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Web Programming Fundamentals

Problem Solving

**Problem 1:**

The goal is to get all three items (Cat, Parrot, Seed) to the other side of the river, taking only one at a time, without leaving the cat with the parrot or the parrot with the seed. What I took from the problem was that both the cat and parrot could act upon the other elements, whereas the seed does not.

The constraints to this problem are that only one of the elements can be carried across the river at any given time. Also, the cat cannot be left alone with the parrot and the parrot cannot be left alone with the seed. The sub-goal is to get all 3 passengers across the river without any harm to any of the elements.

The only solution that would solve the main problem along with the sub goals would be to transport the parrot first, then to return and get the seed. Upon returning to the opposite side of the river, dropping off the seed and picking the parrot back up. Then returning to the original side of the river and picking up the cat, leaving the parrot behind this time. After dropping the cat off, return to the original side and pick the parrot back up.

This solution will work to solve the problem, the cat is not left alone with the parrot and the parrot is not left alone with the seed. Also, only one item is in the boat with the man at any given point. This solution will work for all cases of this particular problem; all goals and sub goals are met.

There is only one solution to this problem, which is to take the parrot first, return for the seed and then pick the parrot back up, return for the cat while leaving the parrot, and then to return for the parrot. My first plan was to take the seed first, since it did not interact with anything, but then I remembered that the cat and the parrot could not be left behind. I looked into taking each one by itself, but soon realized that the journey could not be accomplished without taking more than 3 trips.

**Problem 2:**

The problem is to select one pair of each color of sock, without being able to see them, selecting the fewest amounts of pairs of socks as possible. My insights into this are that it is impossible to guarantee that the selection would include all the colors of socks without choosing nearly all of them.

The constraints of the problem are that there are 20 socks in the drawer of various colors in different amounts. The socks can only be selected in the dark, so determining their color can only be done after selection. The sub-goal of this problem is to select the socks without seeing them.

The sub goal to the problem cannot be solved, since it is one of the constraints to the problem. The only solution is to grab nearly all of the socks, since it is the only way to assure that a pair of each color of socks is found. Specifically you would need to grab 18 socks. This solution is the only way to assure the problem is solved. This solution will works for all cases of this problem. No matter how many times this problem is attempted, this solution will achieve the goal.

The only way to solve this problem is to grab 18 of the socks. Without being able to see any of the socks and needing one complete pair of each of the socks it is the only way those criteria can be met with certainty. I tested a few ideas dealing with probabilities given the amount of socks, but none of them met the requirement of guaranteeing a pair of socks of each color.

**Part 3:**

The problem listed is to figure out which fingers she would stop at given the counting system told in the problem. The insight that I noticed while reading the problem is that the fingers would keep a consistent pattern of their numbering because there is 5 fingers in a 10 count system. The overall goal is to figure out which finger she would stop on at the various intervals given.

The constraints of this problem are that the counting system does not change, the pattern repeats over and over. The sub-goals are the different numbers in which she could potentially count to.

Potential solutions include using the same counting system to duplicate her system and figure out each answer. Also, a basic mathematical equation could help determine which finger she would land on. Also, examining the pattern and figuring it out and how it repeats.

The solution to the sub goals is to use the base solution to figure out which fingers she would land on.

The solution I would use is examining the pattern. Because the pattern is 5 fingers in a 10 count the pattern remains the same, regardless of how many times it is repeated. This would work in all cases of this problem, provided the amount of fingers counted and the count itself remained the same.

My final solution is to simply infer results from the pattern. No matter how many times the process is repeated the fingers that the count lands on would remain the same. I attempted to overthink this problem as well, thinking about math equations and such. In the end, the obvious solution became the simplest.