

ECE 139
SPRING 2005
FRIDAY 10A-12P DISCUSSION
QUIZ # ~~1~~ 3
15 APRIL 2005

NAME:

1. You have two coins. Coin 1 (C1) is a fair coin with $P(\text{Head})=P(\text{Tail})=0.5$. Coin 2 (C2) is a two-headed coin with $P(H)=1$ and $P(T)=0$.

a. You choose a coin randomly and flip it once. What is the probability that the first flip comes out a Head?

b. Again, you choose a coin randomly. This time you flip it 10 times. What is the probability that you get 5 Heads and 5 Tails?

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QUIZ #3

① let $H1 = \{\text{head on first flip}\}$

② We must use total probability.

$$P[H1] = P[H1|C1]P[C1] + P[H1|C2]P[C2]$$

and plug in

$$= \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) + (1)\left(\frac{1}{2}\right)$$

$$\boxed{P[H1] = \frac{3}{4}}$$

③ $P[5H \cap 5T] = P[5H \cap 5T|C1]P[C1] + P[5H \cap 5T|C2]P[C2]$

if we choose $C2$, we cannot get a tail, so

$$P[5H \cap 5T|C2] = 0$$

and

$$P[5H \cap 5T] = \frac{1}{2} P[5H \cap 5T]$$

This is a Bernoulli R.V.

$$P[5H \cap 5T] = \binom{10}{5} \left(\frac{1}{2}\right)^{10}$$

and $P[5H \cap 5T] = \frac{1}{2} \binom{10}{5} \left(\frac{1}{2}\right)^{10}$

$$\boxed{P[5H \cap 5T] = \binom{10}{5} \left(\frac{1}{2}\right)^{11}}$$