Lecture 23

CSE 331

Oct 26, 2016

Graded pitch

note ☆ stop following 28 views Actions

Mini Project pitches graded

Sorry for the delay. The mini project pitches have now been graded.You can look at your grade and comments on Autolab.

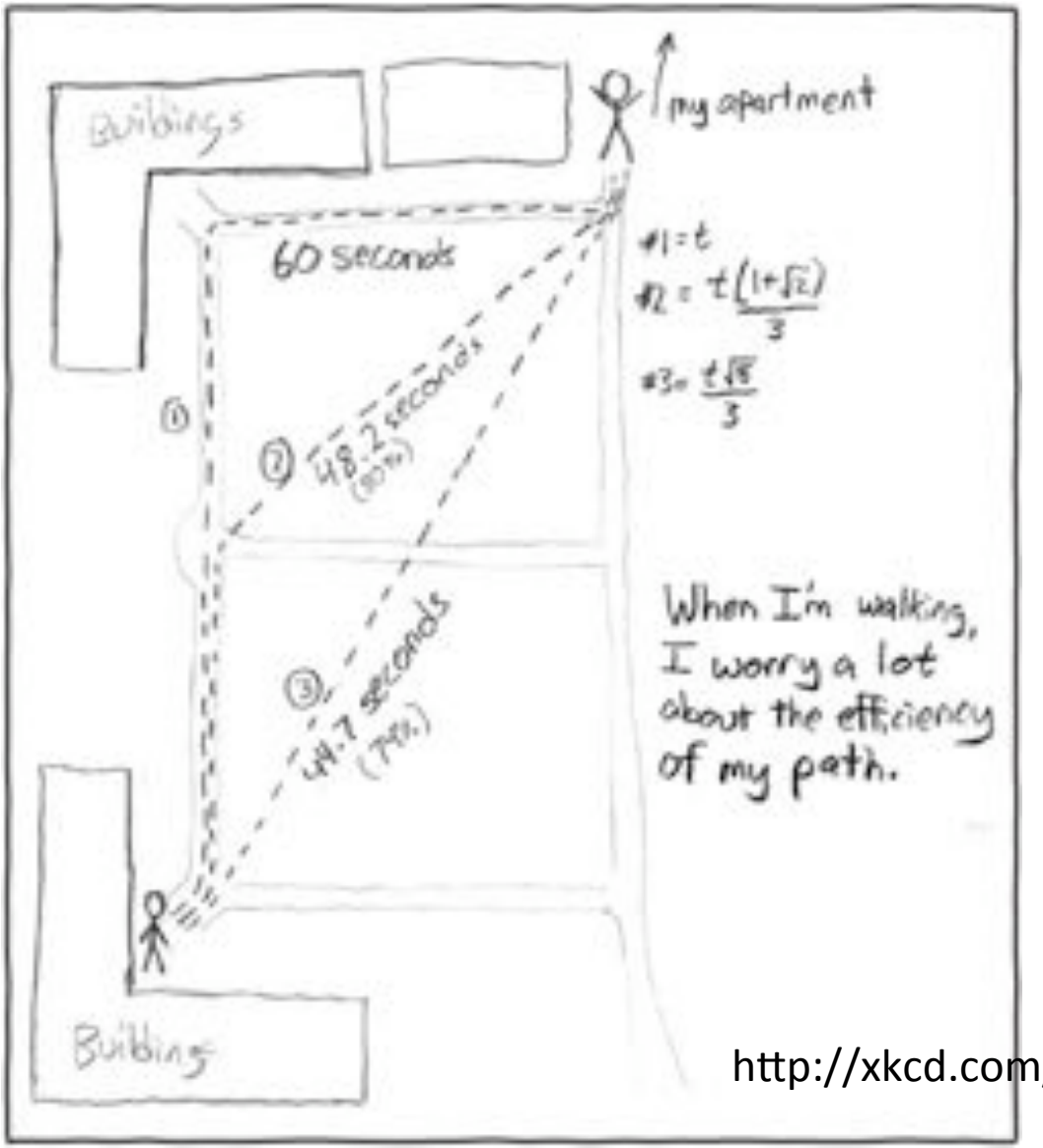
At the end of the post is the grading rubric. Some important points:

- Some of you chose case studies that were already taken. In such a case I have left a note on your pitch asking me to email me alternate case studies (along with their URLs). Please make sure **you email be your alternate cases studied by 5pm on Wed, Oct 26**.
- Autolab just copies submission for the group into individual submissions: I left comments in only one individual submission. If I left them in yours, please share them with your group members.
- I will be posting more details on the video by the end of the week. The deadline for submitting videos is still **11:59pm** on **Mon, Nov 14**. I would recommend that you start thinking about your video now.

Before the grading rubric, here are the stats (out of a possible 100):

- Mean: 80.8
- Median: 85
- Std Dev: 16.9
- Max: 99

Shortest Path Problem



http://xkcd.com/85/

Another more important application

Is BGP a known acronym for you?

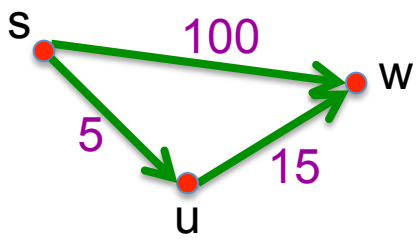
Routing uses shortest path algorithm

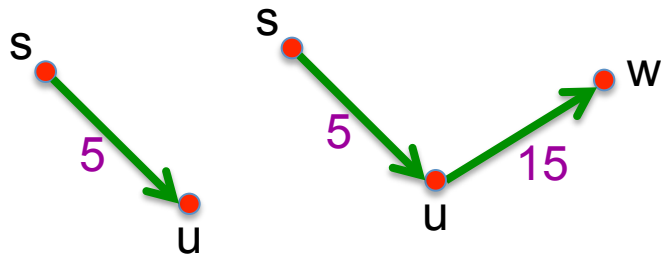
Shortest Path problem

Input: *Directed* graph G=(V,E)

Edge lengths, l_e for e in E

"start" vertex s in V

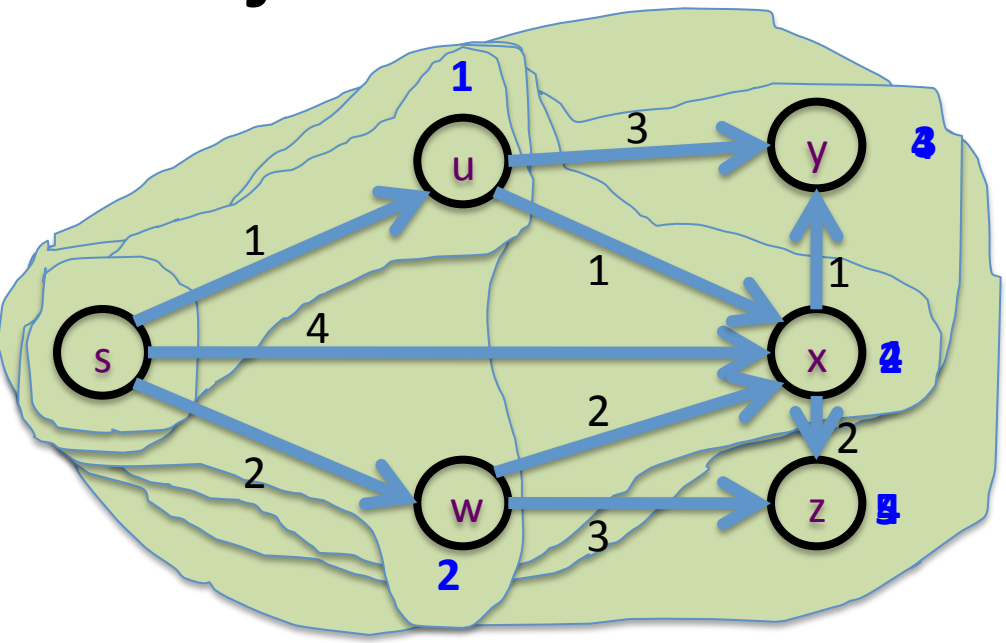




Output: All shortest paths from s to all nodes in V

Dijkstra's shortest path algorithm

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

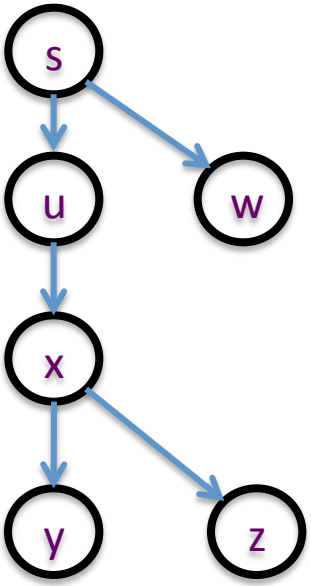
While there is a x not in R with (u,x) in E, u in R

Pick w that minimizes d'(w)

Add w to R

d(w) = d'(w)

Shortest paths



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

Reading Assignment

Sec 4.4 of [KT]