

MSSC 6000

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Feb 9, 2022 - Day 8

Announcements:

→ HW 1 due tonight, 11:59pm

→ HW 2 assigned after finishing Greedy Algos

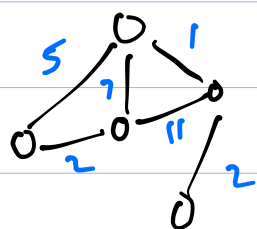
→ Office Hours 2:30-3:30pm

Lecture 3 - Greedy Algorithms (continued)

→ coding I.S. in jupyter

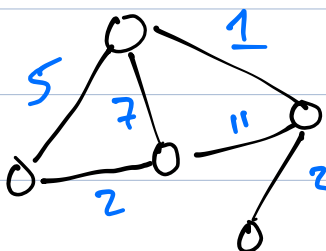
Problem #2: Minimum Spanning Tree

Def: A graph is a set of vertices or nodes, connected in pairs by edges.

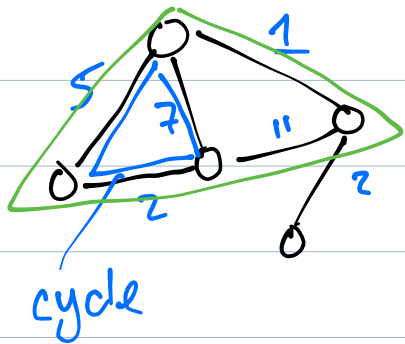


A graph with 5 vertices and 6 edges.

Def: A weighted graph is a graph whose edges have real #s assigned to them as "weights".

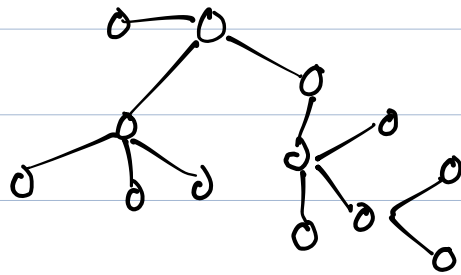


Def: A tree is a graph that is connected and has no cycles.



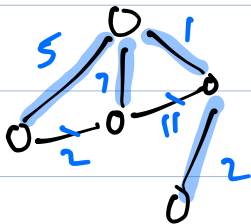
a loop
in the
graph

you can reach
any vertex from
any other vertex
(in one or more
steps)

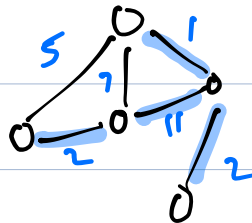


Minimum Spanning Tree Problem:

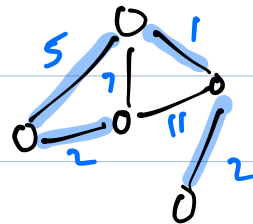
Given a weighted graph G , find the subset of edges that forms a minimum-weight tree that touches all of the vertices



$$5 + 7 + 1 + 2 = 15$$



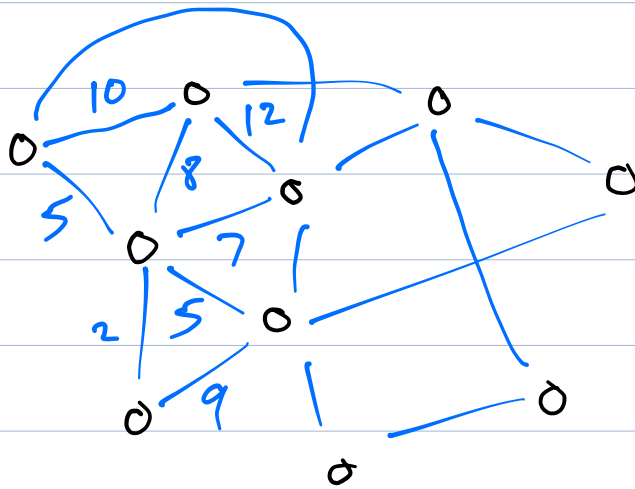
$$1 + 2 + 2 + 11 = 16$$



$$1 + 2 + 2 + 5 = 10$$

Minimum!

Ex: You might need to connect 10 university building to the intranet.



weight of edge
= the cost to
run a cable
between those
two buildings

Possible Greedy algorithm to build a minimal
spanning tree.
best edge = ?