**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 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**

a) Do this in your own words.

A man needs to transport three items but only has room for one item per trip.

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

Birds can fly and cats can swim. It seems like a silly question.

c) What is the overall goal?

He needs to transport all items safely without one item consuming the other.

**2) Break the problem apart**

a) What are the constraints?

The boat has only room for one item. I am also assuming the cat can’t swim and the bird can’t fly.

b) What are the sub-goals?

Keep the bird alive and the seed out of the bird.

**3) Identify potential solutions**

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

Put the bird in a cage. ….wait I don’t have a cage.

**4) Evaluate each potential solution**

a) Does each solution meet the goals?

No, I don’t have a cage. The only way I can figure this out is with a visual. I need to experiment with objects

b) Will each solution work for ALL cases?

No

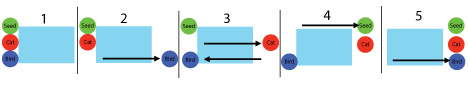
**5) Choose a solution and develop a plan to implement it.**

a) Explain the solution in full.

I brought the bird over first. Then the cat but I returned the bird. Then I brought over the seed. Then return and brought the bird over for the second time.

b) Describe some test cases you tried out to make sure it works.

I labeled three pieces of paper; cat. bird, seed and experimented with them until I figured it out.



**Socks in the Dark:**

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**

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.

**Predicting Fingers:**

A little girl counts using the fingers of her left hand as follows:  She starts by calling her thumb 1, the first finger 2, middle finder 3, ring finger 4, and little finger 5.  Then she reverses direction, calling the ring finger 6, middle finger 7, first finger 8 and thumb 9, after which she calls her first finger10 and so on. If she continues to count in this manner, on which finger will she stop?

a) What if the girl counts from 1 to 10?

b) What if the girl counts from 1 to 100?

c) What if the girl counts from 1 t0 1000?

**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.