



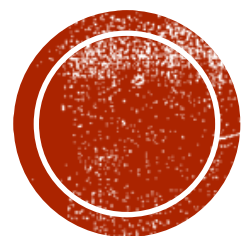
DISCRETE MATHEMATICS IN COMPUTER SCIENCE

**HSIEN-CHIH CHANG
FEBRUARY 2, 2022**

ADMINISTRIVIA

- Midterm 1 grading in progress
- Midterm 2 on Feb 21/22 (Mon/Tue)
- Monday Worksheet due now
- Homework 4 due on Sunday (Feb 6)

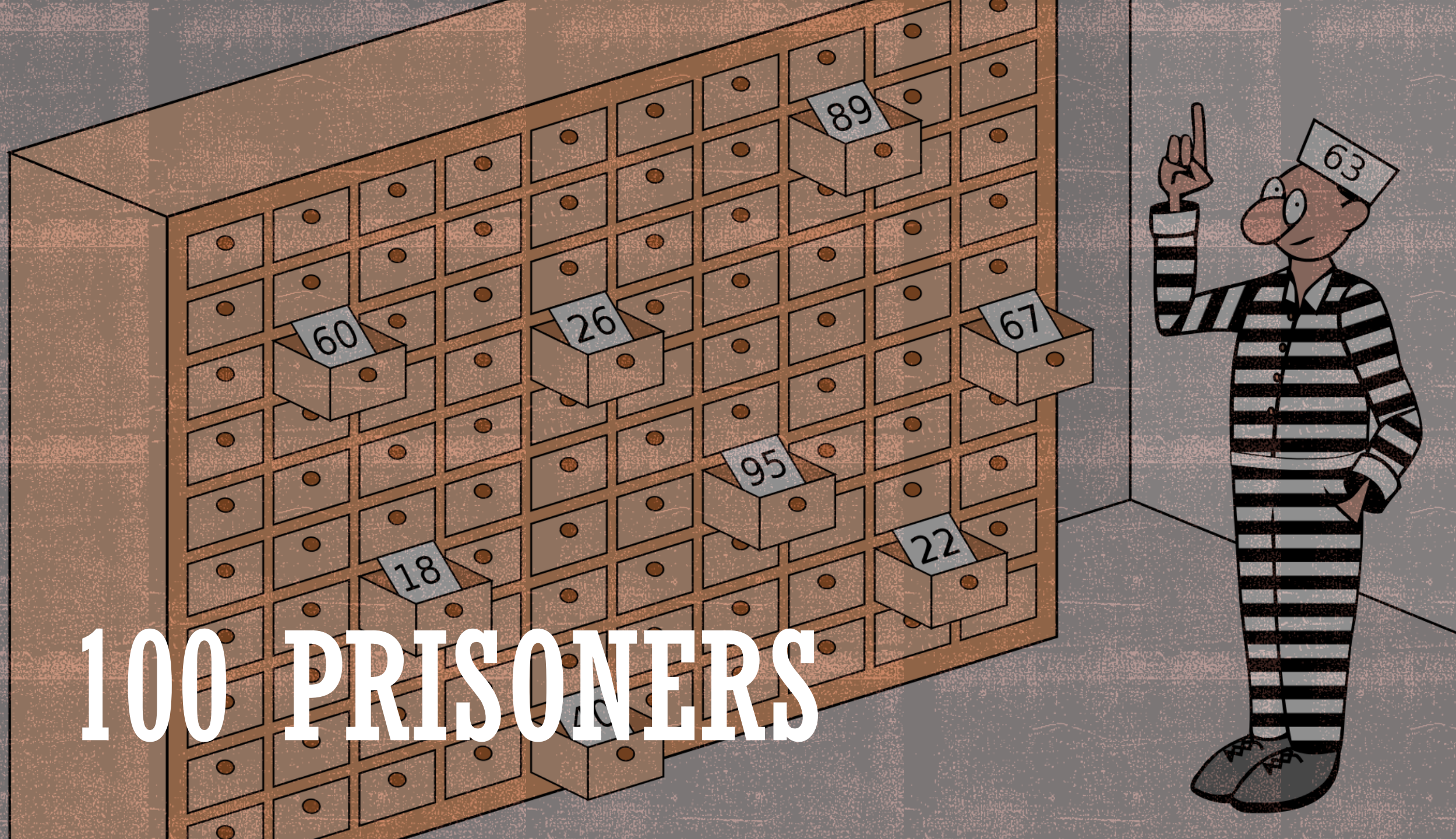


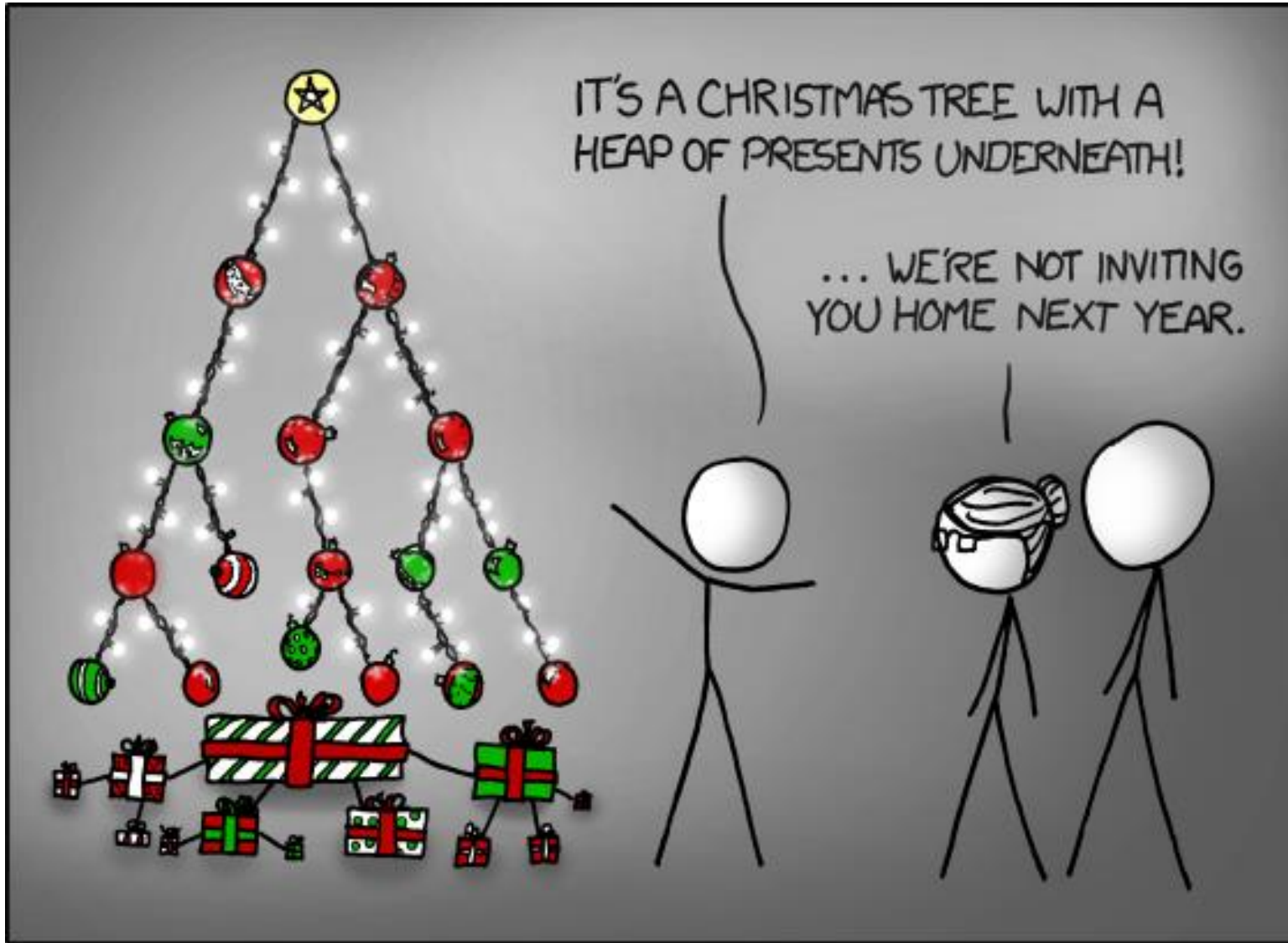


FORESTS AND TREES



100 PRISONERS





Jargon

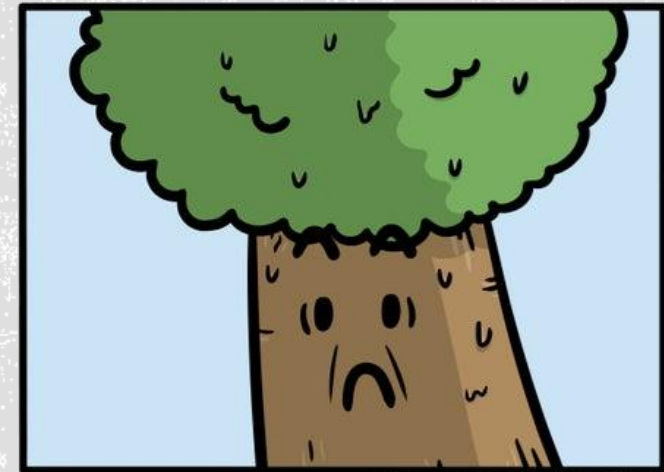
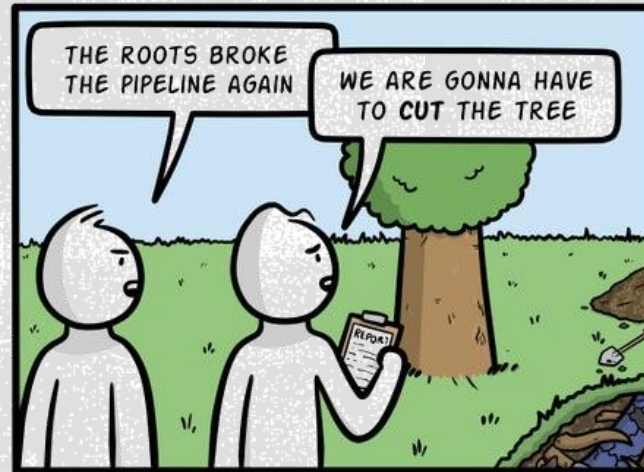
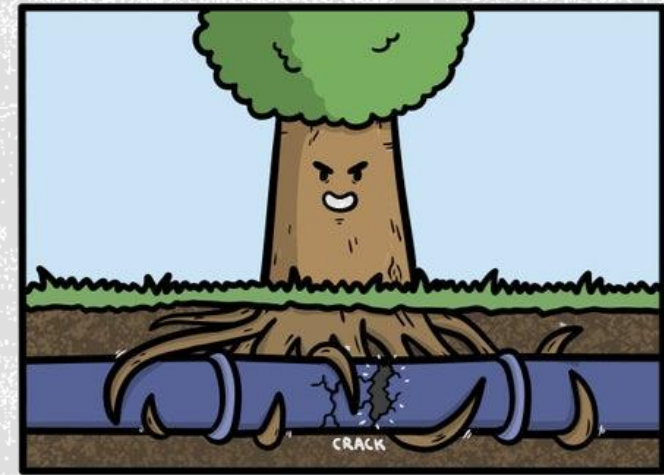
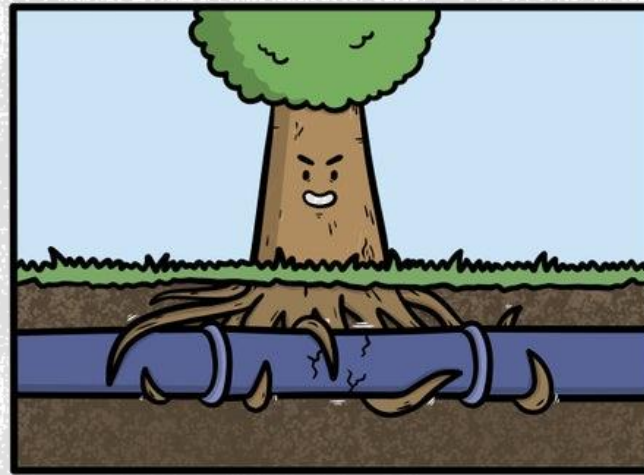
acyclic
forest
tree

leaf
spanning
cut



TREE PROPERTIES

- Which two properties below imply that graph G is a tree?
 - connected
 - acyclic / being a forest
 - has $n-1$ edges
 - spanning
 - every edge is a cut
 - has ≤ 1 path between any pair of vertices



@SHOWERTHOUGHTSCOMICS



EVERY COMPONENT OF A FOREST IS A TREE.

COROLLARY

EVERY FOREST F HAS $|V(F)| - |E(F)|$ TREES.





LEAF LEMMA

Every tree with at least an edge has at least two leaves.



**IF EVERY VERTEX IN G HAS DEGREE AT MOST 2,
THEN G IS THE UNION OF CYCLES AND PATHS.**

COROLLARY



100 PRISONERS



**WHAT THE HOST PUTS IN THE NUMBERS AND
NOBODY IS ALLOWED TO TOUCH THE DRAWERS?**

**NEXT TIME.
TREES IN COMPUTER SCIENCE.**

