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SDI-1015

Activity Problem Solving

1. 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
      1. The man needs to get all his items across to the other side of the river but has certain restrictions on which of the items can be left alone together due to conflicts that may arise.
      2. At some point he is going to need to take a trip back to the starting shore and bring one of the items back with him.
      3. The mans overall goal is to get everything to the other side of the river with out loosing any of the items due to conflict.
   2. Break The Problem Apart
      1. The constraints would include if he leaves the cat and the parrot alone together then the cat will eat the parrot, if the parrot and the seed are left to there own devices the parrot will eat the seed.
      2. The sub goals would be to not leave the parrot alone with the seed, and to not leave the parrot alone with the cat
   3. Identify Potential Solutions
      1. If the cat was left alone, or with the seed, or on the boat with the man it would eliminate the potential for the cat to eat the parrot. If the parrot is alone or with the man on the boat he is safe from being eaten by the cat and the seed is safe from being eaten by the parrot.
   4. Evaluate the Potential Solution
      1. Yes each solution meets the goal.
      2. Yes the solution will work in all cases.
   5. Choose a solution and develop a plan to implement it.
      1. If the man takes the parrot over on the first trip and leaves him there that leaves the cat alone with the seed. The man then comes back to the first shore and takes the cat over to the other shore. That leaves the bag of seed all by itself on the first shore. The man drops the cat off on the shore and picks up the parrot and takes him back to the first shore. Now the cat is on the second shore, the parrot is with the man, and the seed is on the fist shore. The man drops the parrot off on the first shore and picks up the bag of seed and heads back to the second shore. At this point the cat is on the second shore, the seed is with the man, and the parrot is on shore one. The man drops the seed off with the cat and heads back to the first shore. The cat and the seed are both on the second shore and the parrot is on the first shore. Lastly the parrot hops in the boat with the man at the first shore and the return to the second shore, making it so that the man his cat and his parrot and the bag of seed are all on the second shore.
      2. I tested the solution using my daughters doll babies and a car to verify the validity of the solution.
2. 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.
      1. The problem is trying to pull out of a drawer in the dark a pair of socks that are matching. The only way to verify that they match is to pull them out of the drawer.
      2. There is a mathematical solution to this problem. If after pulling a set amount of socks and not returning a match then the original amount of socks comes into question.
      3. The overall goal is to pull out a matching pair of socks.
   2. Break The Problem Apart
      1. The constraints are that it is dark and there is no way to tell what color socks have been pulled.
      2. The sub goals are to pull a set of matching socks.
   3. Identify Potential Solutions
      1. If the person pulls at least four socks they are guaranteed to pull at least one matching pair since there are only three colors to begin with.
   4. Evaluate the Potential Solution
      1. Yes this meets the goal.
      2. Yes it does.
   5. Choose a solution and develop a plan to implement it.
      1. If the user pulls a maximum of four socks they will have at least one matching set.

As we can see above it the user pulls a black sock on the first time then a brown sock on the second and then a white sock on the third then it doesn’t matter what the fourth pull is because it is going to match on of the first three.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1st pull | 2nd pull | 3rd pull | 4th pull |
| Black | x |  |  | x |
| Brown |  | x |  | x |
| White |  |  | x | X |