**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

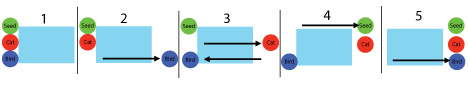
**5) Choose a solution and develop a plan to implement it.**

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.

For some strange reason I live in a cave and my socks are not organized.

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

I probably could stand to learn statistical math. I don’t have time to do this so I am going to have to draw images of socks and experiment.

c) What is the overall goal?

Get matching pairs of socks in the dark.

**2) Break the problem apart**

a) What are the constraints?

It is dark and my sock drawer is a mess.

b) What are the sub-goals?

I need to figure out the best-case scenario and the worst-case scenarios for sock matching sock extractions.

**3) Identify potential solutions**

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

I need to experiment with picking out socks. I can either do this with actual socks or drawings of socks…and test, test, test.

**4) Evaluate each potential solution**

a) Does each solution meet the goals?

I will only know this if I try. The only potential fall back I see is time consumption.

b) Will each solution work for ALL cases?

Yes, I believe so since the only variable I am dealing with is socks.

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

a) Explain the solution in full.

Solution A = 4 socks, no matter what color you need to pull four socks to get one matching pair.

Solution B = 18 socks, because you have the potential of grabbing all of the black and brown socks you need to pull 1 socks.

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

I literally got socks and just experimented over and over until I came to my solutions.



**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.

Young girl does not know how to count logically

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

I can see that I am going to have to come up with a pattern and turn it into an equation.

c) What is the overall goal?

To create a equation that can predict what finger she lands on no matter what she counts too.

**2) Break the problem apart**

a) What are the constraints?

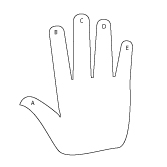
It will be difficult to find the pattern

b) What are the sub-goals?

Give each finger a variable so I can create the equation

**3) Identify potential solutions**

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

Write out a variable for each finger and below it write out 1,2,3,5…. And see if there is a detectable pattern

**4) Evaluate each potential solution**

a) Does each solution meet the goals?

I did find a solution that met all my goals

b) Will each solution work for ALL cases?

Yes, I tested it throughly

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

a) Explain the solution in full.

I found that whenever you divided the number she was counted to by 8, what ever

Number was leftover equaled the number on the very first count. I know that is confusing.

You can see my work below.

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

See work below

Solution =

10 = Index Finger

100 = Ring Finger

1000 = Index Finger

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | B | C | D | E | D | C | B | A | B | C | D | E | D | C | B | A | B | C | D | E | D | C | B | A | B | C | D | E | D | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | B | C | D | E | D | C | B | A | B | C | D | E | D | C | B | A | B | C | D | E | D | C | B | A | B | C | D | E | D | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |

A=1 && A=9

B=2 && B=8

C=3 && C=7

D=4 && D=6

E=5 && E=8

27/9 = 3 SHOULD BE C = TRUE

10/5 = 2 = SHOULD BE B = TRUE

32/8 = 4 = SHOULD BE D = FALSE = B This solution did not work

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | A | B | C | D | E | D | C | B | A | B | C | D | E | D | C | B | A | B | C | D | E | D | C | B | A | B | C | D | E | D | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |

**A= 1, 9, 17, 25**

A = 1 + 8… = 100

**B = 2, 8, 10, 16, 18**

B = 2 + 8…..= 100

B = 8 + 8…..= 100

**C = 3, 7, 11,15, 19, 23, 27**

C = 3 + 8….. = 100

C = 7 + 8……=100

**D = 4, 6, 12, 14, 20, 22, 28, 30**

D= 4 + 8 …..

D = 6 + 8 ……

E = 5, 13, 21, 29

E = 5 + 8…..

Formula = Finger = the remainder of N/8

100/8 = Remainder of 4 = D which is……..Ring Finger!!!!!

Test…

44/8 =Remainder of 4 = D = True

37/8 = Remainder of 5 = E = True

25/8 = Remainder of 1 = A = True

51/8 = Remainder of 3 = C = True!!!!

Solution =

10 = Index Finger

100 = Ring Finger

1000 = Index Finger (No Remainder…)