

Day 1 Brain Teasers - Week 2

Batch I - Vikings

Time Limit: 30 Minutes

June 17, 2019

1 More puzzles!

1. Ronald and Michelle have two children. The probability that the first child is a girl is 50%. The probability that the second child is a girl is also 50%. Ronald and Michelle tell you that they have a daughter.

What is the probability that their other child is also a girl?

There are four possibilities for two children, with equal probabilities:

First Child	Second Child
Girl	Girl
Girl	Boy
Boy	Girl
Boy	Boy

The fourth possibility is not possible, because Ronald and Michelle have a daughter (so either the first or the second child is a girl). Therefore, three possibilities remain, of which in one case the other child is also a girl. As a result, the probability is $\frac{1}{3}$ or 33%.

2. There are five holes arranged in a line. A hermit hides in one of them. Each night, the hermit moves to a different hole, either the neighboring hole on the left or the neighboring hole on the right. Once a day, you get to inspect one hole of your choice. How do you make sure you eventually find the hermit?

Hint: Divide the holes into odd and even sets.

Let holes be numbered 1 through 5. Inspecting the holes in any of the following sequences suffices:

2, 3, 4, 2, 3, 4

2, 3, 4, 4, 3, 2

4, 3, 2, 2, 3, 4

4, 3, 2, 4, 3, 2

Explanation for sequence 2, 3, 4, 2, 3, 4: Let F denote the set of holes where the fox might be hiding. On any morning, the fox is either in an even numbered hole or an odd numbered hole.

So on the first morning, either $F = 1, 3, 5$ or $F = 2, 4$. If $F = 2, 4$, then the following sequence of inspections suffices to catch the fox: 2, 3, 4. However, if the fox was not caught, then F must be $= 1, 3, 5$ on the first morning, so F must equal 2, 4 on the fourth morning. Therefore, repeating the sequence 2, 3, 4 from the fourth day on-wards would suffice to catch the fox.