Problem Solving

Web Programming Fundamentals

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1. a) A man needs to use his boat to take two animals and seeds across a river. He needs to take them in a certain order to prevent the animals from fighting or eating the seeds.

b) I am curious as to why the parrot cannot ride on the man’s shoulder. Also, how big is the bag of seeds, and how could the parrot eat the seeds if the seeds are in a bag?

c) The goal is to get all of them across the water on a boat, without leaving the animals alone together, or leaving the wrong animal alone with the seeds.

2. a) The constraints include that the cat and parrot cannot be left alone together, and the parrot and the seeds also cannot be left alone together.

b) The subgoals for this problem are that the animals should not be allowed to fight, and the parrot should not be allowed to eat the seeds.

3. a) Some of the possible solutions include taking the parrot first, so the cat and the seeds are alone. Or, he can take the cat first and make sure that the parrot cannot eat the seeds. Finally, the man can take the seeds, and place the parrot in a location that the cat cannot reach.

4. a) Each solution could meet the goals if nothing unexpected occurred. However, since Murphy’s Law usually holds true, I would have to narrow down the solution to the man taking the parrot first.

b) No, each solution would not work for all cases because the man does not want to leave the cat alone with the parrot. In addition, he also does not want to leave the parrot with the bag of seeds.

5. I believe that the man should take the parrot first. Next, he should take the cat, and as he is travelling back across the water to pick up the seeds he should take the parrot. He can leave the parrot on the shore, and transport the seeds, and then return again to pick up the parrot. I drew a diagram showing which animals should go next to make the final solution clear.

1. a) There are 20 socks in a drawer, and a matched pair needs to be located in the dark. There are 10 black socks, 6 brown socks and 4 white socks, so I need to determine how many times I have to pull socks of the drawer until I find a matching pair.

b) There are only 3 colors of socks, so it would not take long to find a match.

c) The goal is to pull socks of a drawer until I find a matching pair while being in the dark.

2. a) The constraints are that it is dark, and I have to pull random socks.

b) The subgoal is to figure out how many times I need to pull socks out of the drawer.

3. Some of the solutions are to turn on the light, to take the drawer to a light-filled room, or to pick socks out of the drawer until I find a matching pair.

4. a) All of the solutions would help to resolve the problem.

b) All solutions would work for all cases. Shining light on the sock drawer would definitely work, and so pulling socks out of the drawer would also work.

5. I would pull the socks out of the drawer until I found a matching pair since light was not mentioned as a solution.

a) To find one matching pair, I would remove four socks from the drawer since there are only a total of three colors of socks. After I pull out the first four socks, I should have a matching pair.

b)

1. a) This problem involves a girl counting on her left hand, using a specific numbering system, and I need to find out what finger she will land on after counting on her fingers a certain number of times.

b) The answer is given for the first question.