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Scalable Data Infrastructures (SDI)

Problem Solving

Problem #1: “A Cat, a Parrot, and a Bag of Seed”

*A man finds himself on a riverbank with a cat, a parrot and a bag of seed. He needs to transport all three to the other side of the river in his boat. However, the boat has room for only the man himself and one other item (either the cat, parrot or seed). In his absence, the cat could eat the parrot, and the parrot would eat the bag of seed. Show how he can get all the passengers to the other side, without leaving the wrong ones alone together.*

**Solution #1: The man can transport the bag of seed first, then the cat and then the bird.**

**Solution #2: The man can transport the cat first, then the bag of seed and then the bird.**

Problem #2: “Sock in the Dark”

*There are 20 socks in a drawer: 5 pairs of black socks, 3 pairs of brown and 2 pairs of white. You select the socks in the dark and can check them only after a selection has been made. What is the smallest number of socks you need to select to guarantee getting the following: a) At least one matching pair b) At least one matching pair of each color.*

**Solution a): The probability for grabbing a pair of black socks is higher due to the fact that the quantity is more.**

**Solution b): You will most likely grab 2 pairs of black socks, 1 pair of brown socks and 2 pair of white socks.**

Problem #3: “Predicting Fingers”

*A little girl counts using the fingers of her left hand as follows: She starts by calling her thumb 1, the first finger 2, middle finder 3, ring finger 4, and little finger 5. Then she reverses direction, calling the ring finger 6, middle finger 7, first finger 8 and thumb 9, after which she calls her first finger 10 and so on. If she continues to count in this manner, on which finger will she stop? a) What if the girl counts from 1 to 10 b) What if the girl counts from 1 to 100 c) What if the girl counts from 1 to 1000.*

**Answer a): From 1 to 10 she ends on her first finger.**

**Answer b): From 1 to 100 she ends on her ring finger.**

**Answer c): From 1 to 1000 she ends on her first finger.**