***Scalable Data Infrastructures***

***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.

**Answer**

**1. Define The Problem**

1. So the man need to use a boat that can only hold two things to transport himself, a cat, a parrot and a bag of seed to the other side of the river. He can’t leave certain combinations of things together because they may eat one or the other.
2. The word problem never said how long the man has to get all across the river.
3. Get himself, the cat, the parrot and the bag of seed across the river.

**2.Break The Problem Apart**

1. The constraints are; the man can’t leave the cat with the parrot because the cat may eat the parrot. The man can leave the parrot with the bag of seed because the parrot may eat the bag of seed. The boat can only hold the man and one other item.
2. The sub goals are the not have the cat eat the parrot and not have the parrot eat the bag of seed.

**3. Identify Potential Solutions**

1. So the cat wont eat the parrot, don’t leave them together unattended. So the bag of seed won’t get eaten, don’t leave the parrot with the bag of seed.

**4**. **Evaluate Each Potential Solution**

1. The solutions could work if they are executed right, in the right order.
2. I do believe that the before mention solutions can work.

**5**. **Choose A Solution and Develop A Plan To Implement**

1. The solution I propose is since the boat only has two spots and the man has to take up one, the man can put the parrot in the boat, pick up and hold the cat, make it across the river. Drop off the parrot, while still holding the cat and head back for the bag of seed. Put the bag of seed in the boat, while still holding the cat and make a second trip across the river.
2. I thought about taking the cat first but the parrot would have eaten the seed. So I thought taking the seed first, but the cat would have eaten the parrot. Then I thought about taking the parrot first but after the second trip something would have gotten eaten. Then I reread the problem and it didn’t say the man could not hold a item or the number of trips he had to make so that is how I got my solution.

**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 guarantee getting the following:

a) At least one matching pair

b) At least one matching pair of each color

**Answer**

**1. Define The Problem**

1. There are 20 socks in the drawer, 5 pair of black, 3 pairs of brown and 2 pairs of white ones. We need to find out the smallest number of socks to guarantee a matching pair and a matching pair of each color.
2. There are 10 black socks, 6 brown socks and 4 white socks.
3. Make the least amount of selections and achieve both goals.

**2.Break The Problem Apart**

1. The constraints are; we need to keep the selection number low and we don’t get any do overs.
2. The sub goal is to get 4 total pairs of socks.

**3. Identify Potential Solutions**

1. By there being more black socks, we have a higher chance of selecting a pair of them in fewer tries.

**4**. **Evaluate Each Potential Solution**

1. Yes.
2. Yes.

**5**. **Choose A Solution and Develop A Plan To Implement**

1. The drawer could be organized with black socks to the left of the drawer, brown socks in the middle of the drawer and white socks on the right of the drawer. That way it would only take 2 selections to get 1 pair of socks and 6 selections to get 3 different pairs of socks.