**1) Define the Problem**

a) Do this in *your own words.*

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

c) What is the overall goal?

**2) Break the Problem Apart**

a) What are the constraints?

b) What are the sub-goals?

**3) Identify Potential Solutions**

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

**4) Evaluate Each Potential Solution**

a) Does each solution meet the goals?

b) Will each solution work for ALL cases?

**5) Choose a Solution and Develop a Plan to Implement it.**

a) Explain the solution in full.

b) 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.

**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 the 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:**

The problem is that the man needs to transport a cat, a parrot, and a bag of seed across a river. The goal is for the man to transport each of the three without leaving any behind that could harm the one it is waiting with.

**2. Break the Problem Apart:**

The man is limited to one passenger per boat trip so he must make multiple trips to successfully get everything to the other side of the river. Also, He cannot leave the cat and parrot alone or the cat could eat the parrot and he cannot leave the parrot and the bag of seed alone or the parrot would eat the bag of seed. The sub-goal would be to get each one across safely by avoiding leaving a couple behind that can cause harm to one another between trips.

**3. Identify Potential Solutions:**

Potentially, the best solution is for the man to make four trips. Switching items as he goes about each riverbank side with his boat.

**4. Evaluate Each Solution:**

The proposed solution meets the goal and sub-goal. The man transports each item across the river safely and he did not leave any item behind that could potentially cause harm to another item.

**5. Choose a Solution and Develop a Plan to Implement It:**

The solution that meets the needs of keeping each item safe from the other is for the man to take the parrot with him the first trip. By doing this, the cat is left alone with the seed and it is highly unlikely that the cat will eat the seed. Then, he must go back and get the seed the second trip and when dropping the seed off on the other side of the bank, take the parrot back to the original side again. This ensures that the parrot is not left alone to eat the seed. Once there, drop the parrot off and bring the cat with him to the goal side. This once again leaves the parrot alone on one side and leaves the cat with the seed and no potential harm to any item. Finally, the man makes one more trip to get the parrot and brings it back to the goal bank side and the man and all three items are now safely at their destination.