

The Beehive

Bees are trying to build a beehive. The beehive made by them doubles every day.

If the bees ultimately built the web in 15 days, how many days did it take for the bees to build 25% of the beehive?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

On day 15th the beehive was 100% complete. We know it doubles every day that means it was 50% complete on day 14th and 25% complete on day 13th.

So it took the bees 13days to complete 25% of the beehive.

The Thug

You are an Ice-cream seller, and A boy purchases ice cream worth 200 and hands you over a 500 rupees note. You do not have a change, so you get it from the neighbouring shop and return it to the boy. A few days later the neighbouring shopkeeper finds out that the note you gave him was fake and takes back his money. How much loss do you have to incur?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Loss incurred by you = 1000

One hundred rupees of product and 400 rupees of change to the customer and 500 to the shopkeeper.

The Motorcycle Drone Event

Two motorcycles are separated by a distance of 80kms and move toward each other with a velocity of 40kmph. A drone captures this motion and travels from motorcycle X to motorcycle Y and back to X and so on until both motorcycles collide. Suppose the drone flies at a constant speed of 100kmph. Calculate the distance travelled by drone at the moment both the motorcycles collide.

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Velocity of approach for two motorcycles = $(40+40)\text{km/hr}$

Distance between the two motorcycles = 80kms

Time taken for the motorcycles to collide = $80\text{km}/80\text{km/hr} = 1\text{hour}$

The total distance travelled by the drone = $100\text{km/hr} * 1\text{hr} = 100\text{km}$

Treasure Hunt

You found a treasure that contains ten bags full of infinite gold coins. But there was a note attached to it which stated, *"10 bags full don't be greedy, contains a forged bag pick it, and you lose all of it."* It also noted that the actual coins weigh 1gm each, while the forged coins weigh 1.1gm each. You also don't have much time to carry out the treasure safely before the protector of the treasure returns. You luckily have a digital weighing machine in your backpack. What is the minimum number of weighing you have to do before you can find the nine actual bags of treasure?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

One Weighing.

Take one coin from the first bag, two from the second, three from the third, etc. Eventually, we'll get 55 ($1+2+3+\dots+9+10$) coins. Now, weigh all the 55 coins together. Depending on the resulting weighing machine reading, you can find which bag has the forged coins such that if the reading ends with 0.4, then it is the 4th bag, if it ends with 0.7, then it is the 7th bag and so on.

Three Cats and a Circle

Three cats are sitting at different positions on a circular maze. Each cat starts randomly, picks a direction, and moves along the circle's circumference. What is the probability that none of the cats collides?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Each Cat has two options to move, i.e. clockwise or counterclockwise.

$2 \times 2 \times 2 = 8$ possible scenario.

Out of the eight possible scenarios, the cats won't collide if all three of them move clockwise or counterclockwise, i.e. 2 out of 8 cases.

The probability of Cats not colliding with each other is $2/8 = 1/4 = 0.25$

How many Rabbits?

Suppose a newly-born pair of rabbits, one male, one female, are put in a field. Rabbits can mate at the age of one month so that at the end of its second month, a female can produce another pair of rabbits. Suppose that rabbits never die and that the female always has one new pair (one male, one female) every month from the second month on. How many pairs will there be in one year?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

- They mate at the end of the first month, but there is still one, only one pair.
- At the end of the second month, the female produces a new pair, so two pairs of rabbits are in the field.
- At the end of the third month, the original female produces a second pair, making three pairs in the field.
- At the end of the fourth month, the original female has produced another new pair. The female born two months ago produces her first pair also, making five pairs.

If we carefully notice the pattern, it's a Fibonacci Series, where $F(n)$ represents the number of pairs of rabbits at the end of the n th month.

$$F(0)=F(1)=1; F(n) = F(n-1) + F(n-2);$$

So the series is: 1 1 2 3 5 8 13 21 34 55 89 144...

So at the end of 12 months, we'll have 144 pairs, i.e. 288 rabbits.

The Gold Bar

Ninja got a new Intern for seven days and a gold bar to pay the Intern. The Ninja must give the Intern a piece of gold at the end of every day. What is the minimum number of cuts that can be made on the bar of gold that will allow Ninja to pay the Intern $\frac{1}{7}$ th each day?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Cut Bar in 3 pieces or segments of size $\frac{1}{7}$, $\frac{2}{7}$ and $\frac{4}{7}$.

Give piece 1 at the end of the first day.

Give piece 2 at the end of the second day and take piece 1.

Give piece 1 at the end of the third day.

Give piece 4 at the end of the fourth day and take pieces 1 and 2.

Give piece 1 at the end of the fifth day.

Give piece 2 at the end of the sixth day and take piece 1.

Give piece 1 at the end of the seventh day.

So with 3 cuts, we can achieve this.

The city of Hope

You wake up to find a meteor hit your city one day, and all connections are lost with the outer world. The city of “Hope” was destroyed and deserted but hopefully might have resources that might help you restore your city’s connection with the external world. To reach it, you will have to travel on foot. On a mission like this, each person can only carry enough food and water for five days, and the farthest one can travel in one day is 100 km. Also, the city is 400 km from the starting point.

What is the fewest number of persons (including yourself) that you will need in your Group to accomplish this mission so that you can reach the city, stay overnight, and then return without running out of supplies?

Note: You can’t exhaust our food and water supply as there is nothing to refill in the city of Hope.

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution: It is given that each person can only carry enough rations for five days and as there are four persons.

Hence, a total of 20 days rations is available.

Day 1: 4 days of rations are used up. One person goes back using one day of rations for the return trip. The rations remaining for the further trek is for 15 days.

Day 2: The remaining three people use up three days of rations. One person goes back using two days of rations for the return trip. The rations remaining for the further trek is for ten days.

Day 3: The remaining two people use up two days of rations. One person goes back using three days of rations for the return trip. The rations remaining for the further trek is for five days.

Day 4: The remaining person uses up one day of rations. He stays overnight. The next day he returns to the coast using four days of rations.

Thus, a total of 4 persons, including you, are required.

100 Tubelights and Friends

- There are 100 tube lights, all closed. In an adjacent room are 100 friends. The first friend enters and switches on all the lights one by one.
- The second friend is then let in and switches off the 2nd, 4th, 6th... all the even-numbered doors.
- The third friend is let in. He attends only to the 3rd, 6th, 9th... doors (every third door, in other words), switching off any that is on and switching on any that is off, and so forth.

After all 100 friends have done their work in this way, How many lights will be on at the end?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution: Consider light number 40. Friends will visit it for every divisor it has. So 40 has 1 & 40, 2 & 20, 4 & 10, 5 & 8. So on pass 1 1st friend will switch on the light, pass 2 2nd one will close it, pass 4 open, pass 5 close, pass 8 open, pass 10 close, pass 20 open, pass 40 close. The light will just end up back in its initial state for every pair of divisors. But there are cases in which the pair of divisors has the same number, for example, light number 25. 25 has the divisors 1 & 25, 5 & 5. But 5 is repeated because 25 is a perfect square, so you will only visit door number 25, on passes 1, 5, 25 and leave it on at the end. So only perfect square doors will be open at the end.

Number of perfect square between 1 and 100 are: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, i.e. 10 tubelights will be open.

Crossing the Stormy River

Four people need to cross a stormy river. Unfortunately, they have only one boat, which is too dangerous without it. The boat is only strong enough to support two people at a time. Not all people have the same rowing speed and take different times to cross the bridge. Times for each person: 1 min, 5 mins, 7 mins and 9 mins.

When two people cross the river together, it takes x mins to cross the river [$x = \text{maximum}(\text{person-1 time and person-2 time})$]. What is the minimum time required for all 4 to cross the bridge?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution: 23

Explanation:

In the first round, 1 and 9 rows and cross the boat, 1 comes back, in the second round 1 and 7 cross the river, and 1 comes back, and in the last round, 1 and 5 cross the boat. Total time = $9+1+7+1+5 = 23$ mins.

The Helium Balloon

You're in a car with a helium balloon on a string that is tied to the floor. The windows are closed. What happens to the balloon when you step on the accelerator, and what happens when you apply sudden brakes.

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

When the car accelerates, the air is pushed backwards, just as your body is.

This sends a lighter-than-air balloon forward.

When the car brakes suddenly, the air piles up in front of the windshield.

This sends the balloon backwards.

The Bulb

There are three switches in a room, out of which one controls a bulb in the next room. How often does one visit the next room to find out which switch lights on the bulb?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Flip on the 1st Switch and wait for 5 mins and then Flip on the 2nd switch and go into the room.

If the Bulb is on, it's the second switch.

It is the first switch if the bulb is off but feels warm.

If it is neither warm nor on, it's the third switch.

So we need to visit the room only once to figure out which switch controls the bulb.

The Grid

The figure shows that a 10 x 10 table is filled with repeating numbers on its diagonal. Find the total sum of the table's numbers in your head.

1	2	3			...			9	10
2	3						9	10	11
3						9	10	11	12
					9	10	11	12	
				9	10	11	12		
.			9	10	11	12			.
.									.
.									.
		9	10	11	12				
	9	10	11	12					17
9	10	11	12					17	18
10	11	12			...		17	18	19

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

The total of all the numbers in the table is 1000.

1 & 19 add up to 20. Both are displayed once. 2 & 18 add up to 20. Both are shown twice. 3 & 17 add up to 20. Both are displayed thrice. 4 & 16 add up to 20. Both are displayed four times. 5 & 15 add up to 20. Both are shown five times. 6 & 14 add up to 20. Both are displayed six times. 7 & 13 add up to 20. Both are displayed seven times. 8 & 12 add up to 20. Both are shown eight times. 9 & 11 add up to 20. Both are displayed nine times. 10 is shown 10 times. Adding it all, we get a sum of 1000.

The Chocolate Lover

You have ten white chocolates and ten dark chocolates with no distinction in packaging. What is the minimum number of draws at random, so one has two chocolates of the same type?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

The minimum no of steps are three.

1. Let say you draw a dark chocolate
2. Let say you draw a white chocolate
3. Either it will be black or white, we'll have one pair complete.
4. Even if we pick all three chocolates of the same colour, we will still have a pair, so three random picks are sufficient

The MasterChef

A specific dish requires precisely 7L of water. The problem arises as you do not have glass to measure exactly 7L. You have two glasses of 4L and 5L. How can it be accomplished?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

The above precision can be achieved easily.

First, pour water into the 5L glass and, using the 5L glass fill the 4L glass.

This way, 5L glass will be left with 1L of water.

Pour this 1L into the dish. Repeat the process.

Now you have added 2L of water.

Finally, add 5L of water using 5L glass.

Money Heist

You are at the Bank of Portugal. It has excellent security measures. There are 2 Locker Rooms. One contains 1000 tons of Gold, whereas the other is an unescapable Police Trap. You being the Professor, have found a loophole. The two guards securing the Gates are innocent and have a weird family tradition. One Guard never lies, and the other never speaks the truth. You are disguised as an older man and can ask them no more than a question before becoming suspicious. So what question do you ask any one of them and know the right room that contains the treasure and inform the gang can carry out the heist successfully?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Ask any guard, "What would the other guard say if I ask which way is to the Police Trap?"

And whatever answer he gives is the way to Treasure.

Explantation:

If you end up asking the truthful one, he will speak the truth, and he knows that another guard will lie so that he will show the way to the treasure.

If you end up asking the question to the liar, he will lie about the other, and the answer will be the way to the treasure.

Black and White Hats

One hundred students stand in line, one in front of the other, each wearing a black hat or a white hat. Every student can see the hats of their classmate in front but not their hats or those worn by anyone behind. The class teacher starts at the back of the line and asks each student the colour of their hat. If they answer correctly, they will pass the final exam. If they get it wrong, they'll fail. How many students will pass at most if they are allowed to discuss a strategy before their teacher starts asking the colours of their hats?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Ninety-nine students can pass the final exam by using a simple strategy. The students decide that the last standing student will count and shout the colour in odd numbers in front. Going ahead, the other students can use simple maths to predict their hat colour. The 100th student also has a 50-50 chance.

Ex: The 100th student sees the number of white hats in front is odd, so he says white. The 99th kid now counts the number of white hats in front. If it is odd, then he has a white hat. Else he has the black hat, and similarly, other students can predict their cap colour.

Flip the Coin

One Day you return Home and find a lamp. On rubbing it, A genie appears and gives you an offer. If you solve a simple puzzle, he will grant you 3 wishes. He places 10 coins in front of you on the table. The coins are so made it is impossible to figure the head and tail of the coin by touching. You are told that there are 5 coins with the head facing up and 5 coins with the tail facing up, but you don't know the sequence or which coin has which face.

Can you make two separate sets of coins, each with the same number of tails up? You can flip the coins any number of times.

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Make two sets of coins, with each having 5 coins,

For Example, Set-1: H H T T T and Set-2: T H T H H

Now rotate all the coins in Set-2, which would give, Set-1: H H T T T and Set-2: H T H T T. Each set has 3-3 Tails.

Similarly, the algorithm works for any set with equal coins with any sequence.

Faulty Robot

A company manufactures robots. Few robots are programmed to tell the truth no matter what, whereas others are programmed to lie. So there are two communities in the factory, i.e. the Truth Community and the Lie Community.

You meet with three robots and ask one of them which community do you belong to? Robot 1 replies to something in binary that you don't understand. The Second robot says that Robot 1 belongs to Lie Community. The Third Robot says that the Second Robot is lying. Which community does the Third Robot belong to?

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

Let's assume Robot 1 belongs to the Truth Community. If so, he will not lie and tell he's from the truth community. In this case, Robot 2 is Lying, and Robot 3 is right about it. If Robot 1 belongs to the Lie Community, he will lie from Truth Community, which means Robot 2 is again lying, which makes Robot 3 again being right about it. Therefore Robot 3 is from the "TRUTH COMMUNITY".

Find the Right Shake

You have three bottles of milkshakes that are all mislabelled. One contains Oreo shake, another Kitkat shake, and the third has a mix of both in random proportion. How many minimum shakes would you have to taste to find out how to match the jars' labels correctly?

- A- Oreo Shake
- B- KitKat Shake
- C- Oreo-KitKat Shake (random proportion)

FOR SOLUTION SCROLL TO THE NEXT PAGE!!!!

Solution:

We know that all bottles are mislabelled, i.e. Bottle A labelled as Oreo Shake is not Oreo Shake, and the same goes for all the other bottles.

Take a sip from the Mix Bottle, i.e. Bottle C. We know that it is not the mixed shake as it is mislabeled, so if it is the Oreo shake, then Bottle A is KitKat, since Bottle B is mislabeled as KitKat, and therefore Bottle B is Mixed.

Similarly, Bottle C is KitKat. Bottle B is Oreo as Bottle A can't be Oreo [mislabeled as Oreo]. Therefore Bottle A is mixed.

So we can correctly label the bottles in one tasting.