**A Cat, a Parrot, and a Bag of Seed**

1. A man must transport three items from one point to another. Of these three items, two pairs are volatile if left unattended together. The man’s means of transportation has space for only one item to travel with the man on each trip. The volatile pair will prove to be the constraint that determines the sequence of transport.
2. Of the three possible pairs to be left unattended (cat/parrot, cat/seed, parrot/seed), only one is “safe”: cat/seed; the other two pairs are volatile. All items must arrive safely at the destination. Only one item may be transported at a time, during which time the remaining items will be left unattended.
3. Due to the limitations imposed by the volatile pairs, only the parrot may be taken, as it is the only option that leaves the non-volatile pair. Considering the cat and seed as interchangeable, all subsequent moves, as did the first, belong to a single possible pattern of the utmost efficiency.
4. The two optimal solutions (one solution, if the cat and seed are taken as interchangeable) begin with the universally volatile object, the parrot. An infinite number of solutions exist which are not of optimal efficiency.
5. Following the only possible first move, one possible pattern unfolds in order to achieve the only optimal solution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Key: | ‘P’ represents Parrot; ‘M' represents Man and Boat; | | | | |  |
|  | ‘X’ and ‘Y’ are interchangeable for Cat and Bag | | | | |  |
| Step: |  | Origin: | |  | Destination: | |
|  |  |  |  |  |  |  |
| Start |  | MPXY |  |  | (empty) |  |
|  |  |  |  |  |  |  |
| 1 |  | XY |  |  | MP |  |
|  |  |  |  |  |  |  |
| 2 |  | MXY |  |  | P |  |
|  |  |  |  |  |  |  |
| 3 |  | Y |  |  | MXP |  |
|  |  |  |  |  |  |  |
| 4 |  | MPY |  |  | X |  |
|  |  |  |  |  |  |  |
| 5 |  | P |  |  | MXY |  |
|  |  |  |  |  |  |  |
| 6 |  | MP |  |  | XY |  |
|  |  |  |  |  |  |  |
| Finish |  | (empty) |  |  | MPXY |  |

**Socks in the Dark**

1. Three different types of socks exist in different quantity within a container. Different sets of socks are to be retrieved; however, the specific type of sock retrieved cannot be identified until the entire retrieval process is complete. As the socks retrieved cannot be identified until after the entire retrieval is complete, the answers will involve minimum/maximum quantities within the constraints of the set and subsets of socks.
2. There are: three sock types; a total of twenty socks; ten black socks, six brown socks, and four white socks. Only one selection may take place per request. For the first request, at least one matching pair is required. For the second request, at least one matching pair of each color is required.
3. As we are working with minimum possible numbers that provide mathematical certainty of the required results, there is only one possible solution to each request.
4. Each solution will be the only possible solution, and the correct solution only for its particular request.
5. To guarantee that one matching pair is retrieved from a group of three different types of socks, four socks must be retrieved. This guarantees that, at a minimum, one pair has been retrieved; having four items from a group that contains only three different item types guarantees a pair. Similarly, to guarantee at least one pair of each of the three colors, all but two socks must be taken.

**Predicting Fingers**

1. A girl counts on her fingers, using a repeating pattern that does not cycle evenly. The goal is to predict which finger she will stop on, given the number to which she will count while using the pattern.
2. The numbers she will count to are 10, 100, and 1000; for each instance, we are to determine which finger the count stops on.
3. The simplest (though highly inefficient) solution is to count on one’s fingers in the same pattern as indicated in the problem. A mathematical formula could be developed (rather simply, I suspect) that would predict the outcome.
4. Both solutions will work in all cases, with all numbers supplied.
5. The “smart” solution (creating a mathematical formula to predict the end result) is currently beyond my understanding and ability to demonstrate.