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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

* If I count from 1 to 20, I will find a parameter. Just set:

Thumb first finger middle finger ring finger little finger

1 2 3 4 5

9 8 7 6

10 11 12 13

17 16 15 14

18 19 20

1. Evaluate each potential solution

* Just take one finger, and set up a formula from the parameter.

For example, if I take the first finger, I can set up a formula of (8n)+1

1. Choose a solution

* So, if I need to know 10, I will take, 10
* 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.