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Problem Solving Assignment

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

So this man has no way of getting his cat, parrot and bag of seed across the riverbank because he can only fit one of them in the boat. He knows that if he leaves the cat with the parrot, the parrot will be eaten. If he leaves the parrot with the seeds, the seeds will be eaten. He has to make the right decision on what to bring first. If he doesn’t bring them in the correct order, one of the items will not be coming to the other side of the riverbank with him. Also, once he crosses, he has to make sure the items to eat the other while he goes back across. The overall goal is to get all 3 of the items to the opposite side of the riverbank and that they are all still there once they have all crossed.

The constraints are that he cannot bring all 3 items at one time. That means that he cannot take just one trip to the other side, he has to go 3 times. Another constraint is that each time, he has to leave each item with another item that won’t eat the other item. The sub- goal is that the cat doesn’t eat the parrot, and the parrot doesn’t eat the food.

 A possible solution is to feed the bird before he begins to bring the items. That way, he can bring the cat first, then the bag of seed and then the parrot. While he is gone, the parrot will not eat the seed because it is full. Once on the other side, the cat will not eat the seed while he goes to get the parrot. Once the parrot gets there, he will not have to go back, so the parrot will be safe from getting eaten.

I believe that feeding the parrot and then bring the cat, then the seed and then the parrot is the best solution, that way everything will be safe. With my first test, I thought that A possible solution would be, so that none of the wrong items are left alone together, was to bring the parrot first, that way just the cat and the seed is alone. The cat will not want the seed. The issue is what to bring next because either the parrot will eat the seed while he goes to get the cat, or the cat will eat the parrot.

Another option I thought of  was to bring the cat and on the second trip, bring the parrot and seed by having the parrot sit on his shoulder. But, I know he is only supposed to bring one at a time, but I thought he could try to bring both. One other test was maybe the parrot can fly over while he brings the seed over.

I figured out that the best solution was to have the bird eat some of the seeds, the man bring the cat across, then the bag of seed and finally the parrot. Since the parrot has eaten, he won’t eat the whole bag of seed. If the cat and parrot have no time alone together, the parrot will not be eaten.

**Socks in the Dark**

The problem is that I need to choose one matching pair of socks and one matching pair of each color. There are 5 pair of black, 3 pair of brown and 2 pair of white. I can’t see which socks are which because it is dark and I can’t see until after. The goal is to pick one pair of matching socks and then one matching pair of each color.

The constraints are that I will not be able to use the lights, so I will not be able to see what I am doing. Also, the issue is that none of the socks are paired together, so when I choose a sock, it will only be one a time rather than a pair of them. I want to pick a pair of socks that match and furthermore, pick a pair in all 3 colors.

A potential solution would be that I put all of my socks in sections with like colors, so that when I choose, I know where I am reaching. Another solution is to just pair the socks together so that they are not scattered in the drawer. That would be a solution that would solve all of the problems.

Because the scenario is as if all of the socks were throughout the drawer, and not paired together, I came to the best solution that I could figure out. In order to get at least one matching pair, I would need to pick at least 4 times. I say four times because their are 3 colors in the drawer. There is a possibility that I will pick one of each color, which would be 3 choices. The fourth pick would be a sock of the same color as one of the others. So, that will be 4 picks altogether. In order to guarantee that I get one pair of each color, I would need to make at least 20 picks. Because there are 10 individual black socks, there is a possibility that I would pick 10 black socks. Then, there are 6 brown, so I could possibly pick all 6 and still could possibly not have white socks. Then, there are 4 white socks so, there is at least 4 picks from them. Altogether, there are 10,6 and 4 picks which total to 20 picks. I think that is the least amount of picks to guarantee I have one pair in each color. I have to figure out, if a little girl continues to count starting at her thumb for number 1, and end on her thumb for the number 9, what finger will she stop on if she counts from 1 to 10, 1 to 100 and 1 to 1000.

**Predicting Fingers**

The issue is that, with her counting in that manner, she will not always stop on the same finger. The goal is to figure out which finger the little girl will stop on if she counts to 10,100 and 100.

The main constraint is that she will not land on the same finger every time. Therefore, you have to figure out which finger she lands on each time.

A way that I can figure out the solution would be to count from 1 to 1000 in the same manner that she did, but that would be time consuming.

The best solution I found was to do some of the counting in the manner that the little girl did, and find if there is a pattern in which finger she lands on. I did find a pattern and that was that she always lands on the first finger or the ring finger. For 1 to 10, she landed on her first finger. For 1 to 100 she landed on her ring finger. Lastly, from 1 to 100, she landed on her first finger. I found a pattern that after 1 to 10, it switched to the ring finger for 10 to 20 and then for 20 to 30 it was also the ring finger. For 30 to 40 it was the first finger and for 40 to 50 it was the same. The pattern after 1 to 10 became it was the ring finger landed on twice, followed by the first finger landed on twice. The best solution for me was to find the pattern in the finger she landed on. That was how I solved the problem.