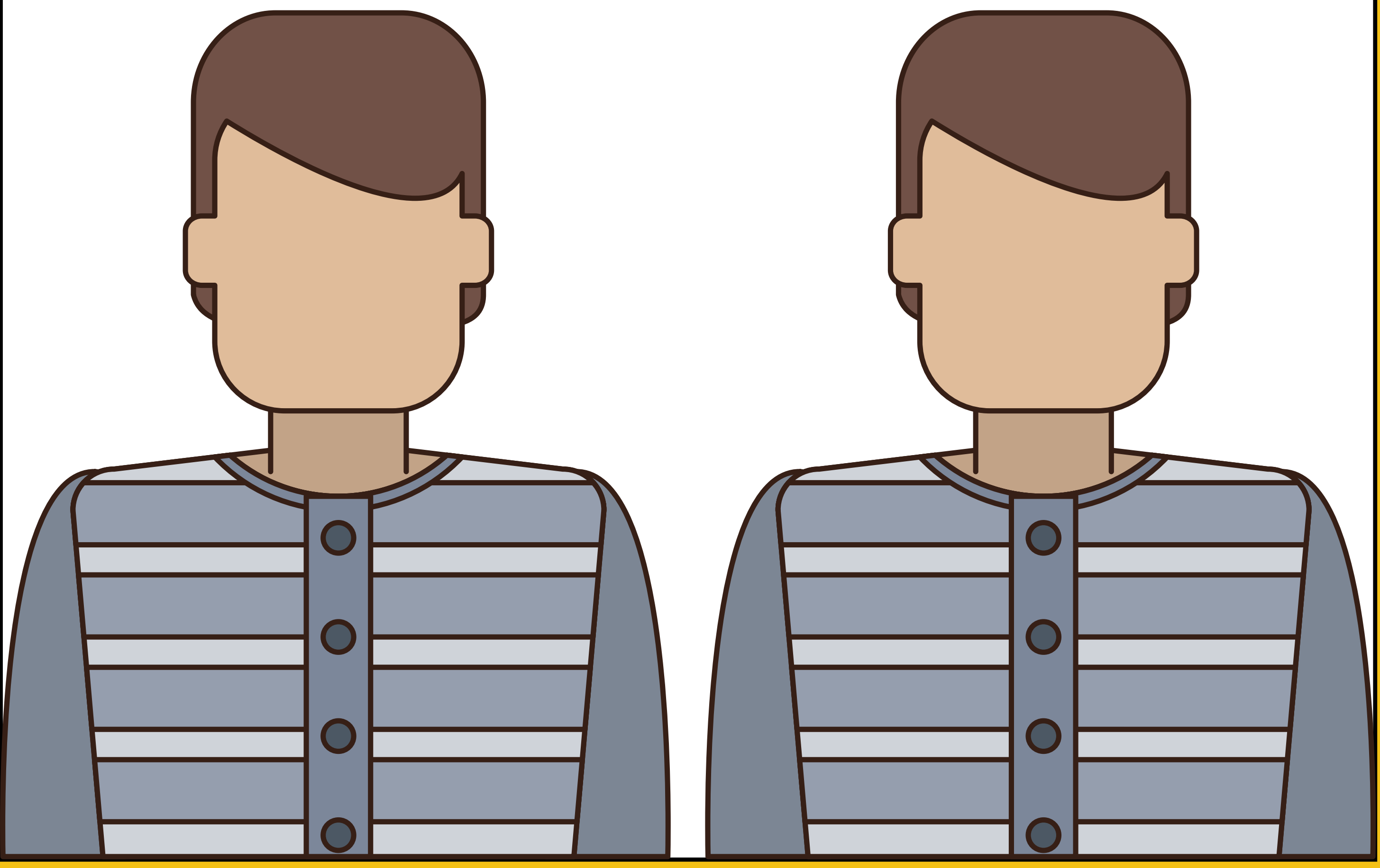
Hi! I'm Dani. I'm a **Data Scientist** that loves solving problems and creatively communicating solutions. One of the things I enjoy the most is brain teasers. And I think their visual representation is a great way to solve and understand them. So I hope you enjoy them too!

cartoon of girl with olive skin, brown eyes, medium light brown hair, long lashes, tiny nose, saying hi

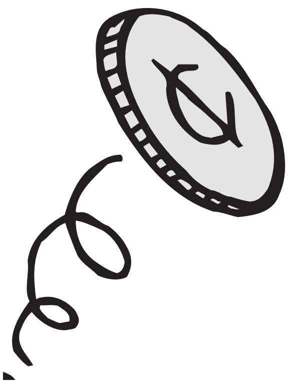
PRISONERS RIDDLE



Two prisoners in jail live in different cells and **can't communicate in any way**.

The warden will start a game where he goes to **each prisoner** every night and **flips a fair coin**.

He will then ask the prisoner to **guess** what he will **flip** for the **other prisoner**. If both guess wrong, they'll be executed. If at least one is right, they live for another day!



The warden lets them make a **strategy** before the game starts.

What strategy should they decide to **live for the most number of days**?

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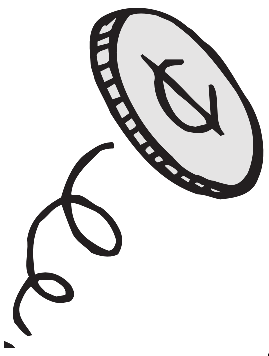
ANSWER PRISONERS RIDDLE

There are **4 SCENARIOS** of coin flips that can happen (P for prisoner):

	P1 gets	P2 gets
SCENARIO 1:	A	A
SCENARIO 2:	A	S
SCENARIO 3:	S	A
SCENARIO 4:	S	S



1

To ensure they'll win in each scenario, **at least one has to guess** the other prisoner's coin correctly (one **OR** the other).

	P1	P2	They win if:		
SCENARIO 1:	A	A	(P1 says A)	OR	(P2 says A)
SCENARIO 2:	A	S	(P1 says S)	OR	(P2 says A)
SCENARIO 3:	S	A	(P1 says A)	OR	(P2 says S)
SCENARIO 4:	S	S	(P1 says S)	OR	(P2 says S)

2

But unfortunately, **they only see what they get**, not what the other prisoner gets. So, if they create a strategy, they could only rely on the information gained from their side (i.e., the coin they get)...

So, if **P1 analyzes how to win** in each scenario as if everything depended on him and **only knowing what he got**:

	P1 gets	They win if:	
SCENARIO 1:	A	(P1 says A)	→ Wins by saying the same coin he gets
SCENARIO 2:	A	(P1 says S)	→ Wins by saying the opposite coin he gets
SCENARIO 3:	S	(P1 says A)	→ Wins by saying the opposite coin he gets
SCENARIO 4:	S	(P1 says S)	→ Wins by saying the same coin he gets

3

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Similarly, **if everything depended of P2**, as he only knows what he got:

	P2 gets	They win if:	
SCENARIO 1:	A	(P2 says A) →	Wins by saying the same coin he gets
SCENARIO 2:	S	(P2 says A) →	Wins by saying the opposite coin he gets
SCENARIO 3:	A	(P2 says S) →	Wins by saying the opposite coin he gets
SCENARIO 4:	S	(P2 says S) →	Wins by saying the same coin he gets

4

So, individually, they both win in Scenarios 1 and 4 by guessing the same coin as the one they get. And they individually win in Scenarios 2 and 3 by guessing the opposite coin as the one they get.

But both of them don't need to win. Only 1 of the prisoners needs to guess correctly in each scenario!

So, if one prisoner always says the same coin he gets, he will always win in **Scenarios 1 and 4**. And, if the other prisoner always says the opposite coin he gets, he will always win in **Scenarios 2 and 3**.

So in every scenario **(1,2,3,4)**, we have **someone** that **will guess correctly**! So, **they'll live forever.** 🤗

5

Visually, if **P1** always guesses the opposite of what he gets and **P2** always guesses the same:

	P1 gets	P2 gets	P1 guess	P2 guess	
SCENARIO 1:	A	A	S	A	→ P2 guessed what P1 got!
SCENARIO 2:	A	S	S	S	→ P1 guessed what P2 got!
SCENARIO 3:	S	A	A	A	→ P1 guessed what P2 got!
SCENARIO 4:	S	S	A	S	→ P2 guessed what P1 got!

So, it doesn't matter the scenario. Someone **always guesses correctly!**

6

END

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