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**SDI (Scalable Data Infrastructures)**

**Problem Solving week1**

Problem #1 A cat, a Parrot and a bag of seed:

A man finds himself on a riverbank with a cat, a parrot and a bag of seed. He needs to transport all three to the other side of the river in his boat. However, the boat has room for only the man himself and one other item (either the cat, parrot or seed). In his absence, the cat could eat the parrot, and the parrot would eat the bag of seed. Show how he can get all the passengers to the other side, without leaving the wrong ones alone together.

1. Define the problem

We need to find the way that the main character move this 3 items from one side of the river to the other avoiding the cat eat the parrot or the parrot eat the bag of seeds. Now the situation don’t spesify how many times he need to do this transfer, but the main goal is to move this animals and the bag of seed without losing any of them.

2.) Break the problem apart

1. The Man need to cross the river and avoid:
2. The Cat eats the parrot.
3. The Parrot eats the Bag of Seed.
4. Left any of this behind when it move one by one.
5. Cross the animals one by one on the boat and get all of them on the other side of the river.
6. Identify potential solution
7. We can move the parrot first and then the cat and last the Bag of seeds.
8. Evaluate each potential solution
9. If we move this on this correct order we will had no one of them the opportunity to eat each other until all are move to the other side of the river.
10. The solution of moving the parrot first and last the bag of seeds it work if we do the transfers 7 times to be successful.
11. Chose a solution and develop a plan to implement it.
12. We will move the Parrot first.
13. We move the Cat second and pick the Parrot to bring back to the original side of the river so the Cat stays by it self on the end side of the goal.
14. We pickup the Bag of seeds and left the Parrot on the start side of the river and move the Bag of seeds with the cat at the end side of the river.
15. We back to the start side of the river and pickup the Parrot and bring him to the end side of the river where is the Cat and the Bag of seeds.
16. All of them are bing transfer with out left unattended each one of the potential ones to be eating from the other one.

They way of moving the parrot first is to live the Parrot by it self when the man look for the cat, we only can carry one at the time back and forward, when the man bring the cat he left the cat and pickup the parrot so the cat and bag of seeds are by it self on each one of the ends and the parrot is in the boat again with him when he go back and pickup the bag of seeds and the cat don’t be with the parrot by it self. When he pickup the bag of seeds he left the parrot by it self so he can transfer the bag of seeds without been eating by the parrot, after the he left the bag of seeds with the cat at the end side of the river he return back to pickup the parrot for the last time and bring all together at the end side of the river.

Problem # 2 Socks in the Dark

There are 20 socks in a drawer: 5 pairs of black socks, 3 pairs of brown and 2 pairs of white. You select the socks in the dark and can check them only after a selection has been made. What is the smallest number of socks you need to select to guarantee getting the following?

a) At least one matching pair.

b) At least one matching pair of each color.

1. Define the problem

a. How can we get match pair of socks and one form each color form 20 socks that is divided by 5 pairs of black, 3 pairs brown and 2 pairs white. This with a situation that the room is dark.

1. The main goal is to get how many socks to get at least one matching pair and at least one matching pair of each color.
2. Break the problem apart

a. The socks are setup on the drawer on separate colors but we can see the socks color at all due is no light on the run.

b. Get the pair of socks of each one of the colors is the sub goal for this problem.

1. Identify Potential solution
2. We need to get 4 socks or 2 pairs of socks to ensure that at least we take one matching pair.
3. We need to pickup at least 6 socks or 3 pairs to ensure that we had one of each matching color.
4. Evaluate each of the solutions
5. When we pickup 4 socks we get one of each the colors but the fourth pick an extra pair of the first color the we pickup so we can have a matching pair color,
6. If we pick 6 socks we ensure that we pick 2 times the same color of the socks and have a match pair of each colors.
7. Chose a solution and developed a plan to implement it

a. Assuming that all the sock was divided by each color on different stacks when we go to pick up the sock on the other from left to right and back again on left to right we repeating toe move of socks out of each one of the stack’s of socks that ensure that we get 2 of each one of the pairs, like if we get one matching pair for example black socks first, brown socks second white sock third and back to black socks fourth, that ensure us that we had 1 matching pair of black socks, if we pick six sock on that order we already pick 2 of each one of the colors.