

STAT 134: Section 3

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January 26, 2022

Problem 1

Consider two tosses of a fair coin. Let H_1 and H_2 be the events that the first toss is H and the second toss is H, respectively. Define T_1 and T_2 analogously. Lastly, define the event $S = H_1H_2 \cup T_1T_2$. In words, S is the event that the two tosses yield the same result.

- Show that H_1 , H_2 , and S are *pairwise* independent.
- Show that H_1 , H_2 , and S are *not* independent by calculating $P(H_1H_2S)$.

Example 8 in Pitman's Probability

Problem 2

Given that there were 12 heads in 20 independent coin tosses, calculate the chance that

- the first two tosses landed heads;
- at least two of the first five tosses landed heads.

Try to do this problem with as little tedious work as possible.

Ex 2.1.5 in Pitman's Probability

Problem 3

A gambler decides to keep betting on red at roulette where there are 18 reds out of 38 tiles in total, and stop as soon as she has won a total of five bets.

- a. What is the probability that she has to make exactly 8 bets before stopping?
- b. What is the probability that she has to make at least 9 bets?

Ex 2.1.12 in Pitman's Probability