

### Student 1

Amy could select  
Black + black  
Black + white  
White + black  
White + white

There are 2 when the balls  
are the same color + 2  
when the balls are different

THE GAME IS FAIR

### Student 2

		2nd ball					
		B1	B2	B3	W1	W2	W3
1st ball	B1	Amy	A	A	D	D	D
	B2	A	A	A	D	D	D
	B3	A	A	A	D	D	D
	W1	D	D	D	A	A	A
	W2	D	D	D	A	A	A
	W3	D	D	D	A	A	A

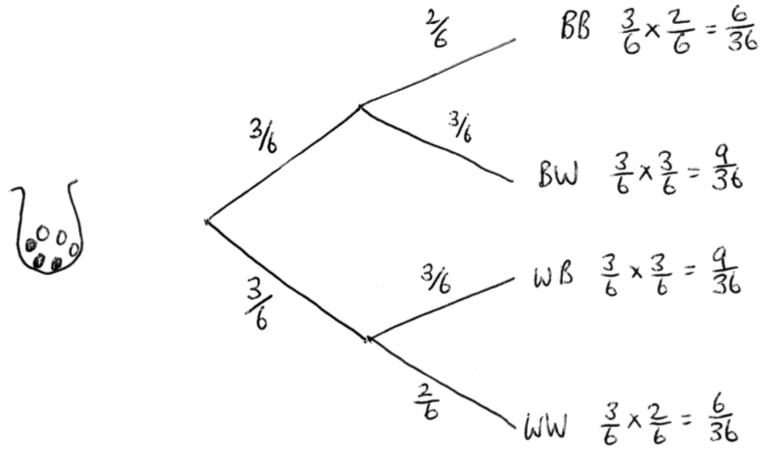
There are 36 equally likely outcomes.

Amy wins 18 times

Dominic wins 18 times

So the game is fair.

### Student 3



$$2 \text{ same color} = \frac{6}{36} + \frac{6}{36} = \frac{12}{36} = \frac{1}{3}$$

$$2 \text{ different color} = \frac{9}{36} + \frac{9}{36} = \frac{18}{36} = \frac{1}{2}$$

### Student 4

#### Lucky Dip

Dominic has devised a simple game.  
Inside a bag he places 3 black and 3 white balls. He then shakes the bag.  
He asks Amy to take two balls from the bag without looking.



If the two balls are the same color then you win.  
If they are different colors then I win.

OK.  
That sounds fair to me.



Is Amy right? Is the game fair?  
If Amy is wrong, then who is most likely to win?  
Show all your reasoning clearly.



1st Draw 2nd Draw  
3 Black (B) 3 Black (B)  
3 white (w) 3 white (w)

1st B B B W W W  
2nd B B B W W W

9 ways Amy wins + 9 ways Amy wins

1st B B B W W W  
2nd BW BW W B B B  
9 ways Amy loses + 9 ways Amy loses

18 ways she wins, 18 ways she loses  
FAIR

### Student 5

On the first draw, Amy can pick either a black or white ball.

$$P(W) = \frac{3}{6} = \frac{1}{2}$$

$$P(B) = \frac{3}{6} = \frac{1}{2}$$

If she picks  
white on the first  
draw then

~~$P(W) = \frac{3}{5}$~~

$$P(W) = \frac{2}{5}$$

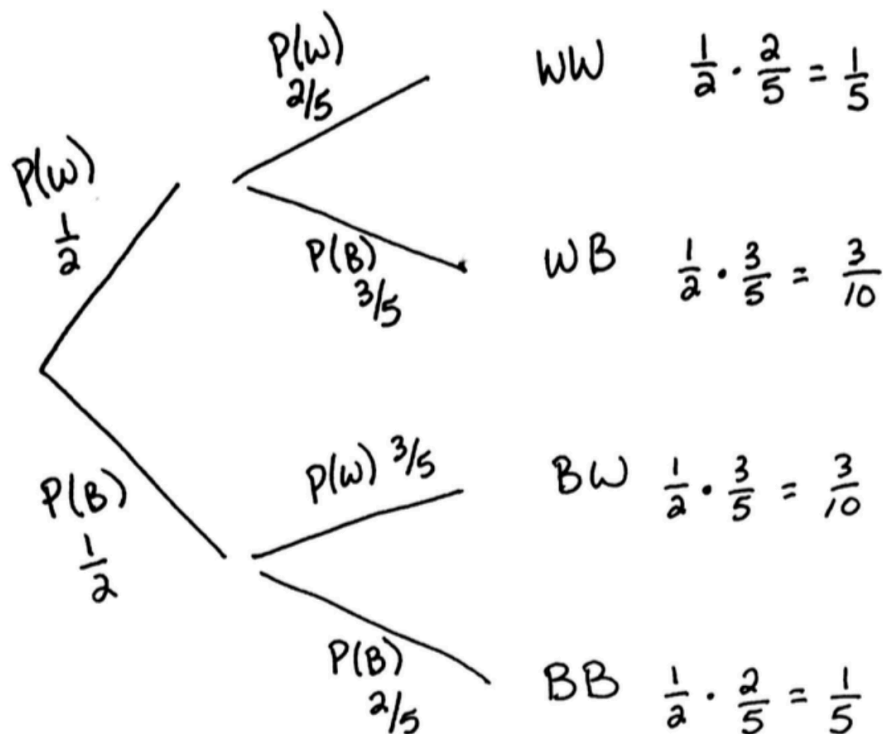
$$P(B) = \frac{3}{5}$$

If she picks black  
on the first draw, then

$$P(W) = \frac{3}{5}$$

$$P(B) = \frac{2}{5}$$

### Student 6



Student 7

The only requirement is that Amy picks two of the same color; this means that we only need to look at the 2nd draw.

