Benjamin Thompson, 1/12/13 Web Programing Fundamentals 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.*

1. Define the problem

The problem is the man needs to get to the opposite side of the river taking with him 3 things. The three things he has are: a cat, a parrot and a bag of seeds. He can only take one of these things with him at a time and needs to be careful what he leaves together so they do not get eaten.

If he leaves the cat with the bird it will be eaten, if he leaves the parrot with the seed it will also be eaten. One thing that is not clearly defined in the original explanation of the problem is the fact that you can take thing both ways as needed.

2. Break the problem apart

The big problems and constraints that I can see are that he can only take one thing with him at a time and that if he leaves some of the items alone they will be eaten.

The sub goals are

- To get to the other side of the river while keeping everything alive

- To not not leave the incorrect items with each other

3. Identify potential solutions

One solution is to leave the cat with and the seeds and cross the river with the parrot, leave the parrot on the opposite side of the river. Return and get the seed, take the seeds to the opposite side of the river and pick up the parrot. Take the parrot to the original side of the river and leave it while you pick up the cat and take it to the opposite side of the river. The final two steps would be to leave the cat with the seeds and return to the original side of the river to get the parrot and proceed to the opposite side of the river.

Another solution would be to change the cat and the seeds on the trips following trip one and two.

Problem 2.

*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:*

Problem 3.

*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*