Lecture 19

CSE 331

Mar 15, 2021

Mid-terms this week

note @630 stop following 44 views Actions

Midterms: Rules that you should follow

The midterms are this week on **Wed, Mar 17** and **Fri, March** 19. Please see @530 about the content and how you should prepare.

Based on our experience with quiz 1 last week, we decided to make some changes. **You must follow the rules below religiously.** Otherwise you'll risk losing some points. All the rules below are for BOTH days (Wed and Fri). **ALL YOU NEED IS HERE, DON'T LOOK AT QUIZ 1 POST FROM LAST WEEK.**

I also give some extra information below in *italic fonts* to inform you about the common mistakes you did last week and also to make sure you correctly understood everything (some students I interacted last week somehow got a very different understanding).

First, the rules about start/ finish times, cheat-sheet, and what you need to do before the exam:

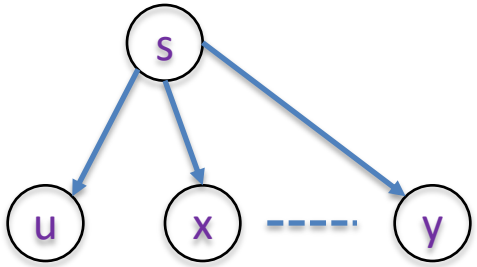
- **The midterms will start at 2:45 pm (NOT 3:00pm!) and end at 4:00pm**. This means **you must be online at your Zoom link at 2:45pm**. You'll be emailed the Zoom links tomorrow.
- **Proctors will lock the Zoom rooms at 2:50pm** which means you WON'T be able to join the exam after 2:50.
  - *This is important for us because many proctors (including myself!) had trouble with the late joiners; we have to check certain things with each participant so you have to join on time!*
- Once you join the Zoom room, the proctor will verify certain things for each participant.
  - You must show your UB id to the proctor. If you don't have it (!), you must show your driver's license or passport (your photo must be there!)
  - You must ensure that the BOTH cameras are located correctly, see below for this.
- **The midterm will be posted on Piazza at 2:58pm (NO EMAIL WILL BE SENT).** It'll be a link to a pdf in UB Box.
  - This will ensure that everyone will have access at the same time.
  - After you click the link, you MUST close the Piazza tab in your browser.
- **The exam duration is 62 minutes: starting at 2:58, ending at 4:00. THIS INCLUDES THE UPLOADING TIME!**
  - *If this was an in-person exam, you would be given just 45 minutes. Thus, you are given EXTRA 17 minutes for uploading.*
- **The deadline at Autolab will be set as 4:00pm sharp. I guarantee that NO LATE SUBMISSION IS POSSIBLE.**
  - *This includes the personal emails you sent with an attached pdf. I'm NOT going to accept any such email after 4:00pm. I'm also NOT going to accept any such email before 4:00pm, it's your responsibility to upload this to Autolab.*
- This is a closed-book, closed-notes, closed-internet exam. **You can use one letter-sized cheat-sheet during the midterm (you can use both sides).**
  - *You can use the same or different cheat sheets on Wed and Fri.*

Dijkstra's shortest path algorithm

Towards Dijkstra's algo: part 1

Determine d(t) one by one

d(s) = 0

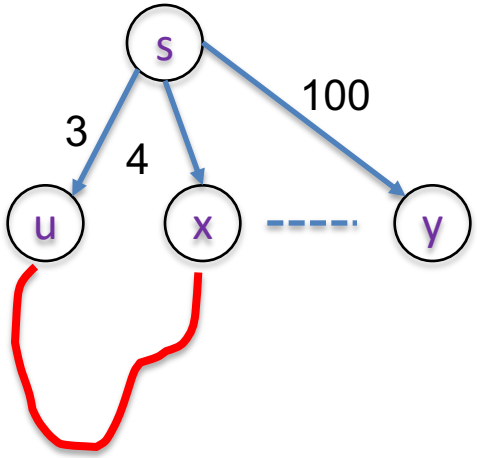


Towards Dijkstra's algo: part 2

Determine d(t) one by one

Let u be a neighbor of s with smallest $l_{(s,u)}$

$$d(u) = l_{(s,u)}$$



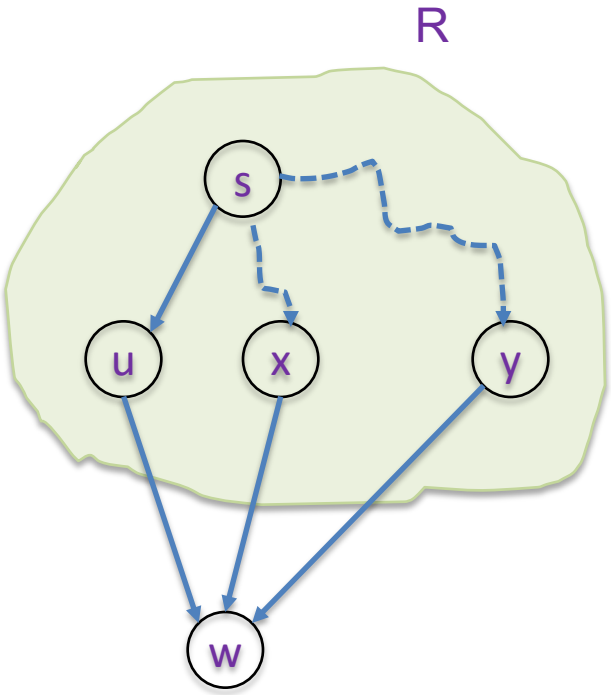
Length of ~ is ≥ 0

Not making any claim on other vertices

Towards Dijkstra's algo: part 3

Determine d(t) one by one

Assume we know d(v) for every v in R



Compute an upper bound d'(w) for every w not in R

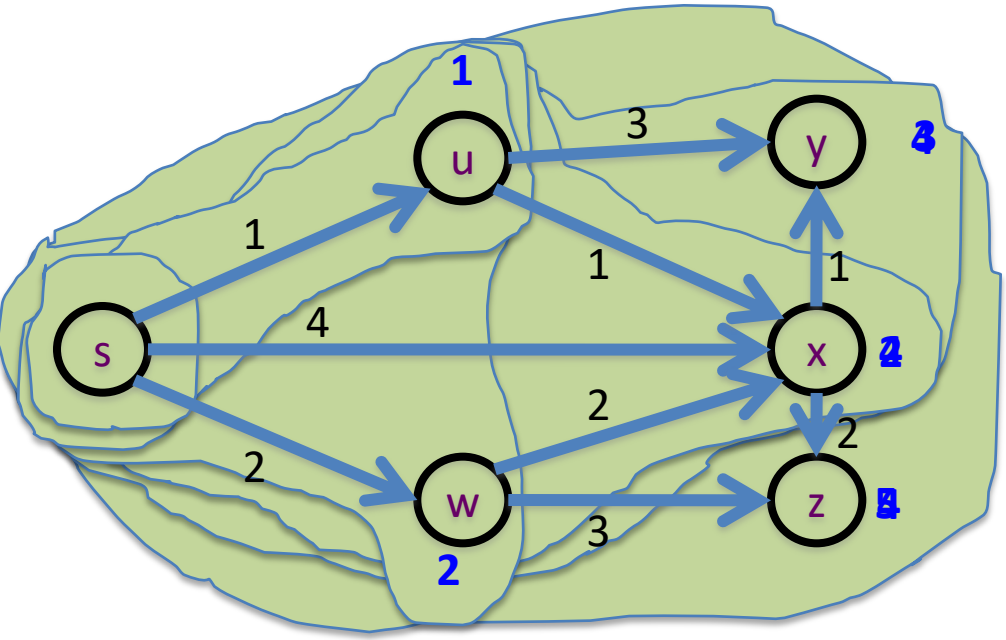
$d(w) \leq d(u) + l_{(u,w)}$

$d(w) \leq d(x) + l_{(x,w)}$

$d(w) \leq d(y) + l_{(y,w)}$

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

Dijkstra's shortest path algorithm



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

d(s) = 0

d(u) = 1

d(w) = 2

d(x) = 2

d(y) = 3

d(z) = 4

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

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

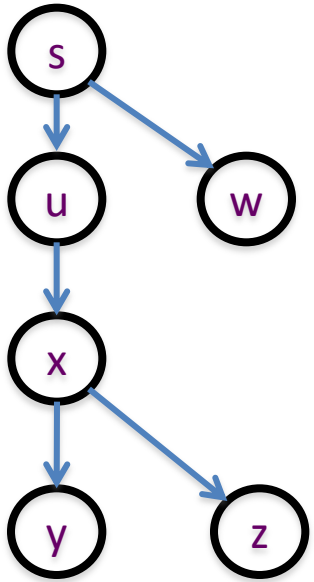
While there is a (u,x) in E s.t. u in R and x not in R

Pick w among all x with smallest d'(w) value

Add w to R

d(w) = d'(w)

Shortest paths



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

Runtime analysis of Dijkstra's Algorithm