**Problem Number one:**

**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.

1. a) The Problem is that the man needs to get the bag of seed, the parrot, and the cat across the river in the boat, but only the man and one other thing can go with him.

b) Why does the cat and parrot not run/fly away? The cat and the bird are probably in cages so it’s possible that they wouldn’t eat each other.

c) The Goal is to get all of them across safely.

1. a) The parrot cannot be left alone with the cat.

The parrot cannot be left alone with the bag of seed.

b) We do not want the parrot to eat the bag of seed, and we do not want the cat to eat the parrot.

1. 1) You can take the bird across first and the cat won’t eat the birdseed, and the bird won’t be eaten by the cat. But then the bird will be left alone with the birdseed or the cat on the other side.

2) Or it is possible that the parrot could fly across being tied to the boat, but you would still need to make an extra trip.

3) Assuming the bird and the cat are in cages no matter what he takes across first they will be safe.

1. I am going to assume the parrot and cat are in cages, because if they were not in cages on either side of the river they could still eat one another. So he could take any of them across first.

Or assuming they’re not in cages and they can’t eat each other on the river. He could tie a string around the birds foot and have it fly across and the cat in the boat, and then he could go back for the bag of seed.

**Problem Number Two:**

**Socks 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.*

1. a) We need to pick at least one matching pair of each color.

b) It is possible that the socks are already matched and folded so you would have to try to get one pair of each color when you reach in.

c) The overall goal is to get one matching pair of each color.

1. You have to choose at least one matching pair, but you need to choose at least one matching pair of each color.
2. If they pairs are balled up you would only have to choose at a minimum of 3 times. But if they are not balled up you would have to choose at least 6 socks to be able to find a matching pair of each color.
3. The solution would vary for every time it was tried.
4. I am putting 5 pairs of black socks balled up(pre-matched), and 3 brown socks balled up, and 2 white pairs of socks, in a drawer and turned the lights off. I am going to choose until I get one of each color.

First pair is white. Second pair is black. Third pair is black. Fourth pair is black. Fifth pair is brown.

Now I’m going to separate them and try again. The least amount of sock we should have to pull is 6. But as we seen above it doesn’t work like that.

First sock is a black Joe boxer. Second sock is a Black Joe Boxer. (Matching pair) Third sock Black Joe Boxer. Fourth sock is a brown gray striped. Fifth sock is a white green striped. Sixth is a Black Joe Boxer. (Another pair but not what we need) Seventh sock is a Black Joe Boxer. Eighth is a Brown with Orange Stripe. Ninth is a black Joe boxer. (Another pair but not what we need.) 10th sock is a Brown with grey stripe. (We now have out brown pair.) 11th is a brown with blue. 12th is a Brown with blue. (Another pair not what we need) 13th is a white with a green stripe. We now have a matching pair for each color.

As you can see you can’t really put a number on it. It’s all up to probability. If you did the test your results would be different.

**Problem Number Two:**

**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 – Ring Finger

c) What if the girl counts from 1 to 1000

1. We need to find out what finger she will land on counting back and fourth on her left hand to 10, 100, and 1000.
2. We need to find what finger on her left hand she lands on counting to 10. We need to find what finger on her left hand she lands on counting to 100. We need to find what finger on her left hand she lands on counting to 1000. We are not counting the last we counted.
3. She’s going to land on her first Finger for 10, 100,
4. Yes it answers the problem and also is correct.
5. The solution is the first finger. I counted to 100 3 times and landed on my first finger for 100. So for every hundred after that would be first finger.