

CSE 312: Foundations of Computer Science, II

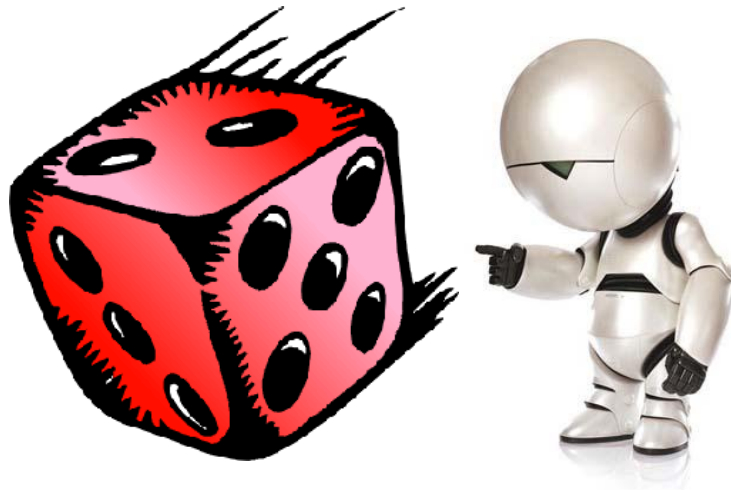
- **Instructor:**

James R. Lee (jrl@cs.washington.edu)

CSE 640

- **TA:**

Jessica Chang (jschang@cs.washington.edu)



CSE 312: Foundations of Computer Science, II

- Probability, statistics, and algorithms

First 20 lectures: prob/stats in CS

Last 10 lectures: algorithms, polynomial time,
and NP-completeness

- Books

Rosen, *Discrete Mathematics* (same as 311)

Ross, *Introduction to Probability*

(supplementary; handouts)

Dasgupta, Papadimitriou, Vazirani, *Algorithms*

(required, but PDF version available online)

- Homeworks

Weekly (out Wed, due next Wed).

can work in pairs



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- **Grading**

weekly problem sets (45-55%)

in-class midterm (15-20%)

in-class final exam (30-35%)

- **Office hours**

Me: Monday, 2:30-4pm, CSE 640

Jessica: Tuesday, 3-4pm, Room TBA

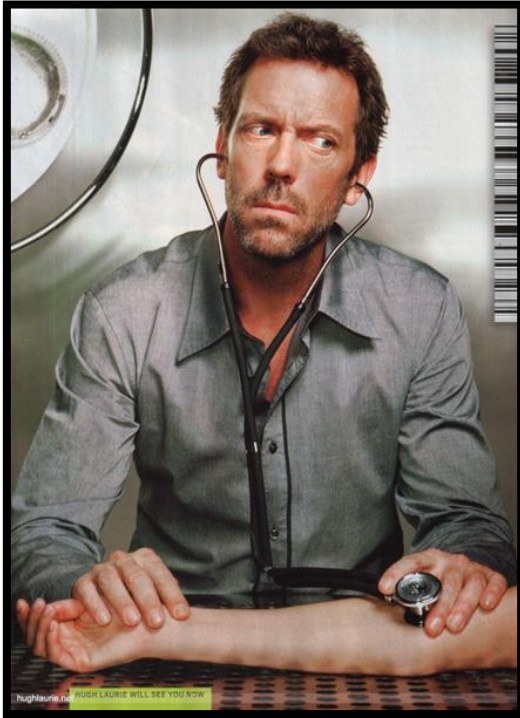
- **Brand new course**

Slightly chaotic lecture notes structure

(Handwritten, external links, slides, etc.)



pretend you're a doctor



You are trying to diagnose the probability that a woman with a positive mammogram has breast cancer, even though she's in a low-risk group: 40-50 years old.

- Probability of a woman having breast cancer is **0.8%**.
- If someone has cancer, probability of a positive mammogram is **90%**.
- If someone doesn't have cancer, probability of a positive mammogram is **7%**.

A woman walks into your office with a positive test.
What's the probability that she has breast cancer?

pretend you're a lawyer



OJ simpson murder trial

Prosecutors:

“A slap is a prelude to homicide.”

Defense:

“Less than 1 in 2500 men who commit domestic abuse go on to commit homicide.”

Both were considering the wrong question:

If a woman is murdered and she has been domestically abused, the chances are 90% that her husband is the killer.

Bayes rule



$$\Pr[A | B] = \frac{\Pr[A \wedge B]}{\Pr[B]}$$

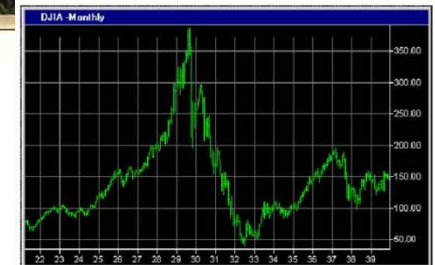


Google
AdWords



bing

NETFLIX



counting vs. probability



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