



MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Bookmarks

- ▶ Unit 0: Overview
- ▶ Entrance Survey
- ▶ Unit 1: Probability models and axioms
- ▶ Unit 2: Conditioning and independence
- ▶ Unit 3: Counting
- ▼ **Unit 4: Discrete random variables**

Unit overview

Lec. 5: Probability mass functions and expectations

Exercises 5 due Mar 02, 2016 at 23:59 UTC

Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s

Exercises 6 due Mar 02, 2016 at 23:59 UTC

Lec. 7: Conditioning on a random variable; Independence of r.v.'s

Unit 4: Discrete random variables > Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s > Lec 6 Variance Conditioning on an event Multiple r v s vertical



Bookmark

Exercise: Using linearity of expectations

(2/2 points)

We have two coins, A and B. For each toss of coin A, we obtain Heads with probability $1/2$; for each toss of coin B, we obtain Heads with probability $1/3$. All tosses of the same coin are independent.

We toss coin A until Heads is obtained for the first time. We then toss coin B until Heads is obtained for the first time with coin B.

The expected value of the total number of tosses is:



Answer: 5

Answer:

Let T_A and T_B be the number of tosses of coins A and B, respectively. We know that T_A is geometric with parameter $p = 1/2$, so that $\mathbf{E}[T_A] = 1/p = 1/(1/2) = 2$. Similarly, $\mathbf{E}[T_B] = 3$. The total number of coin tosses is $T_A + T_B$. Using linearity,

$$\mathbf{E}[T_A + T_B] = \mathbf{E}[T_A] + \mathbf{E}[T_B] = 2 + 3 = 5.$$

You have used 1 of 2 submissions

Exercises 7 due Mar
02, 2016 at 23:59 UTC

Solved problems

**Additional
theoretical
material**

Problem Set 4

Problem Set 4 due Mar
02, 2016 at 23:59 UTC

Unit summary

© All Rights Reserved



© edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open EdX logos are registered trademarks or trademarks of edX Inc.

POWERED BY
OPENedX

