Problem 1: A Cat, a Parrot, and a Bag of Seed

1. So a man has himself and three other items to get across a riverbank. The two issues are that he only has room for himself and one other item in the boat and that certain items cannot be left as a pair because they will eat each other.
2. So the main constraints to this problem are that the cat and parrot can’t be left alone. The parrot and bag of seed can’t be left alone. So the goal will be to make sure each item gets across without the constraints being applied.
3. The initial solution would be to take the parrot across first. Return empty handed and pick up the cat in order to take it to the other side leaving the bag of seed alone. When getting to the other side, the man drops the cat off while picking up the parrot to return it to the other side so the cat does not eat it. When back on the initial side the man drops off the parrot while picking up the bag of seed to take to the other side. Now the man can drop off the seed return to pick up the parrot and will have successfully transported all items across the riverbank.

A second solution would be again to start off with the parrot, but on the return trip the man would pick up the bag of seed instead of the cat. From there the solution would be almost identical with the return of the parrot to pick up the cat.

1. Both solutions would work equally well. Because of the constraints the first item taken would always be the bird.
2. So I chose to go with the second solution. I think this would be best in the case that if the seed were left on its own that a wild animal would eat it. So the solution is as follows: The man takes the parrot across the riverbank with him leaving the bird on the other side. He then returns to the original side and picks up the bag of seed to take to the other side. When he arrives at the opposite side he drops the bag of seed while also taking the bird back in the boat with him. When he arrives to the original side he drops the bird and then takes the cat to the opposite side. Again making sure that none of the constraints are met. When he takes the cat he can drop it off with no worries of the cat eating the bag of seed. All that is left is for the man to return to the original side pick up the parrot and take it back again to the opposite side.