

Probability Theory and Mathematical Statistics

In class assignment

Of three prisoners, Mark, Luke, and John, two are to be executed, but Mark does not know which. Mark therefore asks the jailer “Since either John or Luke are certainly going to be executed, you will give me no information about my own chances if you give me the name of one man, either John or Luke, who is going to be executed.” Accepting this argument, the jailer truthfully replied “Luke will be executed.” Thereupon, Mark felt happier, because before the jailer replied his own chance of execution was $2/3$, but afterwards there are only two people, himself and John, who could be the one not to be executed, and so his chance of execution is only $1/2$.

Is Mark right to feel happier? Prove your assertion by using probability theory.

Mark returns to his cell. That evening an alien doing a comparative study of intraplanetary penitentiary systems interviews Mark. Mark explains his problem. The alien doesn't know if Mark or John will be executed, but she does know how to perform body switches. The alien offers to switch Mark into John's body. So if John is not executed then Mark will live in John's body. Mark would rather be John than dead, so he seriously considers the offer. Mark must decide immediately since the alien is departing for her home planet that night.

Should Mark take the alien up on her offer?