

Freedom or Death: A Prisoner Problem

David Clark
Randolph-Macon College

Friday, October 23, 2009, 1:40 PM, Copley 200

All 100 prisoners are summoned to a large room, where the warden tells them they must play a game. If the team of prisoners wins the game, they all go free; if they lose the game, they are all put to death. The rules of the game are simple:

- The warden has written each prisoner's name on a slip of paper. In an adjacent hallway stand 100 closed lockers, and each locker contains exactly one of these slips of paper.
- The first prisoner must enter this hallway by himself, and is allowed to open 50 lockers, but may not move any of the slips of paper.
- If the first prisoner finds his name, he exits the hallway from the opposite end, and the second prisoner is allowed to enter.
- The second prisoner, again, is given 50 chances to find his name.

The process continues until one prisoner fails to find his name. If this happens, the prisoners lose the game, and all 100 prisoners are put to death. The prisoners win, and are set free, if all 100 prisoners are able to find their names.

No collaboration among prisoners is allowed once the game starts, but they are told they may discuss possible strategies beforehand. After ten minutes of hushed and gloomy discourse and much nail-biting, one of the prisoners, a mathematician who had been frantically scribbling on the prison wall, tells the others he has an idea. The smiling mouth of the onlooking warden twitches downward slightly...

