

Lecture 25

CSE 331

Oct 31, 2018

Happy Halloween!



Peer Evaluation survey

The image shows a screenshot of a Canvas LMS announcement. At the top left, there is a hamburger menu icon, the word "note", and a star icon. At the top right, there are two buttons: "stop following" and "83 views". The main heading of the announcement is "Peer evaluation for mini project (please test it out!)". Below the heading, the text reads: "Peer evaluation for mini project is now live on Autolab. See the [mini project details page](#) ("Survey" section) for more background on this." There are two paragraphs of text below this. The first paragraph says: "We are doing this for the first time... bit. So we would really appreciate if you could submit the video and code... bugs etc." The second paragraph says: "Some important remarks:" followed by a bulleted list of instructions. A large red callout box with a white border and a downward-pointing tail is overlaid on the middle of the announcement, containing the text: "If your group size is not 3 you MUST test it out by FRIDAY".

note ☆ stop following 83 views

Peer evaluation for mini project (please test it out!)

Peer evaluation for mini project is now live on Autolab. See the [mini project details page](#) ("Survey" section) for more background on this.

We are doing this for the first time... bit. So we would really appreciate if you could submit the video and code... bugs etc.

Some important remarks:

- There is some checking being done on... regarding your input (specifically the UBIT IDs of your group mates) but you will not see any of those when you fill in the... which is static.
 - **Please be sure to check the feedback** (by clicking on numbers like you usually do for Q1) to see if there are any issues.
- **If one of your group-mates have dropped, please test out the system by FRIDAY and let me know if you still have a member showing up in the feedback who should not be there.** The start of the feedback will list the UBIT IDs of your group mates.
 - I went through my email and dropped students from groups who had emailed me to say they were dropping out but I'm pretty sure I do not have the latest information.
- **You will need to know the exact UBIT IDs of your group-mates to fill in the form.**
 - If you mis-spell it or add the @buffalo.edu at the end of the UBIT ID, then there were error messages in the feedback.
- **The scores that you see are NOT your final scores.**

Mini project video due MONDAY

note ☆ 147 views

Actions ▾

You can submit mini project video now

You can now submit your mini project videos now. It is due in a bit over 2 weeks: by 11:59pm on Mon, Nov 5.

The [mini-project page](#) has all the details on what is needed in the submission.

Some important points:

- Please make sure you read through the instructions/requirements carefully.
 - Till last year there used to be an intermediate report stage where I could give some preliminary feedback so that y'all could avoid some of the common mistakes in the video. Y'all do not have the luxury, so please make sure you read through the page very very carefully.
- This is a **group submission**. Please see the instructions at the end of this post.
 - Main thing: do **NOT** submit your report till your group is formed.
- **Check on your group.** We are getting close to the resign date. Unfortunately, some students will drop-- so make sure you check with your group mates to see if they'll be around.
 - If your group-mate(s) drop out, then it is OK for you to continue with a smaller group.
 - Even a group of size 1 is OK if you're fine with it. But if not AND if you give me enough notice, I can try and re-assign you to another group.

There are still free slots

note ☆

stop following

130 views

Actions ▾

Meetings to discuss CSE 331 performance

I will email those who have a D or below in their mid-term grade (for more details on the grade see @736). Of course you can also come and talk about your 331 performance even if you have a temp grade higher than D (though students with a D or below will get preference).

I have locked out certain times over next week or so for 10 mins meetings. Please note that **these are NOT walk-ins**: if no one signs up for a slot, I might not be in my office then. If you want to come and talk with me, **please EMAIL me with ALL the slots below that work for you**. (Private posts on piazza will not work: please email me!) Slots will be assigned on a first-come-first-serve basis.

Below are all the available slots (below the start times are listed: a slot that is already taken has a strike-through):

- **Tuesday (Oct 30)**: 11:50am, 12:00pm, 12:10pm, 12:20pm, 12:30pm, 3pm
- **Wednesday (Oct 31)**: 11:10am, 11:20am, 11:30am, 11:40am, 11:50am, 12:00pm, 12:10pm, 12:20pm, 12:30pm
- **Thursday (Nov 1)**: 11am, 11:10am, 11:20am, 11:30am, 11:40am, 11:50am, 1:30pm, 1:40pm, 1:50pm, 2:00pm, 2:10pm, 2:20pm, 2:30pm, 2:40pm, 2:50pm, 3:00pm, 3:10pm, 3:20pm, 3:30pm, 3:40pm, 3:50pm, 4:00pm, 4:10pm, 4:20pm, 4:30pm, 4:40pm
- **Friday (Nov 2)**: 11:10am, 11:20am, 11:30am, 1:40pm, 1:50pm, 4:00pm, 4:10pm, 4:20pm, 4:30pm, 4:40pm
- **Monday (Nov 5)**: 12:00pm, 12:10pm, 12:20pm, 12:30pm, 2:00pm, 2:10pm, 2:20pm, 2:30pm, 2:40pm, 2:50pm, 4:00pm, 4:10pm, 4:20pm, 4:30pm, 4:40pm

You can of course also stop by during my office hours (but students with Qs on the HWs will get higher priority) and you unfortunately cannot book a slot during my usual office hours.

All the meetings will be in my office (Davis 319).

Dijkstra's shortest path algorithm

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

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

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

While there is a x not in R with $(u,x) \text{ in } E$, $u \text{ in } R$

Pick w that minimizes $d'(w)$

Add w to S

$d(w) = d'(w)$

At most n
iterations

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

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

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

Reading Assignment

Sec 4.4 of [KT]



Building a fiber network

Lay down fibers to connect n locations

All n locations should be connected

Laying down a fiber costs money



What is the cheapest way to lay down the fibers?

Today's agenda

Minimum Spanning Tree (MST) Problem

Greedy algorithm(s) for MST problem

Kruskal's Algorithm

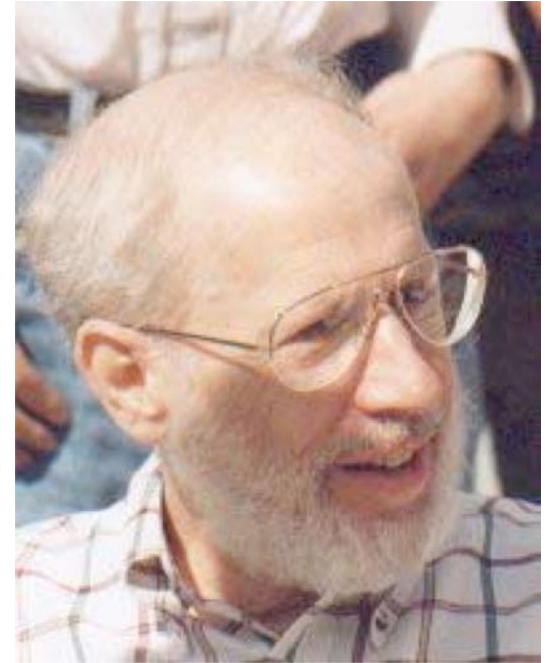
Input: $G=(V,E)$, $c_e > 0$ for every e in E

$T = \emptyset$

Sort edges in increasing order of their cost

Consider edges in sorted order

If an edge can be added to T without adding a cycle then add it to T



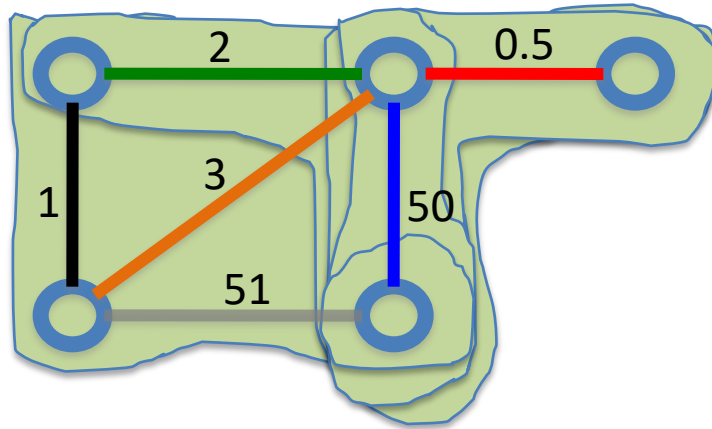
Joseph B. Kruskal

Prim's algorithm



Robert Prim

Similar to Dijkstra's algorithm



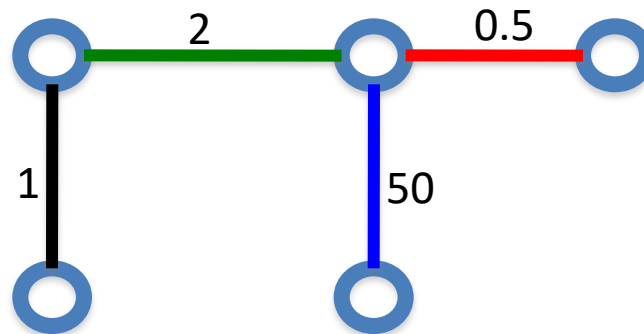
Input: $G=(V,E)$, $c_e > 0$ for every e in E

$S = \{s\}$, $T = \emptyset$

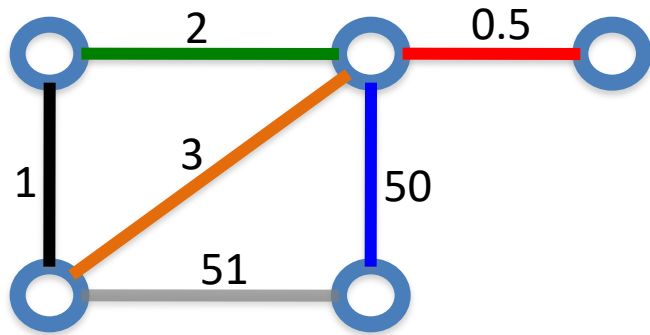
While S is not the same as V

Among edges $e = (u,w)$ with u in S and w not in S , pick one with minimum cost

Add w to S , e to T



Reverse-Delete Algorithm



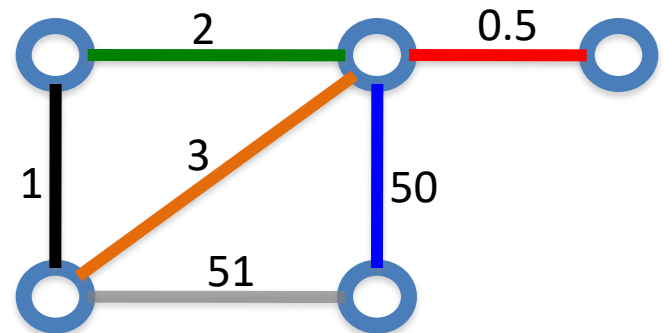
Input: $G=(V,E)$, $c_e > 0$ for every e in E

$T = E$

Sort edges in **decreasing** order of their cost

Consider edges in sorted order

If an edge can be removed T without disconnecting T then remove it

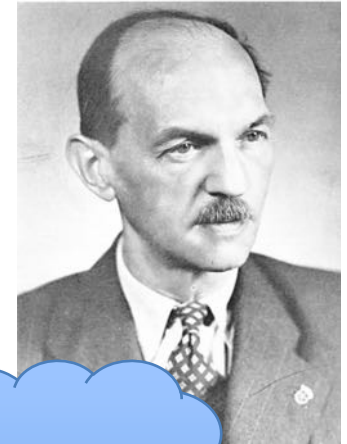


(Old) History of MST algorithms

1920: Otakar Borůvka



1930: Vojtěch Jarník



1956: Kruskal



1957: Prim



1959: Dijkstra