Lecture 23

CSE 331

Oct 17, 2014

Exams next week

Mid-term 1: Monday, Oct 20 from 1-1:50pm

Mid-term 2: Wednesday, Oct 22 from 1-1:50pm

Proctors for Mon: Andrew, Frank, Zulkar

Jimmy

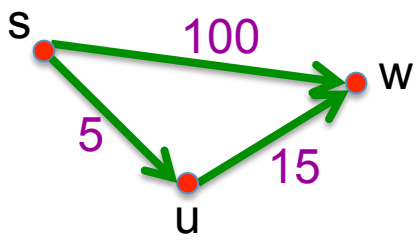
Mahmoud

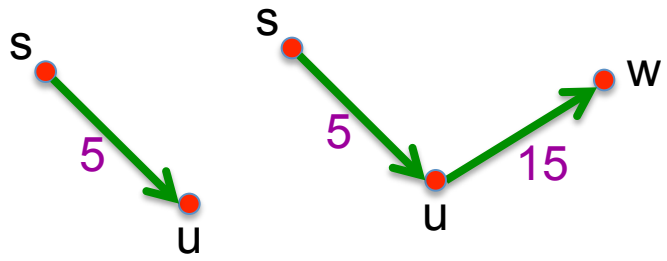
Shortest Path problem

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

Edge lengths, l_e for e in E

"start" vertex s in V

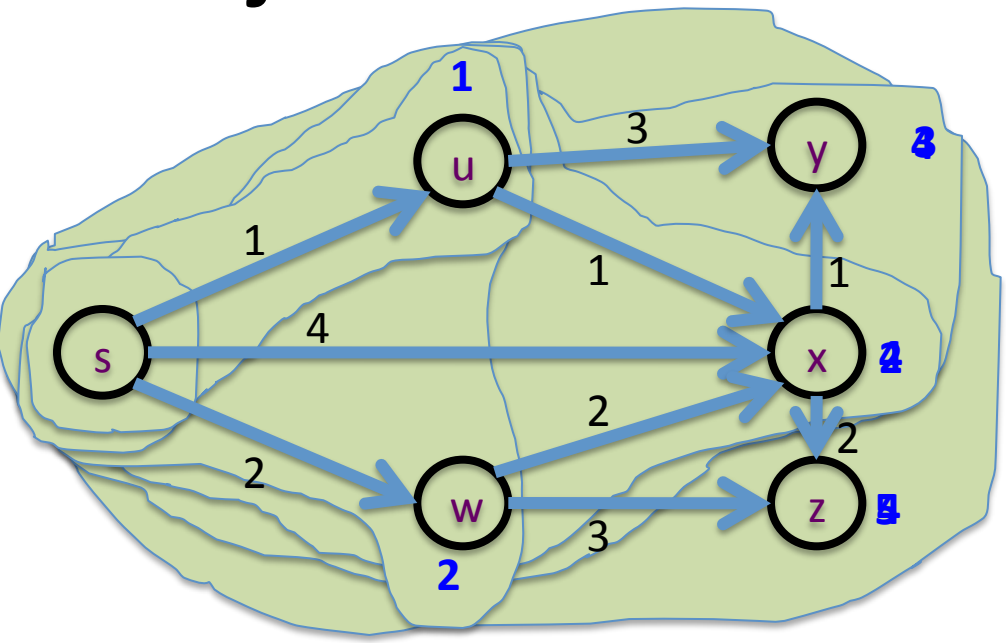




Output: All shortest paths from s to all nodes in V

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

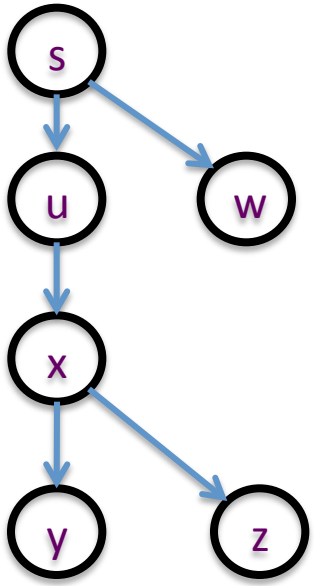
While there is a x not in R with (u,x) in E, u in R

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