

Brain Teasers Updated by Larry, Li on 07-Oct-2012

Question 1: A room has 100 boxes labeled 1 through 100. The names of 100 prisoners have been placed in these boxes by the warden. The prisoners shall visit the room one by one. Each prisoner is allowed to inspect the contents of at most 50 boxes, one after the other and leave the room with no communication with other prisoners (my understanding is no others will know whether or not a prisoner is released after visiting the room as well) If the prisoner discovers his own name in the boxes he inspects, he is released. The prisoners are allowed to collude beforehand and devise a strategy to maximize the chances of releasing each and every prisoner. What is their strategy?

Answer:

Beforehand, the prisoners randomly assign "ownership" of one box to each prisoner. As a result, each of the 100 boxes now has a "label" on the outside.

Each prisoner goes to the box with his name on it. He finds another prisoner's name in the box. He then looks into the box labeled with that prisoner's name. He continues in this fashion until he finds his own name or ends up looking into 50 boxes.

The question is: "Why does this procedure greatly increase the prisoner's chances of survival?"

From probability's perspective, the probability *that a random permutation of $2n$ objects has no cycle of length greater than n is at least 1 minus the natural logarithm of 2* , In this case, it comes to 31.18 percent.

Question 2: It is your task to deliver as much as grain as possible from city A to city B. The cities are 1,000 miles apart. You initially have 10,000 pounds of grain. Your camel may carry up to 1,000 pounds and eats 1 pound of grain per mile traveled. You may leave grain along the way and return to it later. How much grain can you deliver to city B?

Answer: TBD ^_^