**A Cat, a Parrot, and a Bag of Seed:**

**Problem:**

A man has to use his boat with limited space to carry himself and one of his 3 items, a parrot, a cat, and a bag of seed. He is faced with the dilemma that if he only takes one at a time, he risks losing one of the items.

**Goal**:

To get all 3 items across the river via his boat without incident or loss to all 3 items.

**Smaller Problem/Constraints:**

* Parrot will eat seeds if two are left alone while man transports his cat across the river.
* Cat will eat parrot if left alone while man transports seed across river.
* Boat only has room for man and one item to transport.

**What isn’t visible from word problem:**

* The size of the boat.
* How much weight can the boat handle?
* What type of boat (motor, row, etc.)?
* The river’s current and direction.
* The weather on that particular day.
* The size of the bag of seed.
* The size and type of cat.
* The size and type of parrot.
* How wide is the river from bank to bank?
* How much travel time between river’s banks?
* What items are of significant importance?
* Is the boat in a port or in the wilderness? Is there civilization around?

**Possible Solutions:**

* Kill both the parrot and cat
* Let the cat go
* Let the parrot go
* Plant or sell the seeds
* The man could put the parrot on his shoulder, hold the cat on his lap, and place the seeds in the reserved open space. Take the boat across the river, task completed.
* The man could put the parrot on his shoulder, sit on the bag of seed, and place the cat in the reserved open space. Take the boat across the river, task completed.
* The man could put the parrot on his shoulder, transport the seeds in the reserved open space and drop them off on the other side. He would then take parrot with him back to the original point of origin. While keeping the parrot on his shoulder, he would place cat in reserved open space and take the cat to the other shore. Task completed.

**Final Solution:**

There were a few options that the man could have chosen in solving his dilemma of transportation as I noted in the possible solutions section; some more drastic than others while some a more time consuming and hard work. For me the question of practicality is what influenced my final decision.

Apparently, the cat and parrot are important to the man, thus why he faces the dilemma he is in. So killing or letting the animals go will not work. Also the bag of seeds is of some importance to him as well. This will get rid of the idea of selling or planting the seeds. I also presented 3 more viable solutions for the man, however, two of them may only be a theory. There are some variables such as the size of the boat, how much weight it can hold, and type of boat that factor into 2 of the possible solutions. Without this information, Sending the man with a boat laden with too much weight or items could sink it mid-journey and be the demise of all on it. I believe that though it will require more work, time and patience. The man making multiple trips with the parrot in tow is the best solution I could come up with. It will ensure that he not only leaves the cat with the parrot unsupervised, but also he won’t leave the parrot with the seed unsupervised.

**Socks In The Dark:**

**Problem:**

It is dark and I can only pick one pair of socks out of 20 socks that are of 3 different colors. The only way I can verify that I picked a pair is once I have selected it.

**Goal:**

To pick a pair of matching socks with the minimum amount of tries. To pick a pair of each color sock with the minimum amount of tries.

**Smaller Problems/Constraints:**

* It is dark making selecting a pair of matching socks very difficult.
* I am unsure of my selection as I can’t see what I am picking and doubt my decisions.
* I have no real knowledge on probability, which influences my doubts.
* Once decision is made, I run the chance of having mis-matching socks in different colors.

**What isn’t visible from word problem:**

* What is the reason for me being in the dark?
* Is there a limit on how many times I can check my socks until I get it right?
* Is this place wired for electricity or is a rural type setting?

**Possible Solutions:**

* Get a lamp or find some way to get light into the darkness.
* Make sure that I wear socks that are all one color.
* Add special indicators such as tags, or different fabrics to my socks so I can tell the difference between them.
* Learn and use probability so that I can pick the amount of socks needed to ensure I have a matching pair or matching pairs for each color.

**Final Solution:**

This problem was a problem for me. It has been a while since I have done mathematics, 20 years to be exact, so it through me for a loop. I knew it had to do with probability or odds because of the questions asked in regards to finding the minimum amount of pairs to find a solution to each answer. However, I did it caveman style and actually broke out 20 pairs of socks and visually tried to come up with an answer. As I don’t know if it was correct or not, this was my attempt.

Now realistically speaking I could have gone with one of my possible solutions as an answer but because of the math aspect of the problem, I knew this was a test in regards to programming. Getting a lamp was not practical, though it was a logical way to solve the problem of darkness, but since there was no indicator of there was access to some form of electricity or appliance, it was not a feasible answer. Another simple step would be to ensure all of my socks were the same color, but that is not the situation I faced at the particular moment and would still have to figure out an answer until I could make those changes. Adding tags, indicators, etc. just seemed like tedious work for some socks. The problem says I was in a dark room, not blind. For me the most practical way to figure out my issue while I sat in the dark contemplating how to pick a pair of socks would be to use probability or odds. By employing these math concepts I would pick the right amount of minimum socks to ensure that I am able to reach my goal of 1 matching pair or 1 matching pair of each color.

**Answer to questions:**

As stated earlier I actually pulled out 20 pairs of socks to help me attempt to figure out the answers to a and b.

1. The answer was 6. There were 3 different colors, so with 6 socks 1 color had to repeat giving me at least one matching pair.
2. 17 or 18. Logic tells me that if I pick all 10 black socks, and all 6 brown socks, then I will pick one white sock on the 17th and 18th choices thus guaranteeing I have one pair of all 3 color socks. However, I could pick them soon in the time line of picking. But it asks for minimum.

**Predicting Fingers:**

**Problem:**

I have to figure out answers to 3 questions about a girl who uses her fingers to count by going forward starting from her thumb to her pinky and who continues her count going in reverse.

**Goal:**

To figure out the answers to the 3 questions using the method of counting the girl used.

**Smaller Problems/Constraints:**

The time it takes to count from 1–1000 in this method is time consuming.

Counting in this manner can cause confusion, which could lead to a mistake.

**What isn’t visible from word problem:**

This problem was pretty much straight forward and I didn’t see anything hidden in the word problem. I could ask why was this the way she chose to count, why didn’t someone teach her another way, what is the purpose of her counting in this manner, etc. But these are not questions that play a role in answering the 3 questions presented.

**Possible Solutions:**

Teach the girl to properly count using multiplication and addition.

Use multiplication to help figure out the problem.

Use her method and track milestones of each finger for the answer

**Final Solution:**

Once I figured out what numbers would land on what finger, I was able to differentiate odd from even. With 5 and 10 always landing on the pinky I was able to figure out:

First & Ring fingers will always be even numbers, alternating the multiple of 10 as:

First Finger: 10, 40, 50, 80, 90

Ring Finger: 20, 30, 60, 70, 100

101 starts on little finger so counting is the opposite direction of counting from 1-100 above.  Alternating multiples of 100:

First Finger: 200, 400, 600, 800, 1000

Ring Finger:100, 300, 500, 700, 900