Solving Problems  
Web Programing Fundamentals  
  
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Problem One:  
  
1. a) The problem is the limited amount of space in a man’s boat prohibiting him from transporting three items across a river, and the conflict between the items if left unsupervised.  
   
 b) The insight not immediately visible from the problem is as follows: We need to establish what is waiting for the man on the other side of the river. Since there is an apparent conflict between the items if unsupervised, it would be helpful to know if there is someone on the this side of the river who can supervise two of the items while the man transports the other. Are there cages to detain the animals? The problem is written incorrectly. The fourth sentence in the problem uses the words goat and cabbage in place of parrot and bag of seed.   
  
 c) The goal is to reach the other side of the river with all of the items in tact.  
  
2. a) The constraints are the behavior of the cat and the parrot, and the size of the boat.  
   
 b) The sub goals are to keep the cat from eating the bird, and the bird from eating the bag of seed.  
   
3. a) Feed the bird and the cat before leaving. If you feed the bird you can then cross in this order: 1.Cat 2.Bag of seed 3.Parrot. The parrot would be full so he wouldn’t eat the seed, and the cat has no interest in the seed. The cat is full so he won’t even look at the bird. Another solution would be to make a cage for the bird so the cat cannot get to it while you are crossing with the seed. The least cost effective solution is to buy a bigger boat.   
  
4. a) Each solution does meet the main goal and the sub-goals. The items remain intact and each item makes it across the river.   
   
 b) Each solution will work for all cases.  
  
5. a) I choose to build a cage for the bird.   
  
 b) Gather materials for the birdcage. Build the cage. Place the bird inside the cage and secure it. Cross the river with the seed. Go back and retrieve the cat and cross the river and then retrieve the bird.

Problem Two:  
   
1. The problem is that it is too dark to see what color the socks are in the drawer. The assumption is that the socks are thrown into the drawer without being paired with corresponding colors.

The insight not immediately visible is that you can grab as many socks as you like when you put your hand into the drawer, including the possibility that you can grab all 20 socks at once. The wording “at least” is misleading. You will get at least one matching pair and a pair of each color if you grab them all.

2. The constraints are that the socks are likely not matched and it is dark in the room.

Get all the socks. Don’t trip on the way out of the room.

3. The solutions meet the goals because the socks need to all be gathered in order to insure you get the desired matches.

4. The only real solution to insure you get the desired matches is to gather all the socks at once. This is the most efficient way to handle the situation.

5. In order to insure you get all 20 out of the drawer you will need to take your time and feel around the drawer to make sure you have all of them in your arms. Then carefully maneuver across the room to the light switch.

Problem Three:

1. The problem is to determine which finger the numbers 10, 100 and 1000 will fall on when counting the way described in the problem using five fingers.
2. The constraints are that it is cumbersome to count one finger at a time to find the answer. The sub-goal is to determine a pattern that will give us our answer.
3. One solution is to make a chart to determine a pattern. Another solution is to count on your fingers until you get to 1000.
4. Solution one is the most logical and the most efficient and accurate. Solution two is likely to produce errors as you may loose count.
5. I choose to create a chart to determine a pattern and use that pattern to determine which finger was used for 10, 100 and 1000. First create a horizontal column numbered 1 through 5. Underneath each number 1 through 5 create a column for a set of counting numbers. Write out the first 10 counts on each finger. This will reveal the pattern. The answer is a) first finger, b) ring finger, c) first finger.