5. Statistics, Data science, and Probability
Review: Probability and randomness

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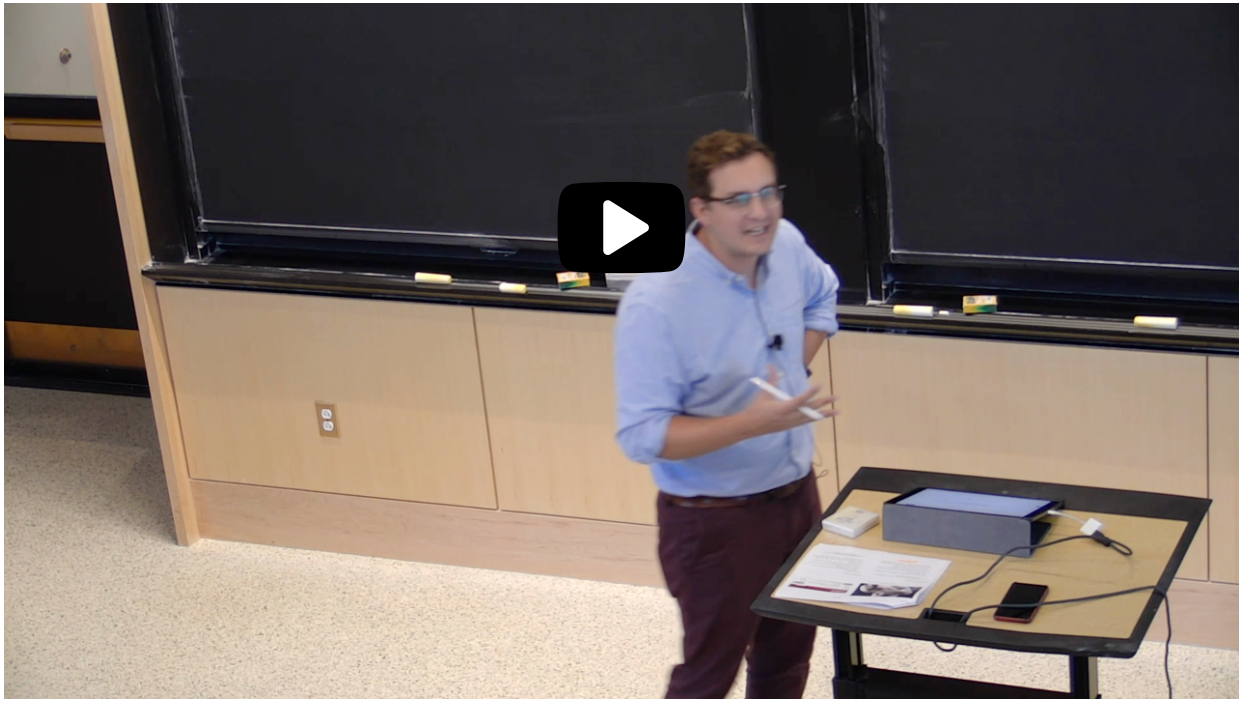

OK.

So going back to what I said, there's a bunch of words

that you've heard that are sort of related.

You're probably not here because you

want to do 1970s statistics.

You want to do machine learning.

You want to do data science.

You want to do artificial intelligence.

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Probability review: dice rolling game

1/1 point (graded)

Alice and Bob play a game where two fair six-sided dice are rolled.

Alice gets $1 if the sum of the numbers of the two dice is a prime number. (The number 1 is not prime.)

Bob gets $3 if the numbers on the two dice are the same (e.g. 1-1, 2-2, ...).

Who makes more money on average (i.e. in expectation)?

- Alice
- Bob
- It does not matter.
- Not enough information to decide.

✔

Solution:

The set of possible outcomes is $\{2,3,4,5,6,7,8,9,10,11,12\}$, of which the prime numbers are $\{2,3,5,7,11\}$. Bob wins $3 whenever he sees one of six outcomes, out of a total of 36. This means he will earn $\frac{6}{36} \times 3 = \frac{1}{2}$ dollars per game in expectation. On the other hand, Alice wins $1 when she sees one of fifteen outcomes. Be careful here, because there are multiple ways for two six-sided dice to sum to 3,5,7 or 11 (As opposed to 2, for which there is only one possible roll). Therefore, Alice wins $1 \times \frac{15}{36}$ dollars in expectation.

Overall, Bob makes more money on average.

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

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Topic: Unit 1 Introduction to statistics:Lecture 1: What is statistics / 5. Statistics, Data science, and Probability

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- Subtitle Correction — 2
  Subtitle error 3:12 and 3:17, instead of conditional it should be computational. Best.
- ? Outcomes for Alice — 6
  I can only count 14 outcomes for Alice
- A question — 3
  If Die 1 is marked red and Die 2 is marked blue, if we rolled a Die 1 first and get a 1(which is R) and rolled Die 2 later and get 1(which is B), is this the s...
- Statistics, Data Science, Machine Learning, Artificial Intelligence — 3
  All are **data-driven fields**: they gather data to get some insight about what's happening and ultimately make decisions. Machine learning, someti...
- Lecture Problem rolling dice 2 — 2

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