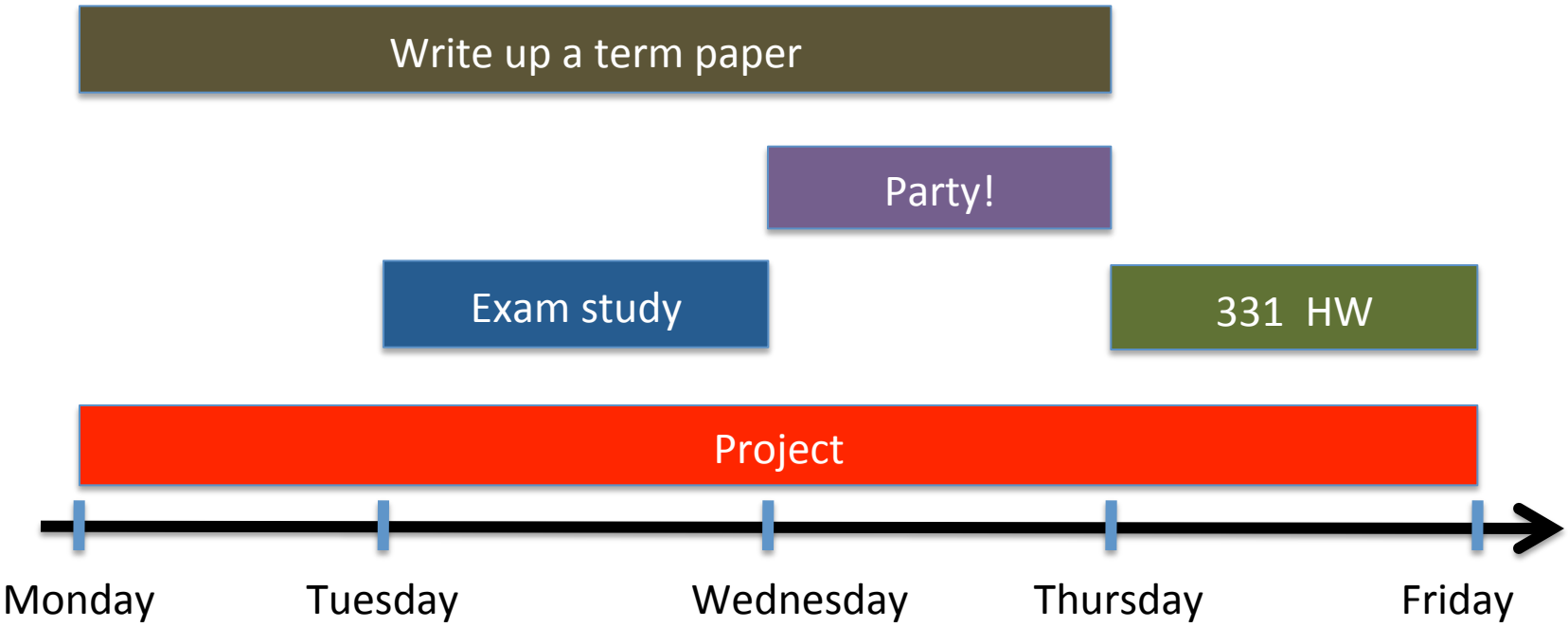
# Reading Assignment

Sec 4.1of [KT]

# Questions?

# The "real" end of Semester blues

There are deadlines and durations of tasks



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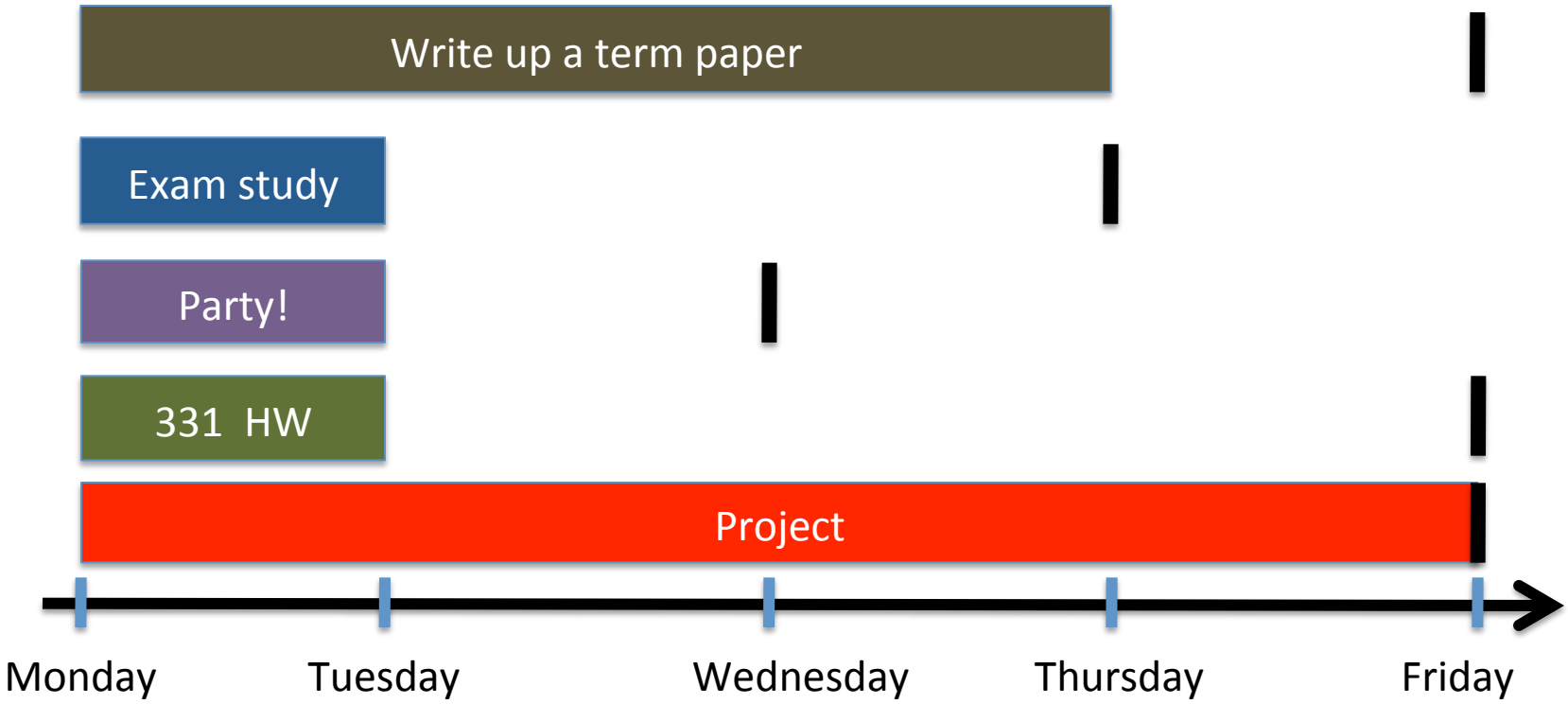


# The algorithmic task

YOU decide when to start each task

Write up a term paper

Exam study

Party!

331 HW

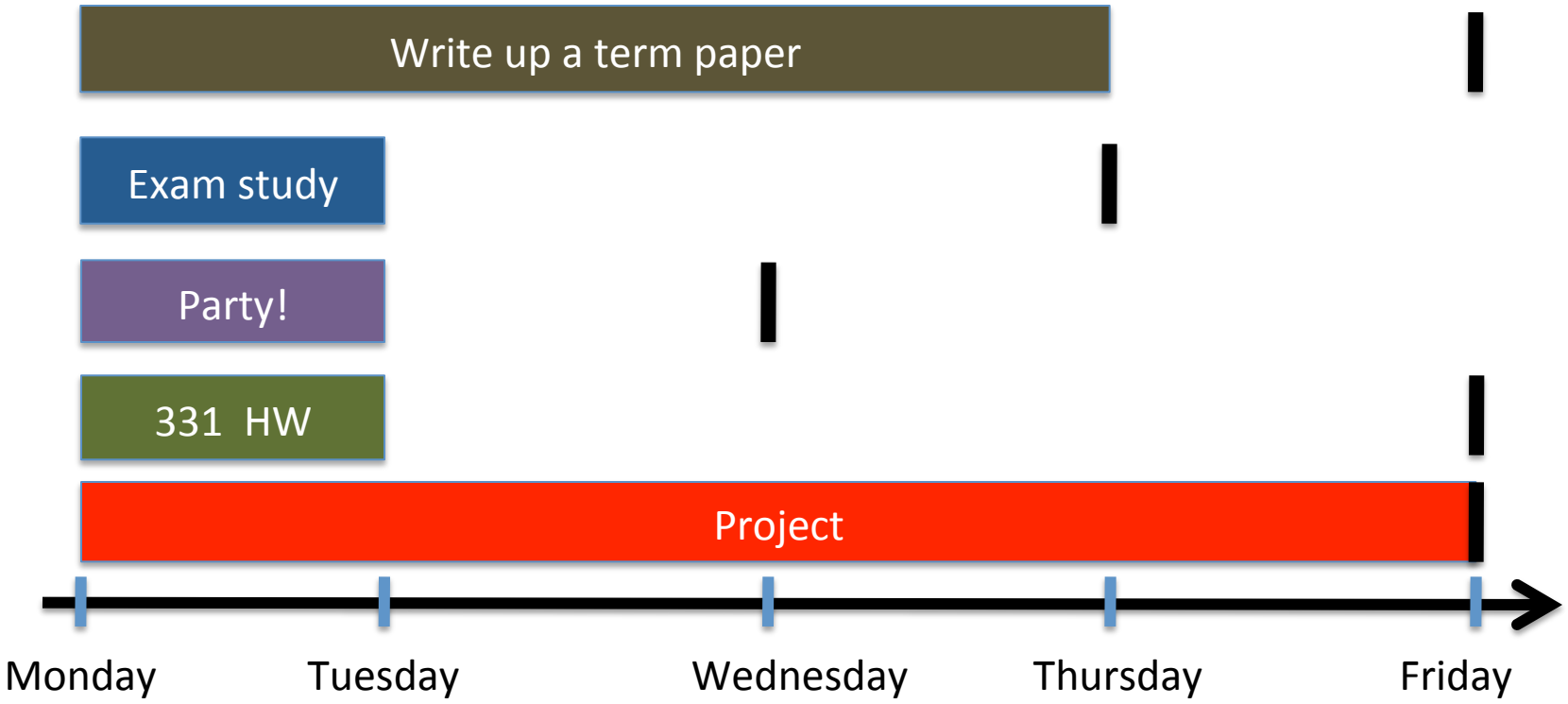
Project

You have to do ALL the tasks

Monday Tuesday Wednesday Thursday Friday

# 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