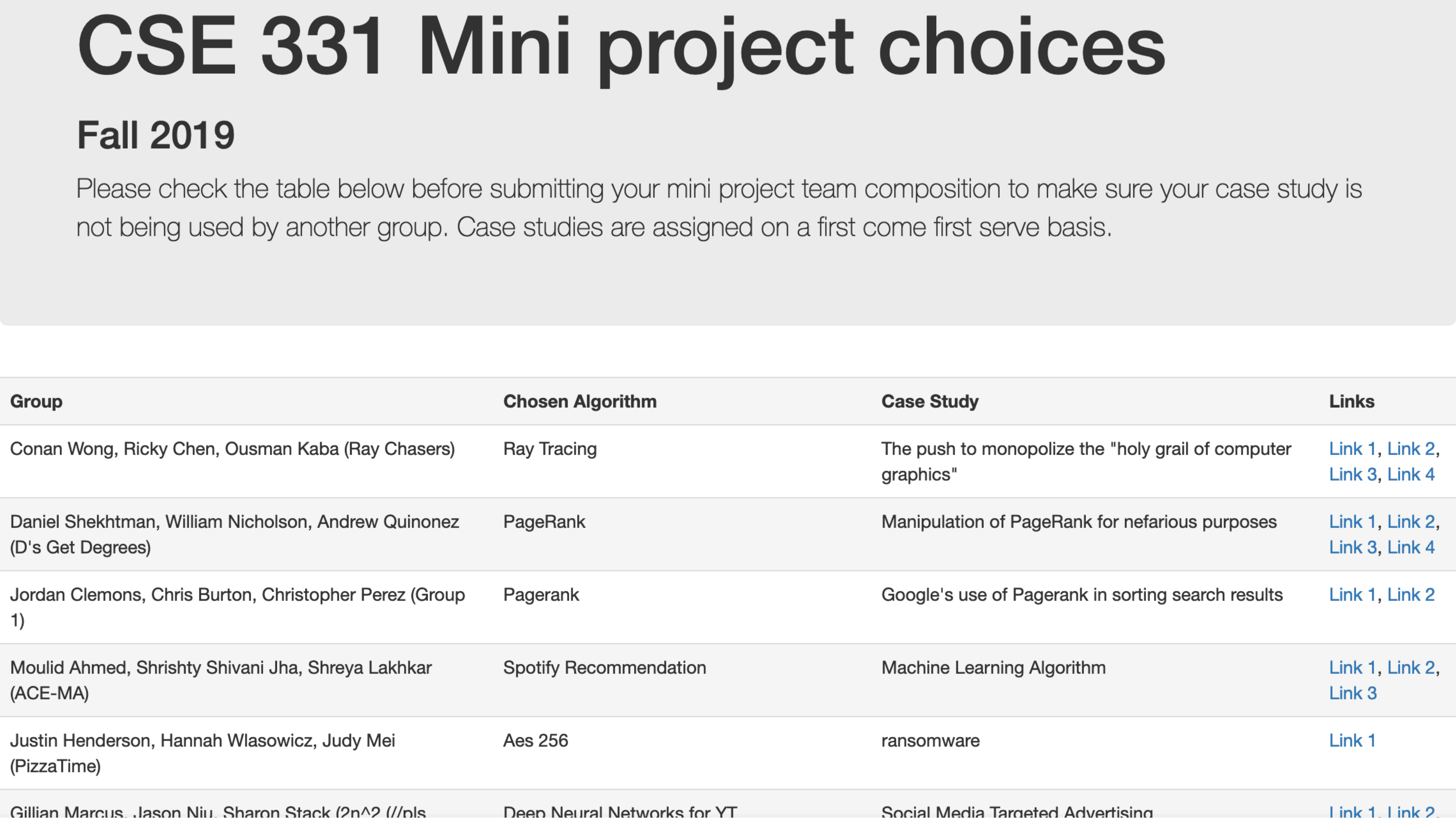
# Lecture 16

CSE 331

Oct 2, 2019

# Video mini projects finalized



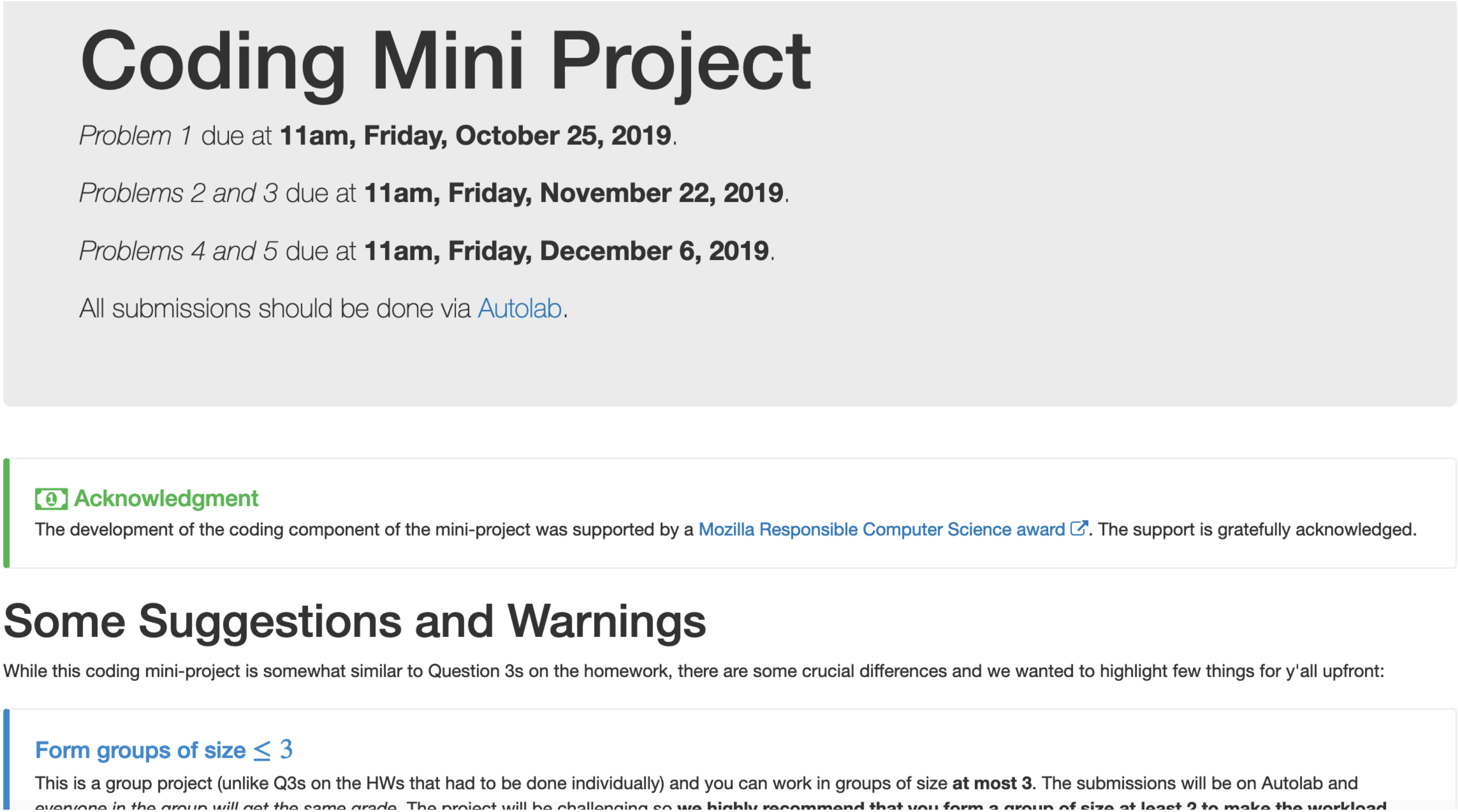
# CSE 331 Mini project choices

## Fall 2019

Please check the table below before submitting your mini project team composition 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 | Chosen Algorithm | Case Study | Links |
|---|---|---|---|
| Conan Wong, Ricky Chen, Ousman Kaba (Ray Chasers) | Ray Tracing | The push to monopolize the "holy grail of computer graphics" | Link 1, Link 2, Link 3, Link 4 |
| Daniel Shekhtman, William Nicholson, Andrew Quinonez (D's Get Degrees) | PageRank | Manipulation of PageRank for nefarious purposes | Link 1, Link 2, Link 3, Link 4 |
| Jordan Clemons, Chris Burton, Christopher Perez (Group 1) | Pagerank | Google's use of Pagerank in sorting search results | Link 1, Link 2 |
| Moulid Ahmed, Shrishty Shivani Jha, Shreya Lakhkar (ACE-MA) | Spotify Recommendation | Machine Learning Algorithm | Link 1, Link 2, Link 3 |
| Justin Henderson, Hannah Wlasowicz, Judy Mei (PizzaTime) | Aes 256 | ransomware | Link 1 |
| Gillian Marcus, Jason Niu, Sharon Stack (2n^2 (//pls | Deep Neural Networks for YT | Social Media Targeted Advertising | Link 1, Link 2, |

# Coding mini project released



## Coding Mini Project

*Problem 1* due at **11am, Friday, October 25, 2019**.

*Problems 2 and 3* due at **11am, Friday, November 22, 2019**.

*Problems 4 and 5* due at **11am, Friday, December 6, 2019**.

All submissions should be done via Autolab.

### Acknowledgment

The development of the coding component of the mini-project was supported by a Mozilla Responsible Computer Science award. The support is gratefully acknowledged.

## Some Suggestions and Warnings

While this coding mini-project is somewhat similar to Question 3s on the homework, there are some crucial differences and we wanted to highlight few things for y'all upfront:

### Form groups of size $\leq 3$

This is a group project (unlike Q3s on the HWs that had to be done individually) and you can work in groups of size **at most 3**. The submissions will be on Autolab and *everyone in the group will get the same grade*. The project will be challenging so **we highly recommend that you form a group of size at least 2 to make the workload**

# 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”

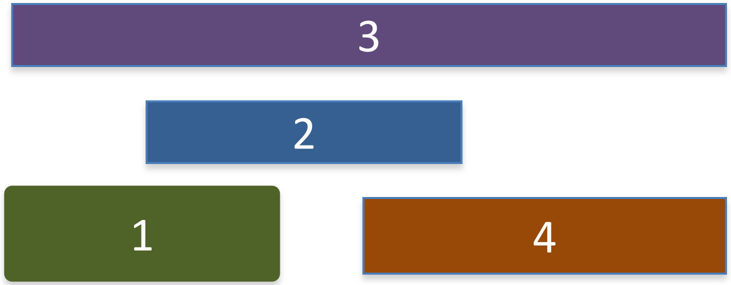
# Today’s agenda

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) ≤ 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 $A^* = A$
```

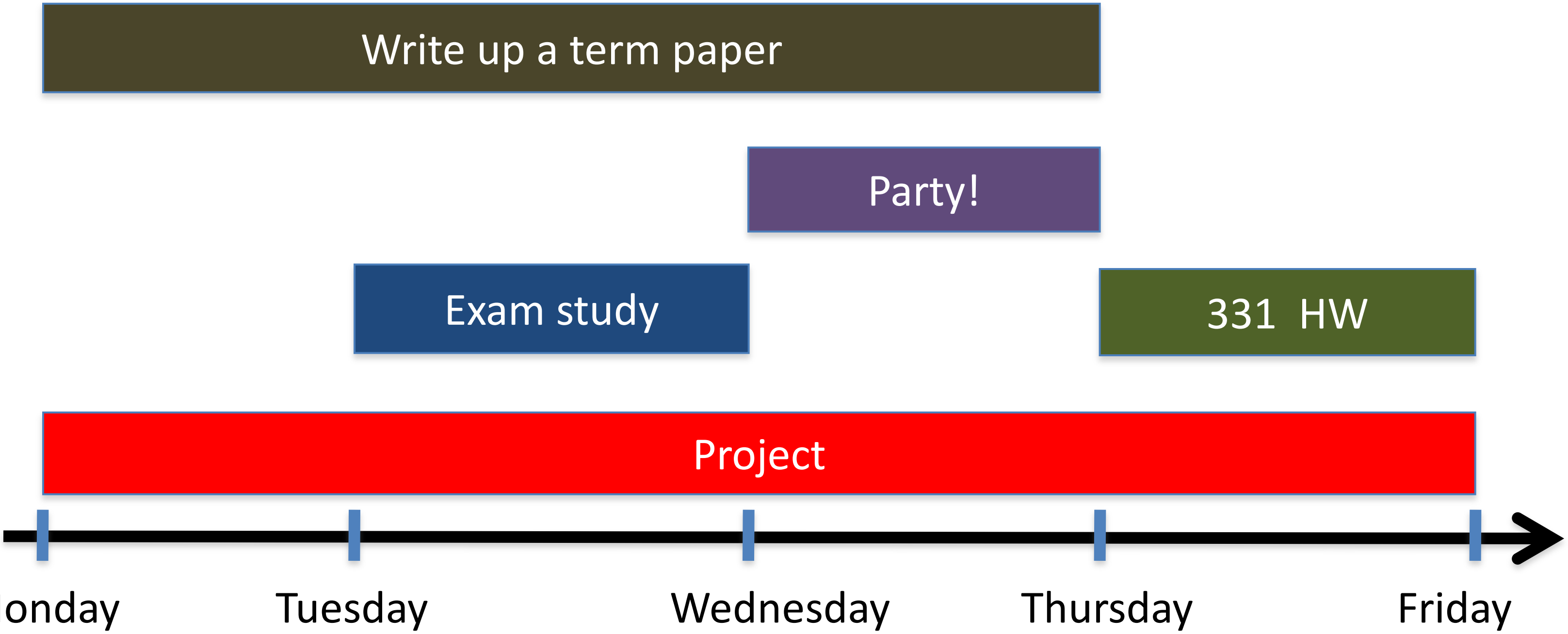
# Reading Assignment

Sec 4.1of [KT]

# Questions?

# The “real” end of Semester blues

There are deadlines and durations of tasks



Write up a term paper

Party!

Exam study

331 HW

Project

Monday

Tuesday

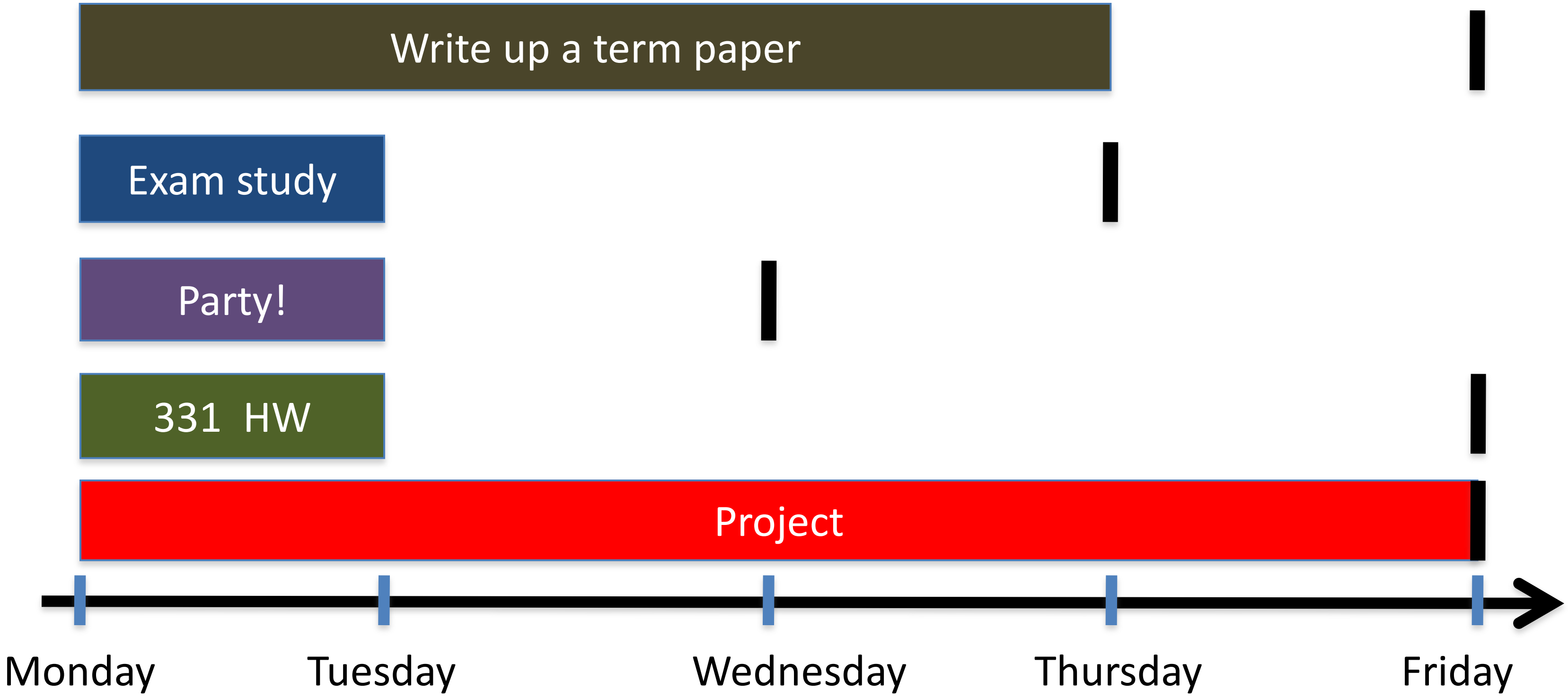
Wednesday

Thursday

Friday

# The “real” end of Semester blues

There are deadlines and durations of tasks



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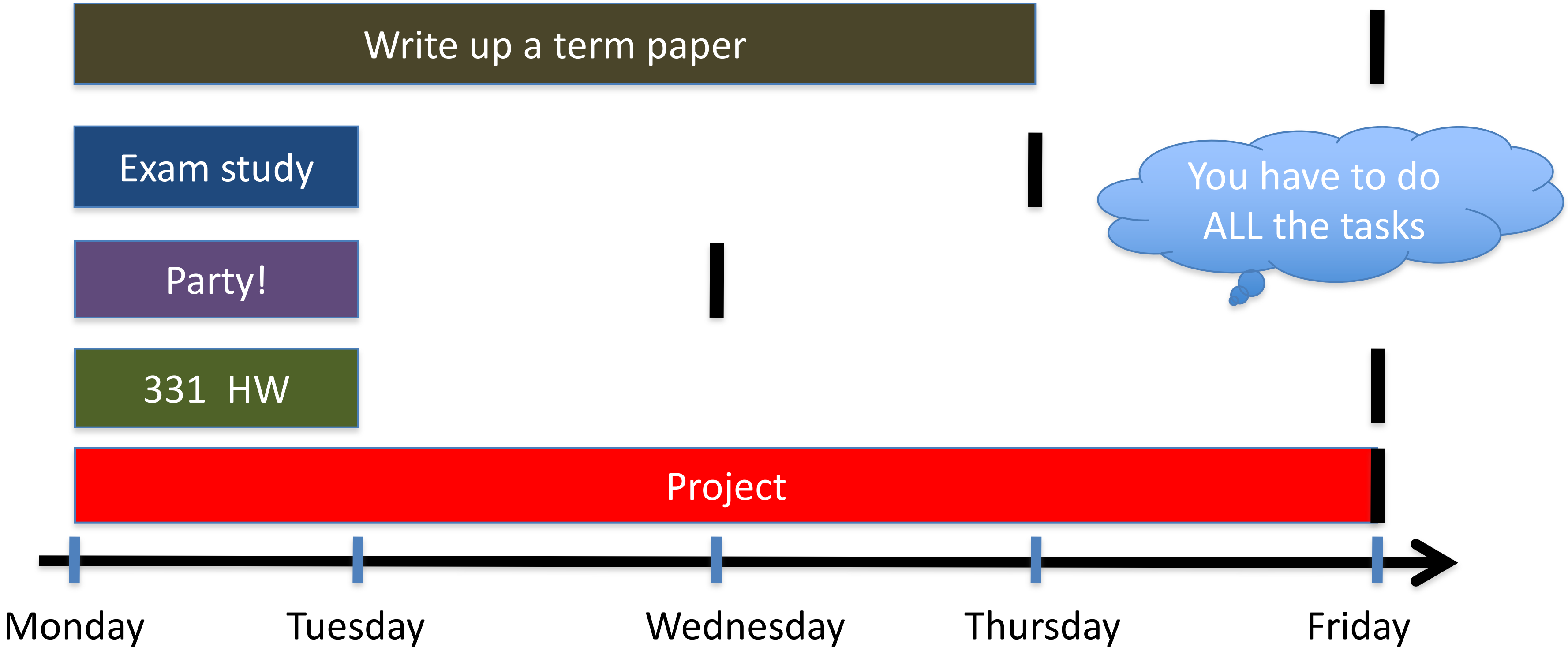
# The algorithmic task

YOU decide when to start each task



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You have to do ALL the tasks

Monday

Tuesday

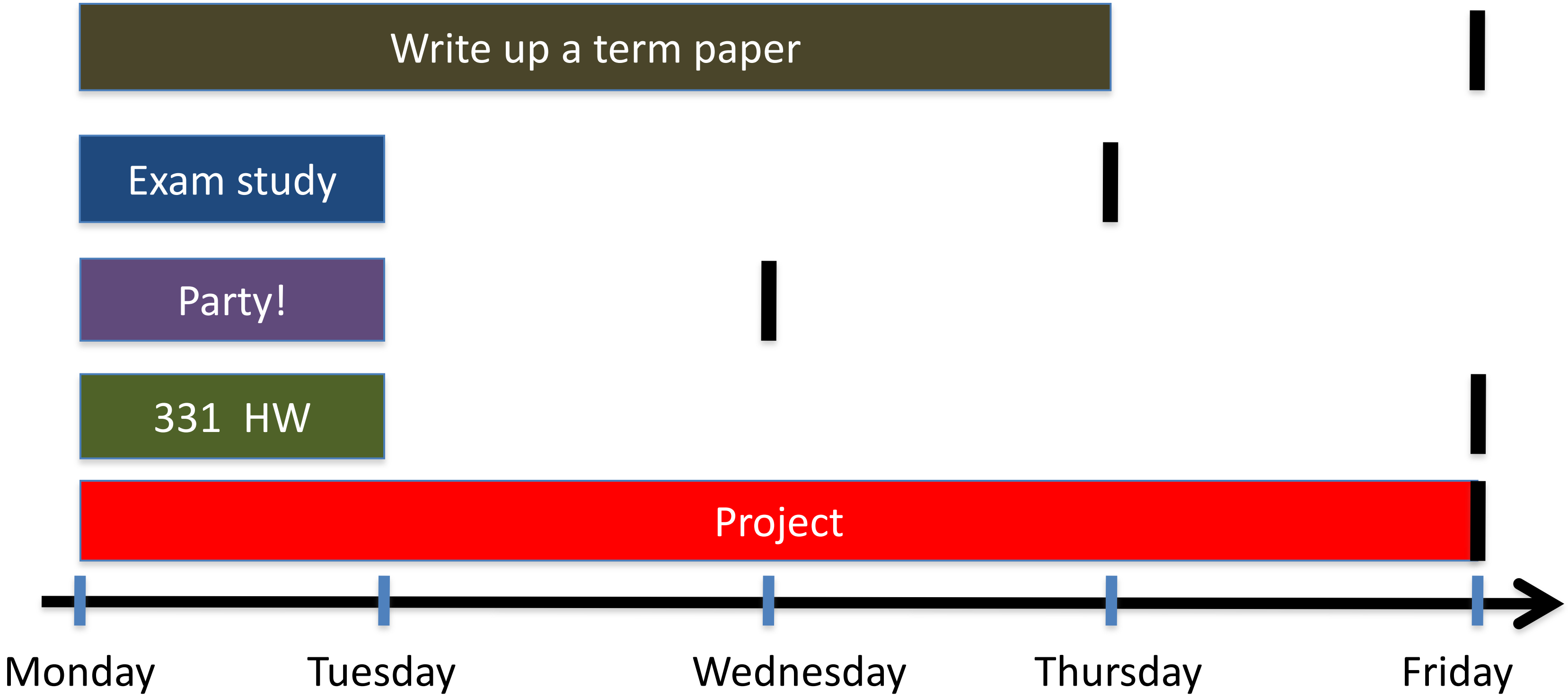
Wednesday

Thursday

Friday

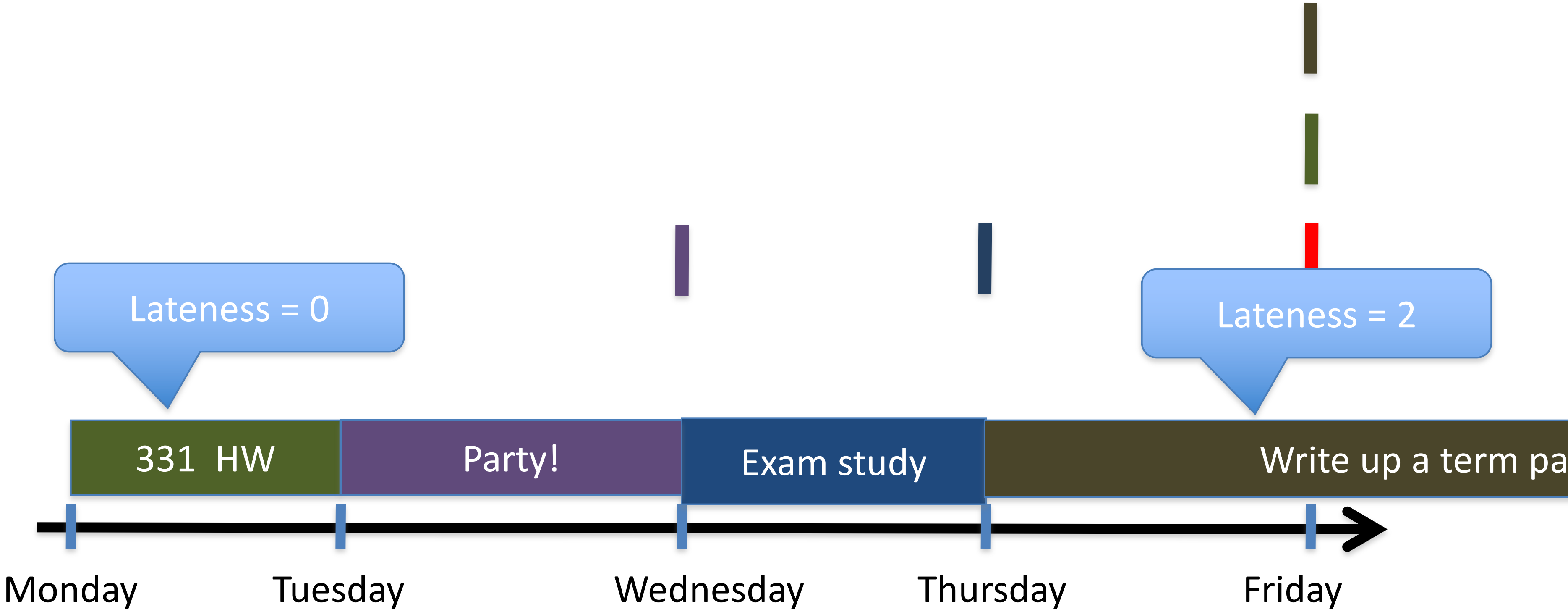
# Scheduling to minimize lateness

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



Lateness = 0

Lateness = 2

331 HW

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Exam study

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