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

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Exercise: Coin tossing

(2/2 points)

Use the second method in the preceding segment to find the probability that the 6th toss out of a total of 10 tosses is Heads, given that there are exactly 2 Heads out of the 10 tosses. As in the preceding segment, continue to assume that all coin tosses are independent and that each coin toss has the same fixed probability of Heads. (In this and subsequent questions, your answer should be a number. Do not enter '!' or combinations in your answer.)

0.2 ✔ **Answer:** 0.2

Answer:
The conditional universe consists of sequences of length 10 that contain exactly 2 Heads. There are

$$\binom{10}{2} = \frac{10!}{8!\,2!} = \frac{10 \cdot 9}{2} = 45$$

such sequences. Out of these 45 sequences, how many have the property that the 6th toss was Heads? There are 9 sequences with this property: the 6th toss is fixed to be Heads, and the other Heads can be any of the remaining 9 tosses. Therefore, the desired conditional probability is $9/45 = 1/5$.

You have used 1 of 2 submissions

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