

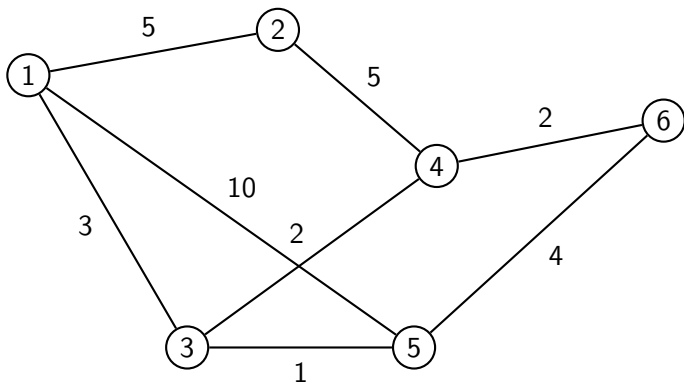
Shortest Paths and Minimum Spanning Tree

Preview

Kelly Choi

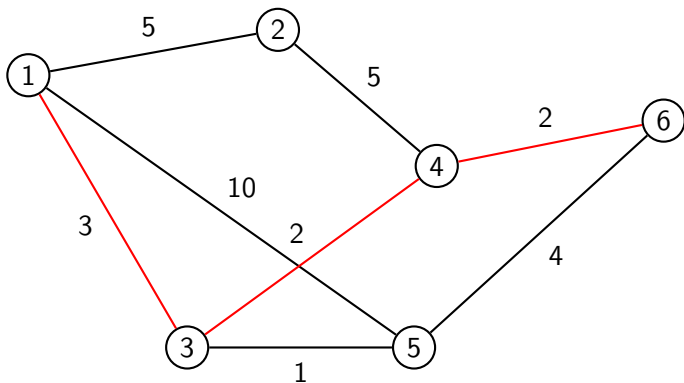
Coming on March 13, 2010

Single Shortest Path Problem



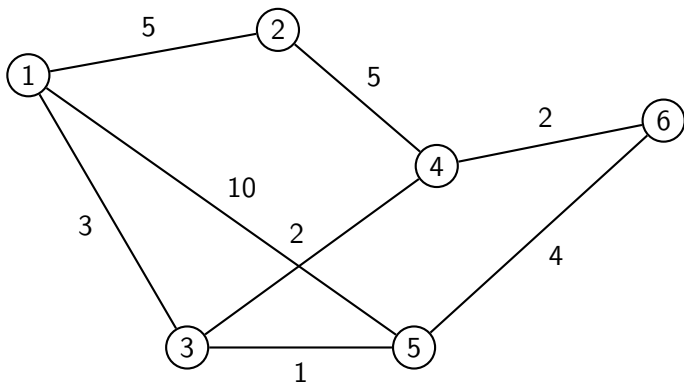
Problem: How to find the shortest path from node 1 to node 6?

Single Shortest Path Problem



Note that the shortest paths may not be the one with fewest edges!

All-pairs Shortest Path Problem



Problem: What if we want to find the length of the shortest path between each pair of vertices?

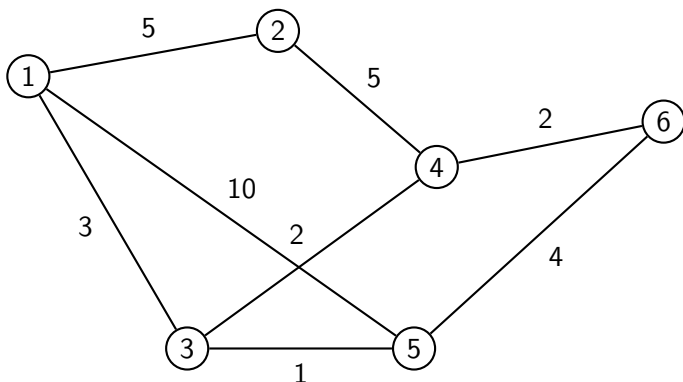
All-pairs Shortest Path Problem

Figure: Length of all-pairs shortest paths between two nodes

(i,j)	1	2	3	4	5	6
1	0	5	3	5	4	7
2	5	0	7	5	8	7
3	3	7	0	2	1	4
4	5	5	2	0	3	2
5	4	8	1	3	0	4
6	7	7	4	2	4	0

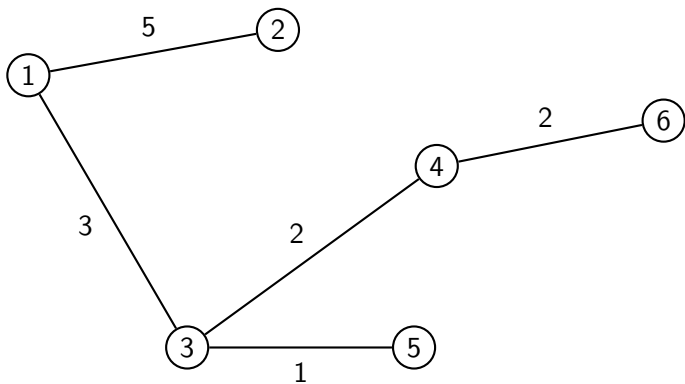
Using the single shortest path algorithm for 6 times would solve the problem, but are there easier ways?

Minimum Spanning Tree



Problem: How to select edges of minimum total weight so that the graph is connected?

Minimum Spanning Tree



Problem: How to select edges of minimum total weight so that the graph is connected?

See you on March 13! :)