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**Class:** Web Programming Fundamentals -Section 1

**Assignment Name:** Problem Solving

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 goat, and the goat would eat the cabbage. Show how he can get all the passengers to the other side, without leaving the wrong ones alone together.

**1) Defining the problem:**

• This man is having some difficulty in trying to figure out how to get himself and his items

across the river without trouble and not over crowding his boat.

• At the beginning of the story, the goat and the cabbage were not mentioned.

• Over all goal would be to get everything he needs across with minimum conflicts.

**2) Break the problem apart:**

• The size of the boat is the constraint. As well as, deciding what item to take across first while

trying to avoid any problems.

• The sub-goals would be, having to travel back and forth multiple times in order to get everything

across safely.

**3) Identify potential solutions:**

• The man can take the cat first, then the parrot, bring back the cat to take the seed. Once the

seeds are across, the man can then return for the cat.

• Leave the bag of seed with the cat. Take the parrot across the river first. Get the cat across

after dropping off the parrot. Once the cat is across, return to get the seeds, but bring the parrot

back so the cat wont eat it. Leave the parrot at the starting point. Then take the bag of seed

across. Afterwards, return for the parrot.

**4) Evaluate each potential solution:**

• Yes, the solution meets the goal. Being able to get everything across with minimum conflict

for the animals.

**5) Choose a solution and develop a plan to implement:**

• A possible solution would be, if you assume the goat is the parrot and the cabbage is the seed, the

cat can be the first to travel across the river. The man can then return for the parrot. Once he’s

taken the parrot to the other side, he can then bring the cat back with him. Leaving the cat

back to the starting point so that he can pick-up the seeds. After dropping the seeds off, he then

returns again for the cat.

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:**

• Trying to get matching pair of socks without being able to see what’s available.

• Why does the selection have to be made in the dark and can only be seeing after the

selection is made?

• Gather matching pairs.

**2) Break the problem apart:**

• Having to make a decision in the dark.

• Can test your luck and gather at least 4-6 socks in hopes you’ve obtained a match.

**3) Identify potential solutions:**

• A potential solution would be to grab a few socks and check them in the light if any

of them match. Whether they do or do not match, feel them. Some may have distinct

features to them to where you can feel the difference.

**4) Evaluate each potential solution:**

• Yes, the solution meets the goals.

**5) Choose a solution and develop a plan to implement:**

• You have 20 socks in a drawer, bring out in groups of 5 to get matching pairs.

Predicting Fingers

A little girl counts using the fingers of her left hand as follows: She starts by calling her thumb 1, the first finger 2, middle finder 3, ring finger 4, and little finger 5. Then she reverses direction, calling the ring finger 6, middle finger 7, first finger 8 and thumb 9, after which she calls her first finger 10 and so on. If she continues to count in this manner, on which finger will she stop?

**A)** What if the girl counts from 1 to 10 **B)** What if the girl counts from 1 to 100

**C)** What if the girl counts from 1 to 1000

**1) Define the problem:**

• Having to figure out and follow the proper pattern when counting.

• The little girl is using one hand to count, rather than 2

• Figure out the counting pattern without getting confused

**2) Break the problem apart:**

• The constraints are using only 5 fingers to count.

• Perhaps use 2 hands

**3) Identify potential solutions:**

• A potential solution would be to use both hands because in my opinion it would be less

frustrating and confusing

• Creating a visual chart with numbers

• Can multiply by either 10, 20, or even 50

• Create a multiplication table

• Can count by tens on her index finger.

**4) Evaluate each potential solution:**

• Yes, the solution meets the goal, but it may take longer

**5) Choose a solution and develop a plan to implement:**

• Using her fingers she can add the last number by 10s. In doing so, 10, 100 and 1000 all stop

on her index finger.