Lecture 20

CSE 331

Oct 18, 2024

Mid-term 1 graded

note @202 stop following 3 views

Actions

Mid-term 1 graded

Thanks to your wonderful TAs powering through, Mid-term 1 has now been graded and the scores and feedback released on Autolab. (There are one of two of you for whom the grading is not yet complete-- this should be done by Friday morning-- will remove this sentence when this is done. Apologies if your submission has not been fully graded yet!)

(**Please see the re-grade policy as well as the grading rubric below before contacting us with questions on grading.**)

Here are the stats (the median is 3 points higher than last fall):

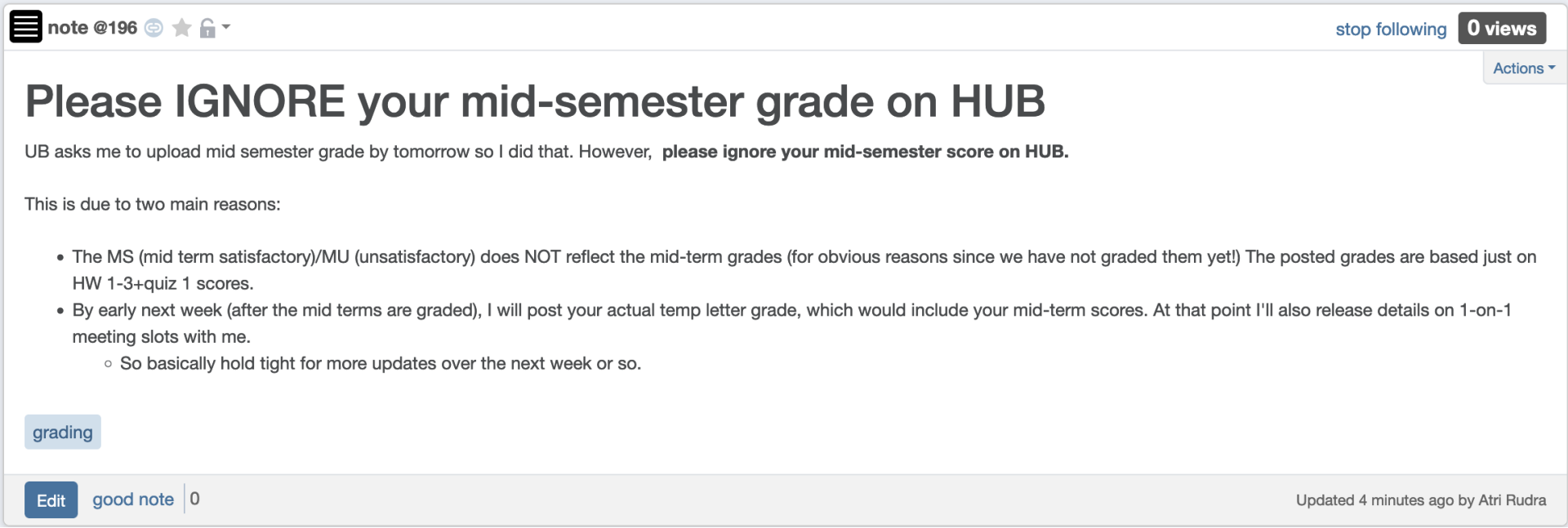
Mid-term 1

Problem	Mean	Median	StdDev	Max	Min
aP1	1.2	2.0	0.9	2.0	0.0
aP2	1.2	1.0	1.2	3.0	0.0
bP1	1.3	2.0	0.9	2.0	0.0
bP2	1.2	1.0	1.1	3.0	0.0

Grading timeline

Mid term 2 grading delayed by a day

Ignore HUB mid-semester grade



Your actual mid-term letter grade

note @195 stop following 1 view

Actions

What's next?

Now that the mid-terms are done, hope y'all take some time to decompress! Some of you might have questions on how you're doing in the course, how you did in the mid-term exams and perhaps some of you think you'd like to come and chat with me.

I just wanted to give y'all some heads up on this:

- Our goal is to be able to finishing grading (both the) mid-terms by Thursday (or so).
  - Your TAs also have mid-terms so we appreciate your patience as they grade your mid-terms!
  - Once that is done, as with the HWs, I'll release the stats as well as the grading rubric. The usual re-grade policy will apply.
- Once the mid-terms are graded I'll assign temporary letter grades to y'all (based on your scores of HWs1-3, Quiz 1 and mid-terms) just so that y'all get a sense of where you stand in the course currently.
  - I'll put up a piazza post with the details once the temp. letter grades have been assigned.
    - But as a heads up, the temporary letter grades will be curved (except for A) but since only 3 HWs have been graded, I will not be dropping the two lowest Q1/Q2/Q3 scores (as I will with the letter grade at the end of the semester). Again, more details forthcoming over the next week.
  - Note that this will *not* be the same as the mid-semester grade that I submitted to HUB @196.
- Those who have a D or below in their temporary letter grade, I'll send email asking you to setup a one-on-one meeting (<=10 mins).
  - Even if you have a better grade than D but want to chat about your performance, you can also sign up (but those with D or below will get preference for a slot)
  - I'll put up a piazza post with details once I finalize the meeting slots.

mid-term grading

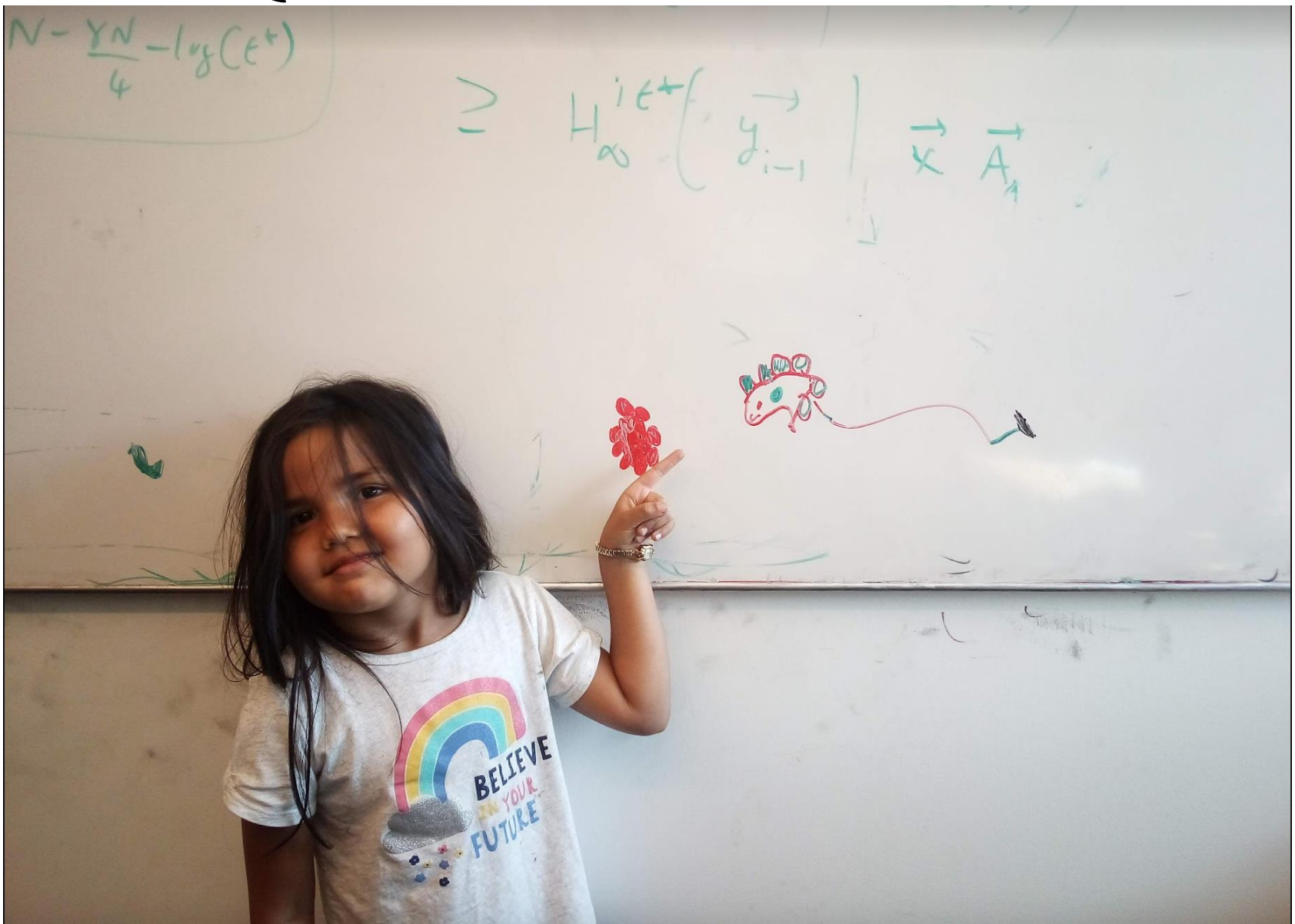
Edit good note 0

Updated 1 minute ago by Atri Rudra

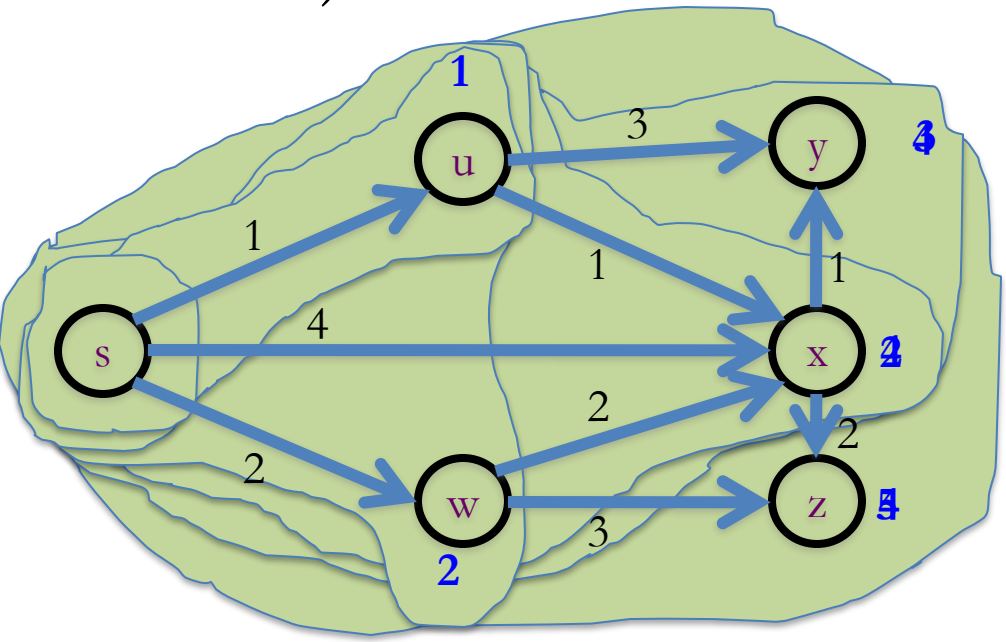
Project deadlines coming up

Tue, Oct 15		**(HW 4 out)**
Wed, Oct 16	Dijkstra's algorithm F24 F23 F22 F21 F19 x²	[KT, Sec 4.4] Week 8 recitation notes
Fri, Oct 18	Correctness of Dijkstra's Algorithm F23 F22 F21 F19 F18 F17 x²	[KT, Sec 4.4] *Reading Assignment:* [KT, Sec 4.4]
Mon, Oct 21	Minimum Spanning Tree F23 F22 F21 F19 F18 F17 x²	[KT, Sec 4.5]
Tue, Oct 22		**(HW 4 in, HW 5 out)**
Wed, Oct 23	Cut Property Lemma F23 F22 F21 F19 F18 F17 x²	[KT, Sec 4.5] *Reading Assignment:* [KT, Sec 4.5, 4.6]
Fri, Oct 25	Mergesort F23 F22 F21 F19 F18 F17 x²	[KT, Sec 5.1]
Mon, Oct 28	Solving recurrence relations F23 F22 F21 F19 F18 F17 x²	[KT, Sec 5.1]
Tue, Oct 29		**(HW 5 in)**
Wed, Oct 30	Counting Inversions F23 F22 F21 F19 F18 F17 x²	[KT, Sec 5.3]
Fri, Nov 1	Multiplying large integers F23 F22 F21 F19 F18 F17 x²	[KT, Sec 5.5] **(Project (Problems 1 & 2 `Coding`) in)** *Reading Assignment:* Unraveling the mystery behind the identity
Mon, Nov 4	Closest Pair of Points F23 F22 F21 F19 F18 F17 x²	[KT, Sec 5.4] **(Project (Problems 1 & 2 `Reflection`) in)**

Questions/Comments?



Dijkstra's shortest path algorithm



$d'(w) = \min_{e=(u,w) \text{ in } E,\ u \text{ in } R} d(u) + \ell_e$

d(s) = 0 d(u) = 1

d(w) = 2 d(x) = 2

d(y) = 3 d(z) = 4

Input: Directed G=(V,E), $\ell_e \geq 0$, s in V

R = {s}, d(s) =0

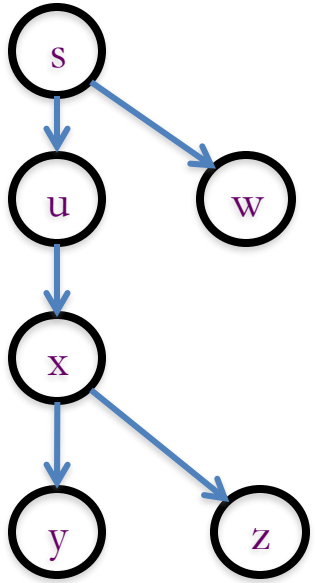
While there is a x not in R with (u,x) in E, u in R

Pick w that minimizes d'(w)

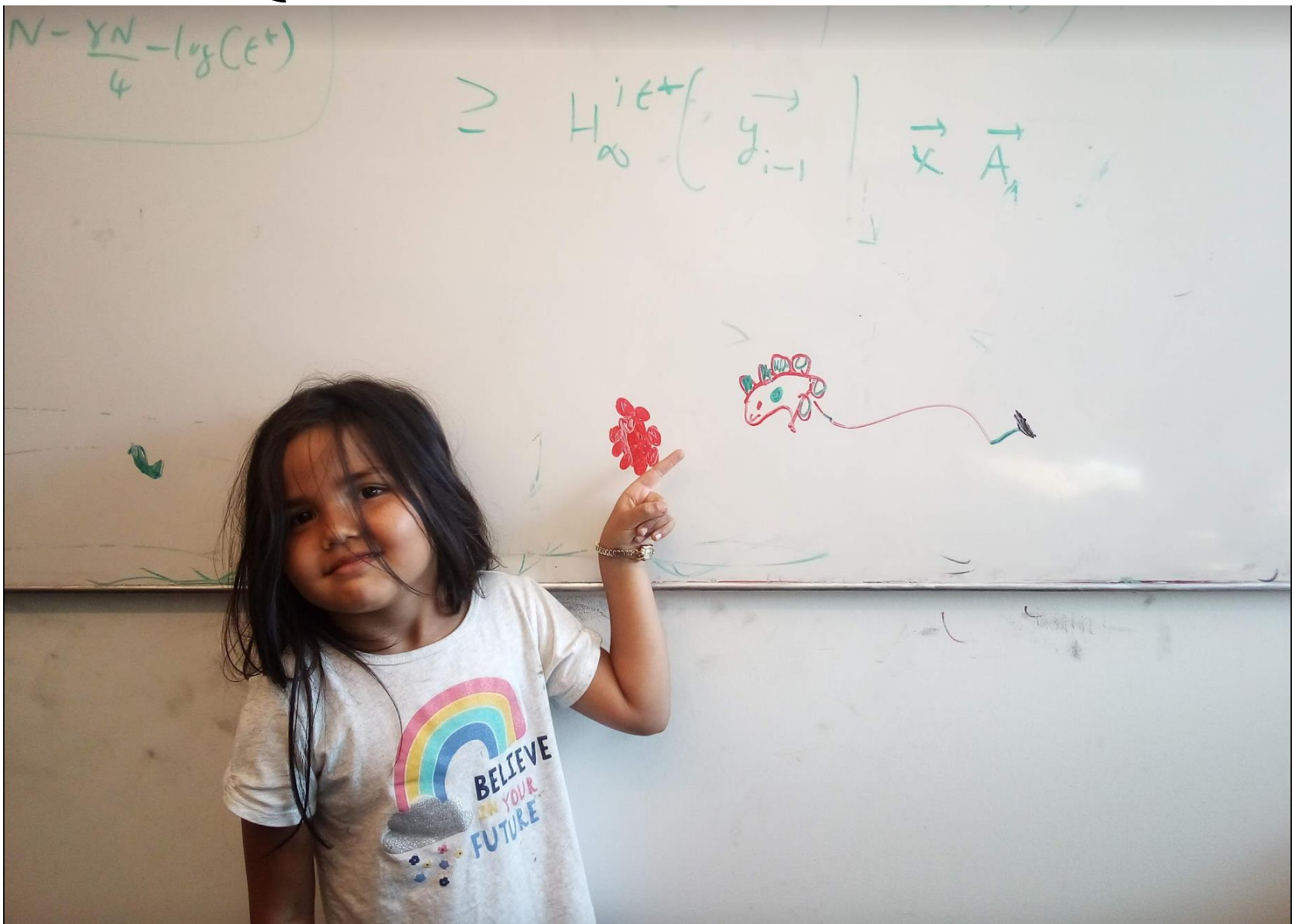
Add w to R

d(w) = d'(w)

Shortest paths



Questions/Comments?



Couple of remarks

The Dijkstra's algo does not explicitly compute the shortest paths

Can maintain "shortest path tree" separately

Dijkstra's algorithm does not work with negative weights

Left as an exercise

Rest of Today's agenda

Prove the correctness of Dijkstra's Algorithm

Dijkstra's shortest path algorithm

P_u shortest s-u path in "Dijkstra tree"

$d'(w) = \min_{e=(u,w) \text{ in } E,\ u \text{ in } R} d(u)+\ell_e$

Input: Directed $G=(V,E)$, $\ell_e \geq 0$, s in V

$R = \{s\}$, $d(s) = 0$

While there is a x not in R with (u,x) in E, u in R

Pick w that minimizes d'(w)
Add w to R
d(w) = d'(w)

Lemma 1: At end of each iteration, if u in R, then P_u is a shortest s-u path

Lemma 2: If u is connected to s, then u in R at the end

Proof idea of Lemma 1

Dijkstra's shortest path algorithm

$d'(w) = \min_{e=(u,w) \text{ in } E,\ u \text{ in } R} d(u)+\ell_e$

Input: Directed $G=(V,E)$, $\ell_e \geq 0$, s in V

$R = \{s\}$, $d(s) = 0$

While there is a x not in R with (u,x) in E, u in R

Pick w that minimizes $d'(w)$
Add w to R
$d(w) = d'(w)$

At most n iterations

$\Sigma_{x \in V} O(\ln_x+1)$
$=O(m+n)$ time

$O((m+n)n)$ time bound is trivial

$O((m+n) \log n)$ time implementation with priority Q

Reading Assignment

Sec 4.4 of [KT]