Jeremy Suika
Web Development Fundamentals Section 1
Problem Solving
March 5, 2014

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

Define the problem:
    Do this in your own words:

We have to get the three items across the river. The Parrot and the bird cannot be left alone, or they will eat one of the other items, and the puzzle is over. So figure a way to transport across the river with the right combination of items/animals.

    What insight can you offer into the problem that is not immediately visible from the word problem alone?

All I know is that if the cat is alone with the parrot, the bird gets eaten. And the parrot cannot be left alone with the bag of seeds. I feel you have to make a trip across the river and bring back something with you.

    What is the overall goal?

Same as stated above. You need to get all the animals across the riverbank without eating each other.

Break the problem apart
    What are the constraints?

The constraints are the animals that are in question. The Cat left with the parrot will eat it. The Parrot with the seeds will eat it. We also can only have two items on the boat, yourself and one thing. So I can't have three items, just two.

    What are the sub-goals?
Identify potential solutions

A sub goal will be the survival of the animals.

    For each of the sub-problems you've discussed in #2, what is a possible solution?

Making sure not of the animals that will eat each other are left behind.

    Evaluate each potential solution
This exercise will be done in the solution.

    Does each solution meet the goals?

Yes it does meet the goals.

    Will each solution work for ALL cases?
NA

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Choose a solution and develop a plan to implement it.
Explain the solution in full.

You can't have the cat or the parrot by themselves. You can't have the Parrot and the seed bag by themselves. On the left side of the river you have all three things.

1. You travel over to the right side with the Parrot and drop him alone on the right side.
2. Travel back to the left side of the river.
3. You grab the seed bag and take it over to the right side. (leaving cat alone on right side)
4. On the right side you drop off the Seed, <u>but you</u> take the Parrot with you back to left side.
5. Once you reach the left side you drop off Parrot and take the cat with you to right side.
6. At the right side you drop off the cat and leave him with the seeds. (no one gets eaten)
7. You travel back to the left side and pick up the parrot, and make your way over to the right.
8. All three items are across the river and everyone made it out alive and not eaten.

Describe some test cases you tried out to make sure it works. (You can include drawings and diagrams as part of your explanation as long as they are clearly communicating the solution).

I drew a C,S,P to represent the items. I also drew a left side and a right side to represent the sides of the river. In my notes I would say "took Parrot across river." Then the "P" would be removed from the left side, and replaced with it on the right. I could see which animal not to take or to leave alone due to the fact I could see them together on paper. Below is a small example of what I did to solve the problem.

Left Side of River   **_Right Side of River_**

Parrot
Cat
Seeds   —————You travel with the Bird over to the right side——   Parrot

                                          you travel back to right side————————

Cat   —————You travel with the Seeds over to the right side—
Seeds

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Socks

Define the problem:
  Do this in your own words:

You have to grab socks out of your sock drawer. Its in the dark so you cannot see. You have to see the lowest amount of grabs you need to get ONE matching pair. And another question is how many grabs to get the matching pairs in the three different color socks.

  What insight can you offer into the problem that is not immediately visible from the word problem alone?

I can see no insight into this problem. I see only darkness. (joke) But no real insight just have to figure out the percentages and work on the formula.

  What is the overall goal?

The goal is to find out how many socks you need to grab to guarantee that out of the 20 socks, you get one pair. You cannot see the socks.

Break the problem apart
  What are the constraints?

One of the constraints are the fact that it is dark and cannot see. That limits us on selecting the right amount of socks quickly and easily.

  What are the sub-goals?
None. Maybe seeing how many times it takes to get a matching pair, but that is the same goal as the primary.
Identify potential solutions
You can add up the socks and it equals 20. if you create a formula you have the possibilities like something out of 20 socks total. i.e. 2/20, 4/20. Its odds and statistics, similar to gambling and betting against the house.

 Choose a solution and develop a plan to implement it.

Done

  Explain the solution in full.
You will only have to make two attempts at the socks to guarantee a matching pair.

The first random grab you have these choices:

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1 Black
1 Black

1 Black
1 Brown

1 Black
1 White

1 Brown
1 White

1 White
1 White

1 Brown
1 Brown

(With theses grab possibilities, you have a few possible sock pairs that are not matching.

The Bold are the non matching.

The Second Grab:

        Whatever sock you grab, you are guaranteed to have a pair of you pick the socks from before and the seocd grab.

So….If you only do two blind grabs you are guaranteed a pair. To get a pair of each you have to do 7 random pulls, as you subtract the amount of pairs from the 20 total.