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.

1. **Define the Problem**

The problem is this…there is a man with a boat on one side of the river. Accompanying him is a cat, a parrot and a bag of seed that he need to get to the opposite side of the river, but how to do so without each of his passengers dining on the other (with exception to the bag of seeds). Some things I considered before breaking this problem down were some general ideas like: Can the parrot fly? Just how big is the bag of seeds and can the cat sit on top of it? Also, just how big is the boat? The overall goal is to get all 3 items (cat, parrot, seeds) to the other side without the cat eating the bird or the bird eating the seeds.

1. Break the problem apart

By breaking the problem apart, I determined that obviously if he leaves the cat with the bird, the bird is history. If he leaves the birds with the seeds, the seeds are history. Obviously there isn’t enough room in the boat for all three to go with the mighty sailor, leaving him with the issue of getting all of them across the river in one piece.

1. Identify potential solutions

To accomplish the sub-goal of not allowing the cat to eat the parrot or the parrot to eat the seeds, I determined that several trip are going to need to be made.

1. Evaluate each potential solution
2. Choose a solution and develop a plan to implement it

Problem 2:

**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:

1. At least one matching pair
2. At least one matching pair of each color
3. Define the Problem
4. Break the problem apart
5. Identify potential solutions
6. Evaluate each potential solution
7. Choose a solution and develop a plan to implement it

Problem 3:

**Predicting Fingers:**

A little girl counts using the finger of her left hand as follows: She starts by calling her thumb 1, the first finger 2, middle finger 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?

1. What if the girl counts from 1 to 10
2. What if the girl counts from 1 to 100
3. What if the girl counts from 1 to 1000
4. Define the Problem
5. Break the problem apart
6. Identify potential solutions
7. Evaluate each potential solution
8. Choose a solution and develop a plan to implement it