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Web Programing Fundamentals

Problem Solving

**Problem 1 – A Cat, a Parrot, and a Bag of Seed**

1. Define Problem

* To get all the passengers to the other side of the river without leaving the wrong ones alone together

1. Break the problem apart

* In the absence of the man, the cat could eat the parrot, and the parrot would eat the bag of seed.

1. Identify Potential Solutions

* The parrot can go first

1. Evaluate each potential solution

* The parrot going first the cat will not eat the bag of seed

1. Choose a solution

* The man takes the parrot to the other side first, comes back alone.
* Takes the bag of seed to the other side.
* Leaves the bag of seed the other side and take the parrot back to the initial point
* Leaves the parrot and takes the cat to the other side.
* Leaves the cat with the bag of seeds and go back to the initial point by himself
* Takes the parrot to the other side again, and he will have all the on the other side of the lake.

**Problem 2 – Socks in the Dark**

1. Define Problem

* Out of 20 socks in a drawer, get at least one matching
* Part B - Out of 20 socks in a drawer, get at least one matching of each color

1. Break the problem apart

* In the dark, out of 20 socks I have 5 pairs of black socks, 3 pairs of brown and 2 pairs of white, that have to be guaranteed that can be matched

1. Identify Potential Solutions

* Take at least 2 of each
* Part B - Take at least the total number of 2 colors + a pair

1. Evaluate each potential solution

* I have 20 socks, which are 10 black, 6 brown and 2 white. As I need one guaranteed matching, I only need to take 1 of each + 1.
* Part B - To have at least one matching of each color, I have to be sure I will take out 2 out of the 3 colors all out, plus 2, which will be the 3rd color matching

1. Choose a solution

* Take out 3 socks.
* I will have at least 3 of the same color, but to be sure, I will take the 4th socks, so if I had taken out of each, by now I will have at least 2 of one color, making a pair.
* Part B
  + Take out the total number for the most 2 colors that are in the drawer.
  + After taking out 16 socks, I will take out another 2, which for sure, I will have at least 1 matching pair of each color of socks.

**Problem 3 – Predicting Fingers**

1. Define Problem

* Little girl counting fingers only on the left hand without counting the same finger twice on the same round. I need to know:
  + What finger she will finish the counting if:
    - Counts from 1 to 10
    - Counts from 1 to 100
    - Counts from 1 to 1000

1. Break the problem apart

* As we have 5 fingers, one round will be from the thumb to the little finger once. By reversing direction, it will be another round, perhaps, she doesn’t count the finger she finished the last round again.

1. Identify Potential Solutions

* The parrot can go first

1. Evaluate each potential solution

* The parrot going first the cat will not eat the bag of seed

1. Choose a solution

* The man takes the parrot to the other side first, comes back alone.
* Takes the bag of seed to the other side.
* Leaves the bag of seed the other side and take the parrot back to the initial point
* Leaves the parrot and takes the cat to the other side.
* Leaves the cat with the bag of seeds and go back to the initial point by himself
* Takes the parrot to the other side again, and he will have all the on the other side of the lake.