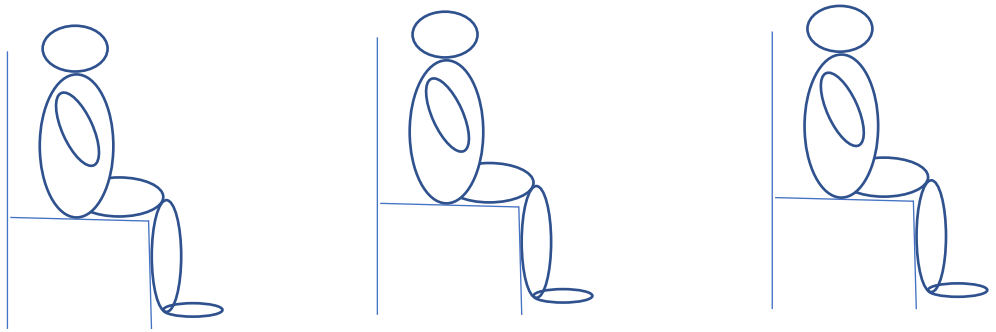
1. The Hat Problem



The person at the back is asked: “What colour hat are you wearing?”

If this person could see two green hats in front of her, she would know that she was wearing a red hat.

But she replies: “It is impossible to tell.”

Therefore the front two hats are either red and red, or red and green.

The middle person is now aware of this. She is asked what colour hat she is wearing.

If this person could see a green hat in front of her, she would know that she was wearing a red hat.

But she replies: “It is impossible to tell.”

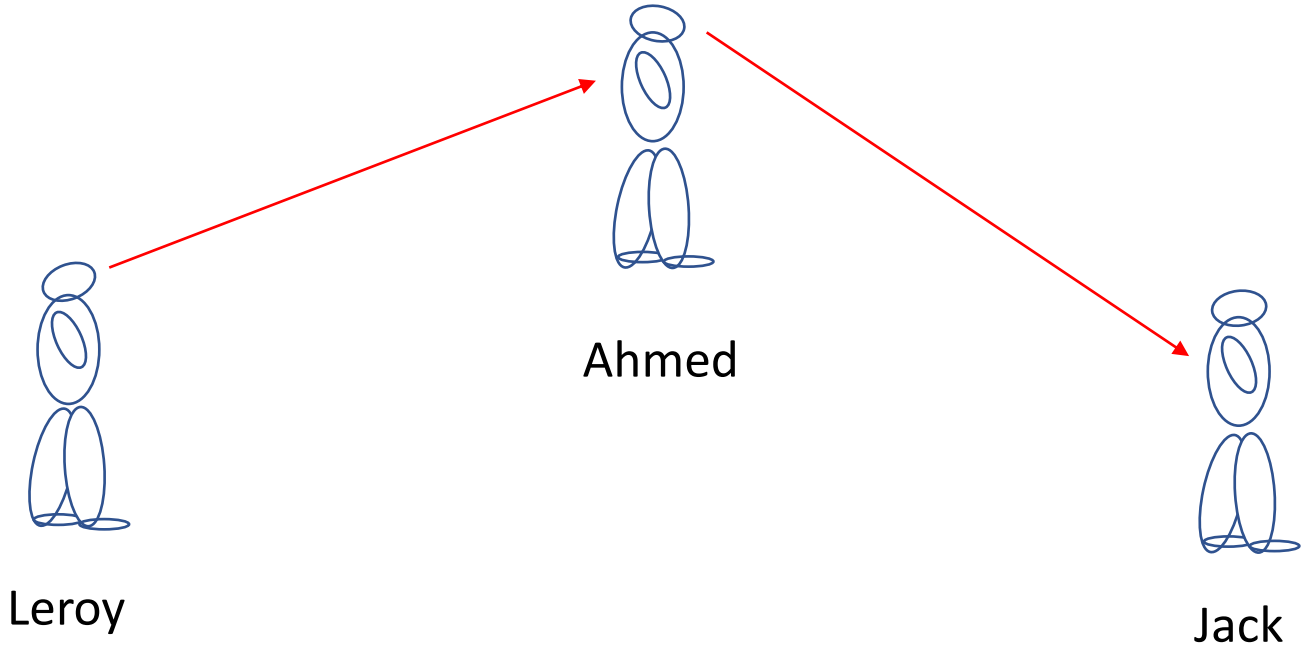
Therefore she cannot see a green hat. The person in the front must be wearing a red hat.

The person at the front is aware of this and is able to say that she is wearing a red hat.

2. Who's looking at whom?

Leroy is looking at Ahmed.

Ahmed is looking at Jack.



Leroy is married. Jack is unmarried.

Is a married person looking at an unmarried person?

Assume that Ahmed is married. He is looking at Jack who is unmarried.

Now assume that Ahmed is unmarried. Leroy, who is married, is looking at him.

So whatever Ahmed's marital status, a married person is always looking at an unmarried person.

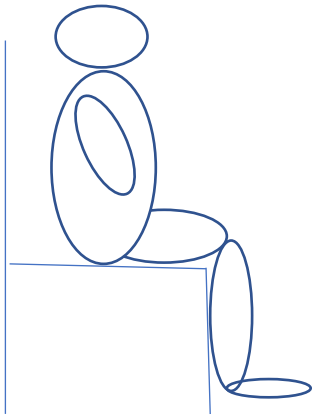
3. Truth and Lies

A woman is driving from England to Scotland. Suddenly her SatNav stops working, and she can't get a signal on her phone.

She finds herself completely lost.

Eventually she comes to a T-junction – one way will take her back to England, the other will take her to Scotland.

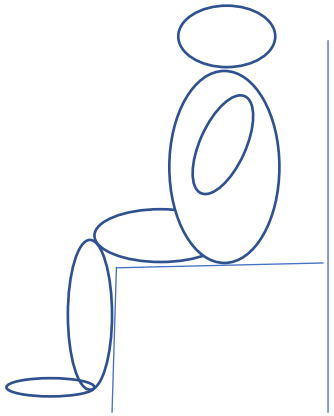
At the junction she sees two men, seated between a notice:



One of these two men comes from the City of Lies. He will always lie in response to any question you ask him.

The other comes from the City of Truth. He will always give a truthful answer.

You are allowed to ask one and only one question. You can choose which person you ask, but there is no way you can know which one is which.



The driver needs to know which road to take to get to Scotland. What question should she ask?

"If I asked your friend to point towards Scotland, which way would he point?"

Whichever one is asked, he will always point in the wrong direction.

4. Cheryl's birthday

Albert and Bernard become friends with Cheryl, and they want to know when her birthday is. She gives them a list of 10 possible dates:

May 15	**May 16**	**May 19**
June 17	**June 18**	
July 14	**July 16**	
August 14	**August 15**	**August 17**

Cheryl tells Albert the month of her birthday, and Bernard the day.

Albert says: I do not know the date of Cheryl's birthday, and I know that Bernard does not know either.

Bernard says: At first I didn't know when Cheryl's birthday was, but now I know.

Albert says: Now I know too.

When is Cheryl's birthday?

Albert says: I do not know the date of Cheryl's birthday, and I know that Bernard does not know either.

There are only two unique days: 18th and 19th. One is in May, one is in June.

If Albert had May or June he knows it would be a possibility that Bernard knew the date.

But he says that Bernard doesn't know the date, so we can rule out May and June.

Bernard says: At first I didn't know when Cheryl's birthday was, but now I know.

Bernard now knows that it must be July or August. If he has the 14th then he wouldn't know the correct date. So it is either July 16th, August 15th or August 17th.

Albert says: Now I know too.

If Albert had been given August he wouldn't know which one it is, because there are two possible dates in August. But since he now knows, then he must have July.

Her birthday is therefore July 16th.