Announcement:

Midterm 3 tonight!

7:00pm - 8:30pm in 217 Noyes Lab. (ref. sheet allowed)

Be early!

Exam covers through Chapter 5 (focus on Ch. 4, 5)

Most focus: topics that appeared in lecture or homework

Some focus: topics in relevant subsections of textbook

Low/no focus: topics in subsections we didn't cover at all

Partial topics list: (plus, see first two lists)

Vertex/edge connectivity:

Def'ns

Whitney's Thm.

Different characterizations of 2-connectivity and 2-edge-connectivity

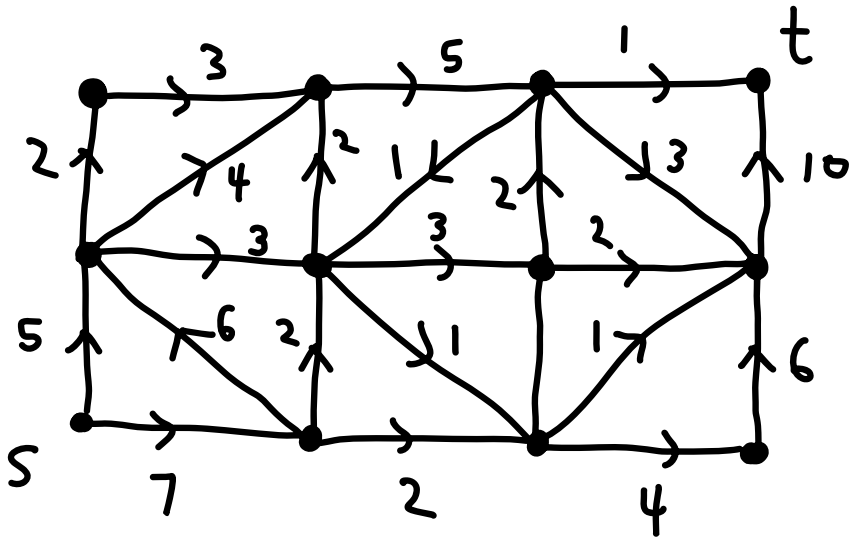
Digraph vertex/edge connectivity

Menger's Theorem (4 versions)

- Max-flow, min-cut theorem
  - Defn's
  - Theorem itself
  - Ford-Fulkerson algorithm
- Connections between: flows, cuts, (edge)-disjoint paths, matchings, indep. sets, vertex/edge covers, etc.
- Vertex coloring
  - Defn's (e.g. Chromatic number, k-criticality)
  - "Easy bounds", and more difficult ones (e.g. Brooks' Thm.)
  - Greedy coloring
    - Algorithm
    - Consequences
  - Mycielski's construction and theorem
  - Chromatic polynomial
    - Values / how to compute for small graphs
    - Deletion-contraction recurrence

Examples:

1) Find and prove a minimum capacity source-sink cut:

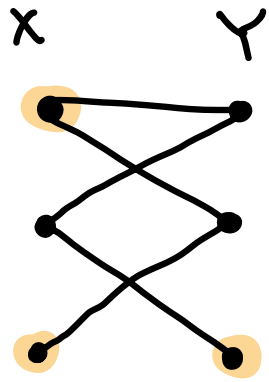


2) Prove that the number of proper k-colorings of a Conn. simple graph G is $< k(k-1)^{n-1}$ if $k \geq 3$ and G is not a tree.

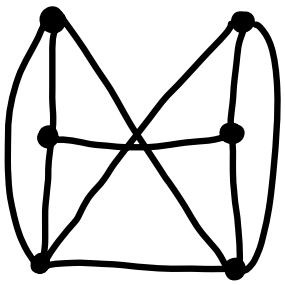
Pf:

3) Let G be a simple graph s.t. $\overline{G}$ is bipartite. Show that $\chi(G) = \omega(G)$.

Pf:



$\overline{G}$ T



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