

Lecture 22

CSE 331

Oct 23, 2017

Graded mid-term-1

Grades for mid-term-1 released on Autolab

mid-term 2 in a day or two

Temp letter grades

note ☆ stop following 35 views

Temp grades will be assigned this week

By the end of this week, I hope to assign all of you a temporary letter grade based on your grades on HWs 1-4 and the mid-terms grades. The hope in doing so would be to give you a better sense of where you are with regard to the rest of the class. Also the week after I will have some dedicated one-on-one meeting times in case you want to come and chat with me regarding your 331 performance (with preference given to those with a lower temp grade).

grading mid-term

edit good note | 0

Updated 49 minutes ago by Emily Walker and Adri Rudra

Reading Assignment

Sec 2.5 of [KT]

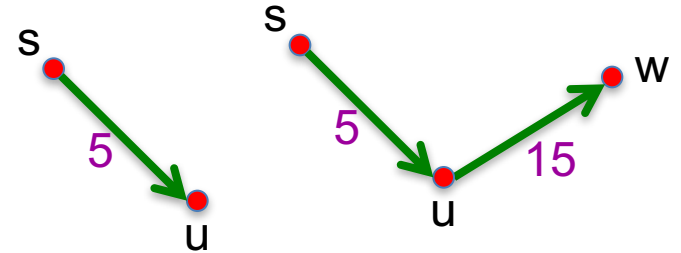
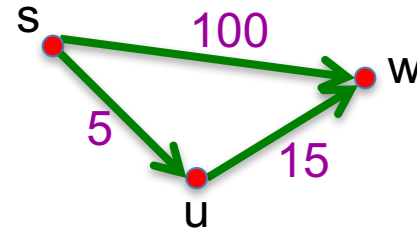


Shortest Path problem

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

Naïve Algorithm

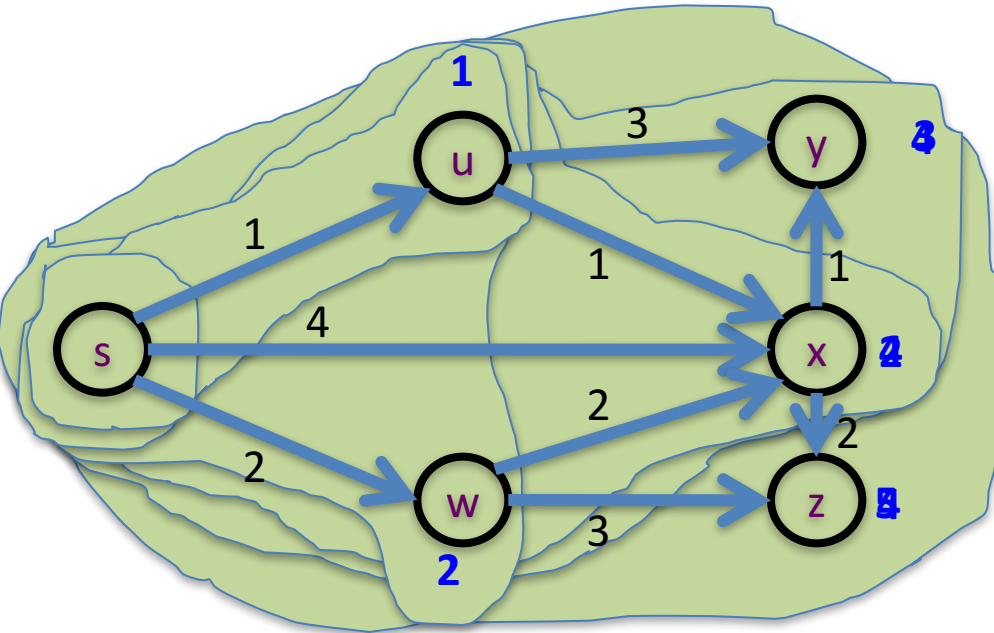
$\Omega(n!)$ time

Dijkstra's shortest path algorithm

E. W. Dijkstra (1930-2002)



Dijkstra's shortest path algorithm



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

$d(s) = 0$ $d(u) = 1$
 $d(w) = 2$ $d(x) = 2$
 $d(y) = 3$ $d(z) = 4$

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

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

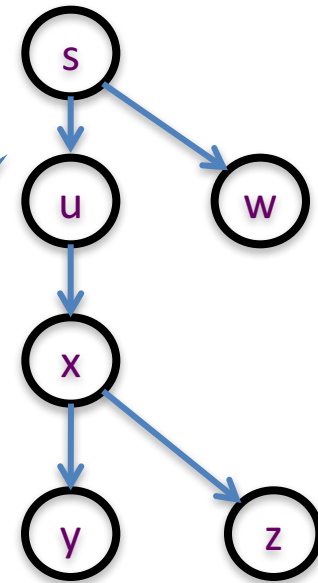
While there is a x not in R with $(u,x) \in E$, $u \in R$

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