1. 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 Problem: Calculate probability of fulfilling the problems requirements
2. Break problem Apart: Calculate the probability for a single selection of each color. Determine total number of each sock color.
3. Identify Potential Solutions
4. Calculate odds of selecting 1 of each color, for a pair, your odds are compounded.
5. Perform physical experiment, analyze results, repeat until average answer is stable
6. Evaluate Potential Solutions
7. Calculate Odds
8. Black socks = 10, Brown Socks = 6, White Socks = 4
9. Odds of selecting black sock with single hand selection = 50%
10. Odds of selecting brown sock with single hand selection = 30%
11. Odds of selecting white sock with single hand selection = 20%
12. Perform Physical experiment

(a) Process = Tedious and inefficient

1. Choose a Solution
2. The odds of getting a matching pair on initial selection are 25% in favor of black. There is a 50% chance of getting a black sock on each selection, needing to do so moves your odds to 25% (There is a 9% chance of getting brown alone, and 4% for white alone)
3. For fun, I believe the best chances you have of sequentially selecting a pair of black socks followed by a pair of brown socks followed by a pair of white socks is 9/100% (0.09%) I did this by compounding the chances. 25%\*9%\*4%
4. Predicting Fingers

A little girl counts using the fingers of her left hand as follows: She starts by calling her thumb 1, he 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 finger 10 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 to 1000

1. Define Problem
2. Break problem Apart
3. Identify Potential Solutions
4. Evaluate Potential Solutions
5. Choose a Solution

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 subgoals?

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)