Lecture 18

CSE 331

Oct 9, 2017

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

Lecture starts
at 1:15pm

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”

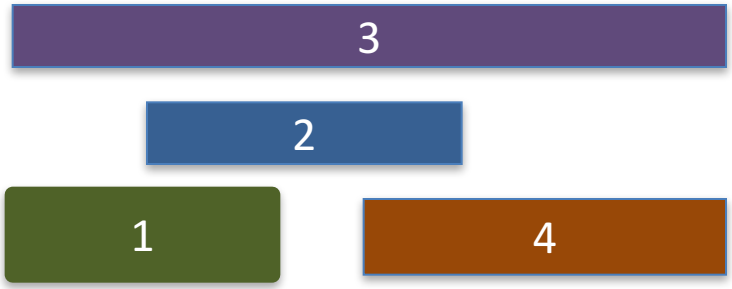
Today's agenda

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

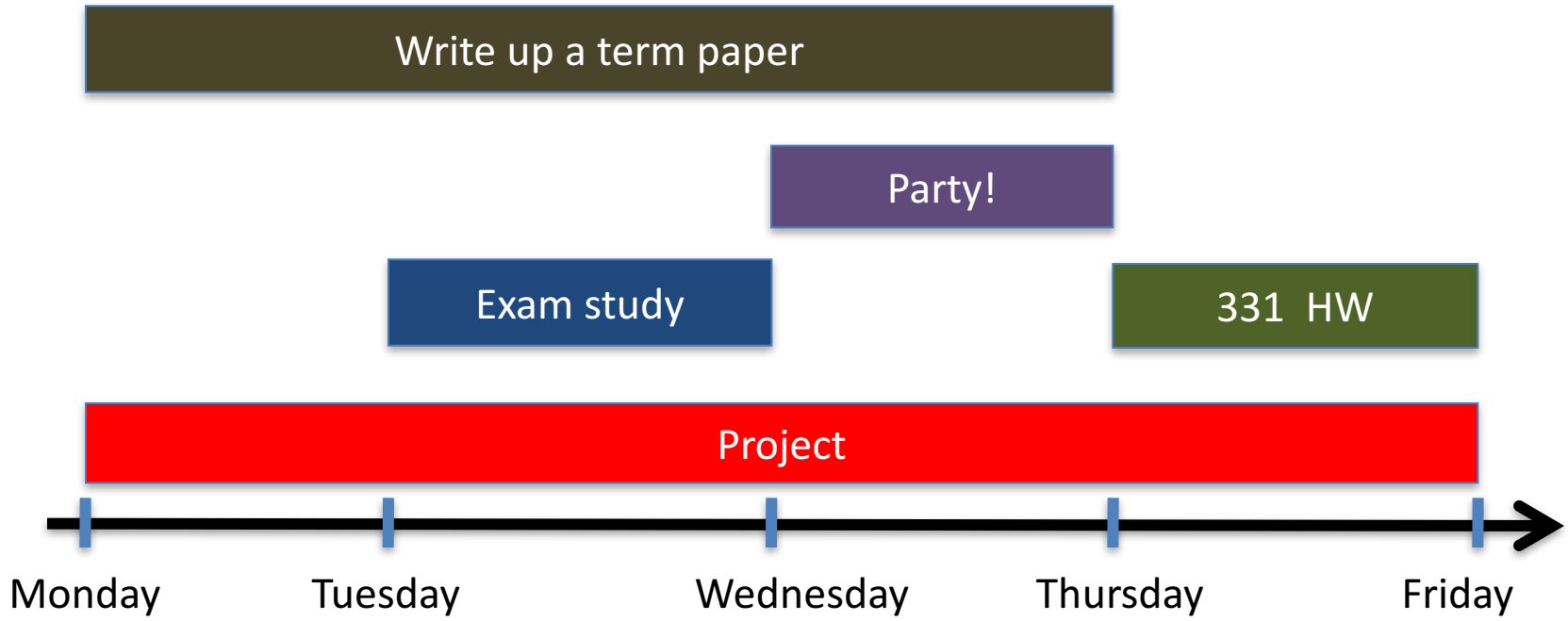
Reading Assignment

Sec 4.1of [KT]

Questions?

The “real” end of Semester blues

There are deadlines and durations of tasks



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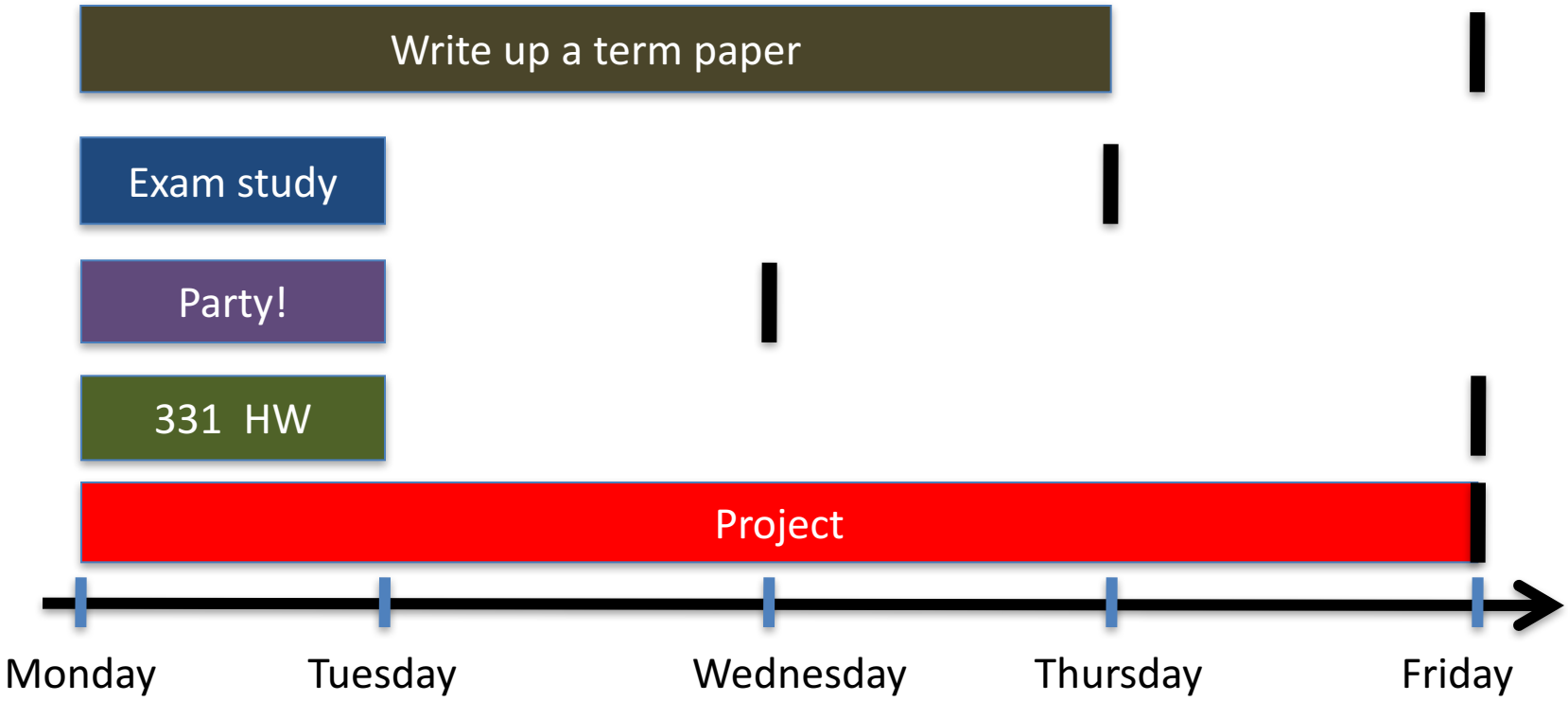


The algorithmic task

YOU decide when to start each task

Write up a term paper

Exam study

Party!

331 HW

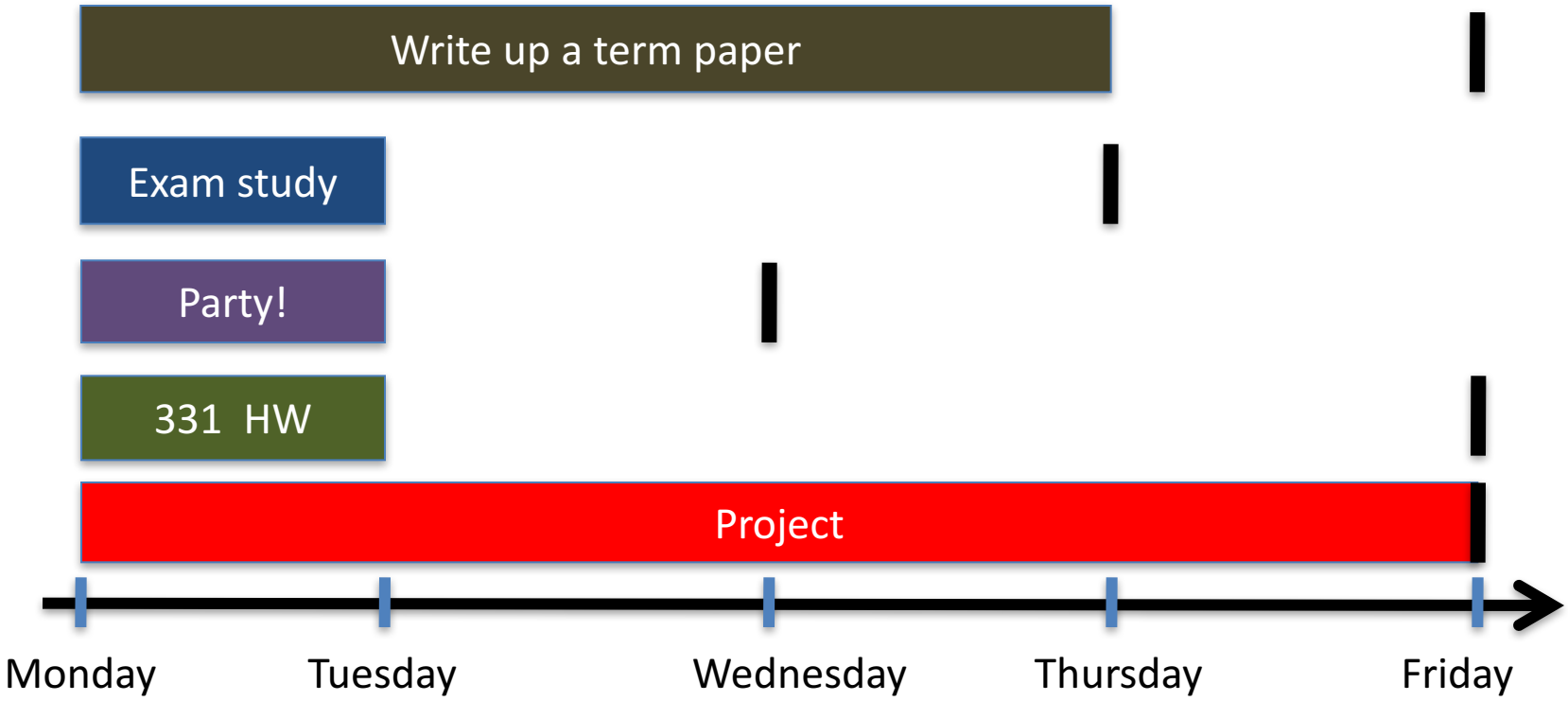
Project

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