

“A Puzzle About Airline Drinks” – beginning of solution

The first time that the hostess comes by, she has two cups of coke and two cups of orange juice. Andrew chooses coke; from his perspective, there is a chance that Bob will also choose coke, and hence, there is a chance that Carol will be forced to take orange juice. (This is in fact what happens.) If Andrew were to choose orange juice instead, Carol would certainly be able to choose a coke, because at least one coke would still remain after Bob’s choice of drink. Thus, if Carol prefers coke to orange juice, Andrew should choose an orange juice, and guarantee Carol a coke. Because he does not do so, we can conclude that Carol prefers orange juice to coke.

Bob knows all of this when he makes his choice, and therefore he can conclude that Carol will take one of the two remaining cups of orange juice when it is her turn. This leaves one coke and one orange juice for Bob and Denise; of course, Bob will choose the one that Denise does not prefer. Thus we can conclude that Denise prefers orange juice to coke, as well.

The second time that the hostess comes by, she has three cups of coke and one cup of orange juice. Of course, Andrew chooses a coke, in the hope that the orange juice will make its way to Carol, since (as we already knew) she prefers orange juice to coke. However, Bob knows that if he does not take the orange juice, then Carol will take it. Hence, Bob knows that Denise will get a coke no matter what he does; and thus, he will choose whichever he himself prefers. Since Bob chooses an orange juice, we can conclude that Bob prefers orange juice to coke.