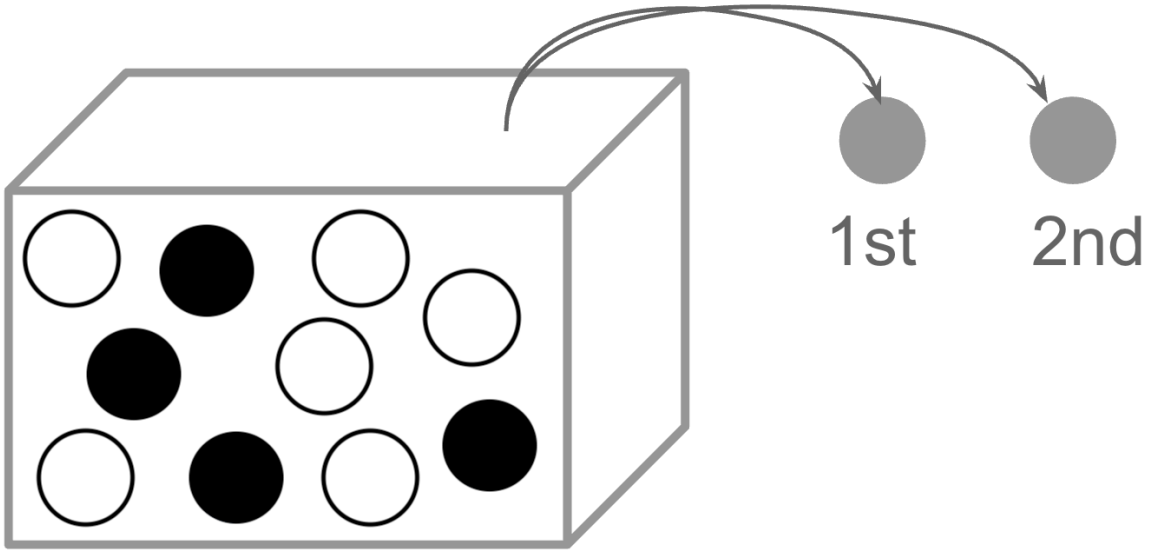
Consider a box containing 10 balls: 4 solid and 6 hollow, as displayed in the following figure.



Assume you pick a 1st ball, then a 2nd ball (no replacement). Find the probability that:

1. both balls are solid.

2. both balls are hollow.

3. 1st is solid, 2nd is hollow.

4. 1st is hollow, 2nd is solid.

5. 2nd is solid, given 1st is hollow.

6. 2nd is solid, given 1st is solid.

7. at least one of them is solid.

8. both balls are the same (either both solid or both hollow).

Consider a fair, eight-sided die.

9. I roll the die four times. What is the probability that I roll the **same** number on all four rolls?

10. I roll the die twice. What is the probability that the rolls are **different**?

11. My dog Bella has two toys that she loves: an orange ball, and a thick rope. Each time she picks out a toy, she chooses it independently of all the other times (like a coin toss). That day, she was busy, so went to her toys only **three** times.

Define the events A and B where:

A is the event that she picked the rope *at most* one time;

B is the event that the toys she picked that day included *both* the rope and the ball.

Are A and B independent? Answer yes or no, and show your work below.

An American roulette wheel has 38 pockets, of which 18 are red, 18 black, and 2 are green. In each round, the wheel is spun and a white ball lands in one of these 38 pockets.

12. What is the probability of getting at the ball landing in a green pocket *at least once* in 5 spins of the wheel?