A Cat, a Parrot, and a Bag of Seed

1. Define the Problem
   1. A man has a cat, parrot and a bag of seed and needs to cross a river. He only has room in his boat for him and one other item. If the man is not present the cat would eat the parrot or the parrot would eat the seed. He needs to cross the river with all three items.
2. Breaking the Problem apart
   1. Crossing the river with himself and one other item
   2. Can not leave the Cat and Parrot alone
   3. Can not leave the Parrot and seed alone
   4. Can leave the Seed and Cat alone.
   5. All need to cross the river
3. Identify Potential Solutions
   1. Cross the river with himself and item, and the other items will ok together
   2. Leave the cat and the seed alone while you take the parrot over
   3. Leave the Parrot and cat alone while you take the seed over
   4. Take the Parrot over while you leave the other two alone
4. Evaluate each Solution
   1. Each Solution meets the goals but does not work in all cases.
5. Solution
   1. The solution for the problem is as follows:
      1. He first takes the Parrot to the other side
      2. He travels back to the alone
      3. He then takes the Seed to the other side
      4. He then takes the Parrot back to the other side
      5. He then takes the Cat to the other side
      6. He travels back to alone
      7. He then takes the Parrot back to the other side.
   2. I tried several test cases, and was not thinking about traveling back to the first side with any items. As I was driving home a light bulb went off and realized that I could take items back to the other side, so the wrong items would not be left alone with each other.

Socks in the Dark

1. Define the Problem
   1. You are in the dark and need socks. In your sock drawer you have 20 socks made up of 5 pairs of black, 3 pair of brown, and 2 pair of white.
      1. You need one matching pair of socks with the smallest selection possible
      2. You need one matching pair of each Color with the smallest selection possible.
2. Break the Problem Apart
   1. You need to select one matching pair
   2. You need to select one matching pair of each color
3. Identify Potential Solutions
   1. You can select 4 socks and this would give a guaranteed match
   2. You can select 10 socks and this would only give you a guaranteed match with Black socks
   3. You can select 16 socks and this would only give you a guaranteed match with Black & Brown socks
   4. You can select 18 socks and this would only give you a guaranteed match with Black & Brown & White socks
4. Evaluate Each Potential Solution
   1. Not all solutions will work.
   2. Solution (a) will work for the first problem
   3. Solutions (b, c) will work for the first problem, but not in the smallest selection possible. And it will not work for the second problem, because we would not have a guaranteed match for each color.
   4. Solution (d) will work for the second problem
5. Solution
   1. The first solution is to pull 4 socks from the drawer. This will ensure you have a match. Since color does not matter.
   2. The second solution is to pull 18 socks from the drawer. This will allow you to have a guaranteed match in each color.

Predicting Fingers

1. Define the Problem
   1. Girl is counting on her hands to ten. She counts in the same direction each time, and wants to know which finger each will leave off with when she hits:
      1. 10
      2. 100
      3. 1000