**Problem 1**

1) Define the problem

1. A cat, parrot, a man and, bag of seeds need to be transported to one side of the river. There is a man with a boat, the man on the boat can only take himself, the man and one other item across the river at a time. If the cat and parrot are alone the cat will eat the parrot. If the parrot and seeds are left alone the parrot will eat the seeds. *How can all passengers get to the other side without leaving the cat and parrot together or the parrot and seeds together?*
2. The second man does not have to be in the boat also there is no limit on how many times the boat can go back and forth.
3. The over all goal is to get all the passengers to one side without leaving the cat alone with the parrot or the parrot alone with the seeds.

2) Break the problem apart

a) The constraints are that the cat and parrot cannot be together alone and the parrot and the seeds cannot be together alone.

b) The sub goal is to do it the most efficient way possible.

3) Identify potential solutions

a) Not leaving the cat and parrot alone together and not leaving the seeds and parrot alone together.

4) Evaluate each potential solution

a) Yes the solution will meet the goal it would not be a solution if it did not.

b) The solution should work.

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

a) First the man on the boat would take the cat and the seeds across the river and drop them off, then he would go back and get the other man and the parrot and take them across the river, then all would be there. (Personally I do not know why the parrot did not just fly over)

**Problem 2**

1) Define the problem

a) There are 5 pair black socks, 3 pair brown socks and 2 pairs of white socks in a drawer. What is the smallest number of socks you need to select to guarantee get one matching pair and one matching pair of each color.

b) I do not see any insight.

c) The overall goal is to get one matching pair of socks with the minimum you can pull out and one matching pair for each color with the minimum amount of socks being pulled out of the door.

2) Break the problem apart

a) The constraint is that there is no light on.

b) The sub goal is to do it the most efficient way possible.

3) Identify potential solutions

a) Do an experiment to solve the problem.

4) Evaluate each potential solution

a) The solution should meet the goal.

b) The solution should work for answering both questions.

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

a) For the first problem of finding at least one matching pair of socks four should be chosen.

**Problem 3**

1) Define the problem

a) Determine what finger the little girl will stop on from 1-10, 1-100 and 1-1000.

b) It is going up in 10’s.

c) The overall goal is to identify which finger it will be stopped on.

2) Break the problem apart

a) The constraint is that there is no light on.

b) The sub goal is to do it the most efficient way possible.

3) Identify potential solutions

a) Do an experiment to solve the problem.

4) Evaluate each potential solution

a) The solution should meet the goal.

b) The solution should work for answering both questions.

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

a) First the man on the boat would take the cat and the seeds across the river and drop them off, then he would go back and get the other man and the parrot and take them across the river, then all would be there. (Personally I do not know why the parrot did not just fly over)