Flipping a coin

If you flip a fair coin 4 times, which string are you more likely to get: (A) HHHH; (B) HTTH?

1. A
2. B
3. Equally probably
4. Not enough info to decide.

Flipping a coin

If you flip a fair coin 4 times, which are you more likely to get: (A) 4 heads; (B) 2 heads and 2 tails?

1. A
2. B
3. Equally probably
4. Not enough info to decide.

Flipping a coin

You flip a coin 10 times. How many different sequences like HHTTHTHTTH (**microstates**) are possible?

1. 10! (= "10 factorial" = 10 x 9 x 8 x …x1)
2. 10^2
3. 2^{10}
4. 10
5. 11
6. Some other number

Flipping a coin

You flip a coin 10 times. How many different results like 5 heads and 5 tails (**macrostates**) are possible?

1. 10! (= "10 factorial" = 10 x 9 x 8 x …x1)
2. 10^2
3. 2^{10}
4. 10
5. 11
6. Some other number

We use probability for flipping coins because

1. The world of the coin is fundamentally random.
2. The world of the coin is fully predictable given the starting conditions, but we can't determine the starting conditions well enough.
3. We want to to be able to set good odds for our bets.
4. We want to be able to predict the future.
5. Some other reason.

How do we know that a coin is “fair” for flipping?

1. We buy a special coin from a trustworthy manufacturer.
2. We use any US coin because the US Mint explicitly makes all coins to be flipping fair.
3. We test it by making an infinite number of flips.
4. We test it by making a finite number of flips.
5. There is no way that we can know a coin is fair.

Suppose you thought a coin was fair and flipped it 30 times and it came up 16 H + 24 T. Would you challenge its fairness?

1. Yes
2. No

Suppose you thought a coin was fair and flipped it 300 times and it came up 160 H + 240 T. Would you challenge its fairness?

1. Yes
2. No