CSE 201 3-11-21

- SETs: +0.5% if response ≥ 85%
- Final exam: Wed. 3/17
- hw7 due
- NP-completeness, supplementary lec.

adversary arguments:

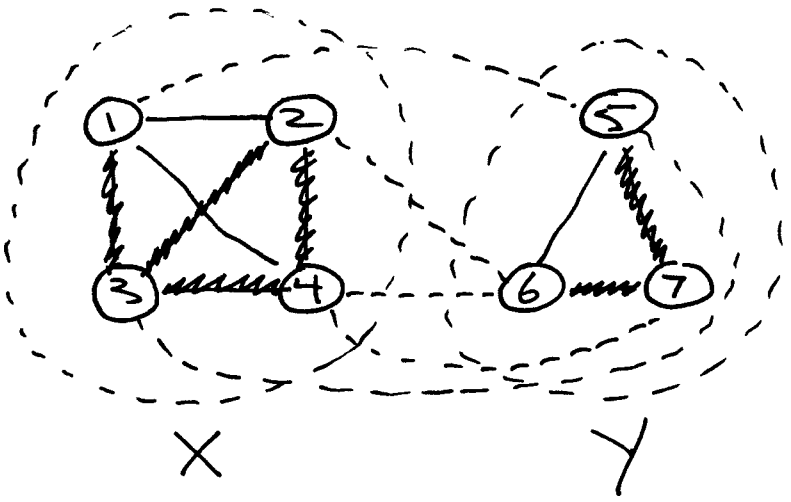
Problem: Graph connectedness

consider algorithms that ask only adjacency questions:

'is u adjacent to v'

i.e. edge probes.

Ex. $n = 7$



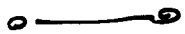
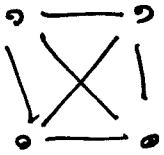
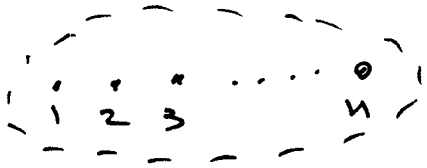
adv. strategy : answer each probe as if the graph is as above.

suppose Algorithm asks only 11 adj. Questions.

Questions:

15	no	67	yes
23	yes	24	yes
34	yes	47	no
46	no	13	yes
57	yes	35	no
26	no		

complete graphs:

		# edges
K_1		0
K_2		1
K_3		3
K_4		6
K_5		10
K_n		$\binom{n}{2} = \frac{n(n-1)}{2}$ $= \frac{1}{2}n^2 - \frac{1}{2}n$

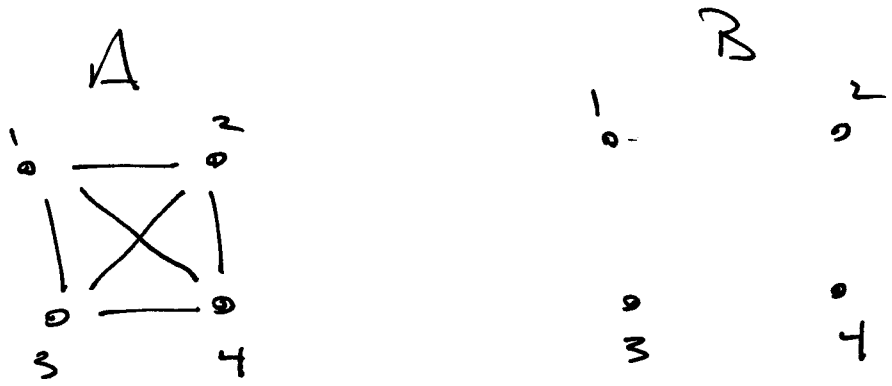
(# graphs on n vertices)

$= (\#$ of subsets of $E(K_n)) = 2^{\binom{n}{2}}$

Ex. $n = 4$, $\binom{n}{2} = \binom{4}{2} = 6$

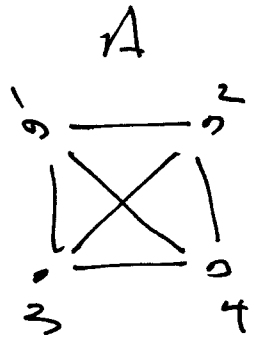
Adversary strategy: answer no to any edge probe unless that answer would prove G is disconnected.

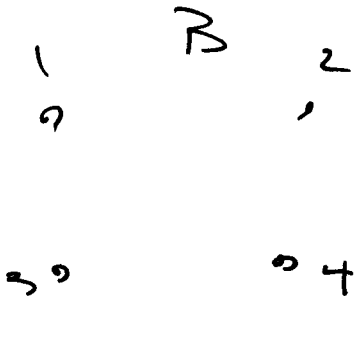
maintains two graphs:

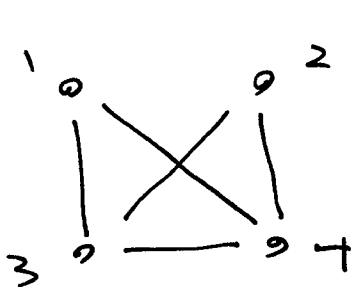


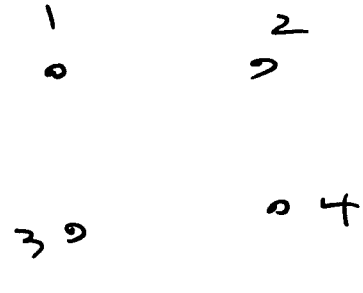
- answer no to e if $A - e$ is conn, and remove e from A
- answer yes to e if $A - e$ is disconn, and add e to B

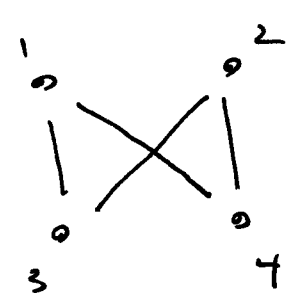
Suppose algorithm asks only 5 adj. Questions: 12, 34, 14, 24, 13
n, n, n, y, y

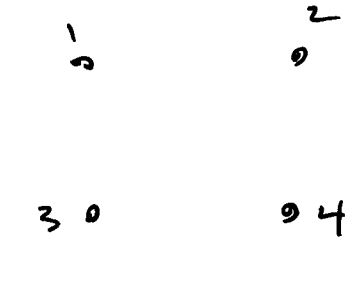


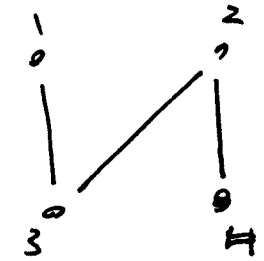


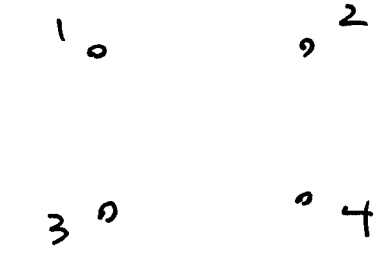




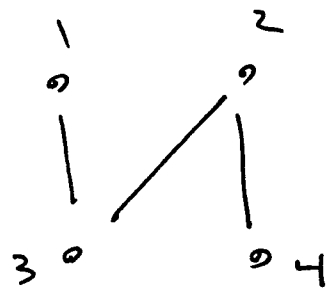


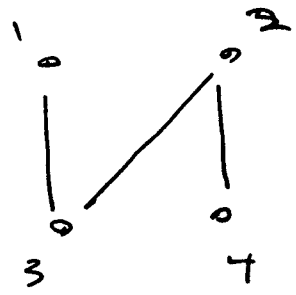




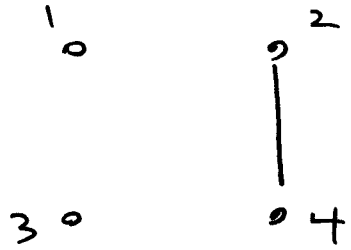


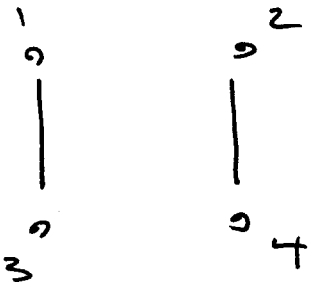
A





B





note: Both A, B are consistent with seq. of answers.

also A is connected, B is disconn.