## **­To Note:**

In puzzles, where there is continuous reduction and increase in values after as person pays redundant visits, try solving by backtracking.

## Each of the campers walks at a different speed. One can cross the bridge in 1 minute, another in 2 minutes, the third in 5 minutes, and the slowest camper takes 10 minutes to cross. How can the campers make it across in exactly 17 minutes?

1, 2, 5, 10

5, 10 ←------------------------------------------> 1, 2

1, 5, 10 ←---------------------------------------> 2 +3

1 ←---------------------------------------------->5, 10, 2 +10

1, 2 ←----------------------------------------------> +2

XX ←------------------------------------------------> 1, 2 +2

==17 minutes

8 balls 1 lighter

Divide in 3 groups of 3, 2, 2 and compare 2 and 2 then follow

Pirates

100 Coins 5 pirates - A, B, C, D, E as per their seniority order. How much max the senior pirate can get.

Solution: A keeps 98 and gives C 1 each E 1.

Reasoning - if D and E left then D won't give anything to E, so E will be happy to accept one coin. If C, D, E left, D wants to overthrow C, so he won't accept. C will give 1 coin to E and win. If B, C, D, E left. B will give one coin to E and will win. Taking these into consideration, if A, B, C, D, E left B won't accept.C will think that he won't get any if B wins and similarly E think that he will get 1 if he accepts the proposal (enough as E wil be overthrown if D survives)

Maximum chocolates

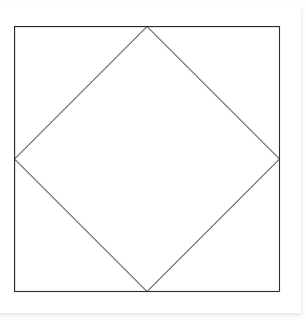
A boy has Rs. 15/- want to eat chocs worth Re. 1/- piece and 3 wrappers fetch him 1 chocolates. How many chocs boy can eat?

the boy will spend 15/- and buy 15 chocs, he will buy 5 more from 15 wrappers. Hence, he has now 5 wrappers and 20 chocs eaten. the boy will spend 3/5 wrapper and will get a choc taking count to 21. he will combine those 2 wrappers with wrapper of new choc and get 1 more choc taking count to 22.

100 doors in a row that are all initially closed. you make 100 passes by the doors starting with the first door every time. the first time through you visit every door and toggle the door (if the door is closed, you open it, if its open, you close it). the second time you only visit every 2nd door (door #2, #4, #6). the third time, every 3rd door (door #3, #6, #9), etc, until you only visit the 100th door.

Gates will get toggled as many times as the number of divisor it has. For example let’s take cell number 20, it gets toggled on days 1, 2, 4, 5, 10 and 20. The open doors will be those which have odd number of divisors and those are perfect squares.

Can you make 2 squares and 4 right angled triangles using only 8 straight lines ?



25 horses 5 tracks and find 3

5 races to get the 5 max in a group, 1 more race to sort those first in the groups...retain the first and race 5 others : 2, 3, 6, 7, 11 and find the top 2 to get top 3 horses, so total of 7 races

Tell me the name of 30 words that don’t have the alphabet “a” in them in 30 seconds?

count from 1 to 30

Seven pirates attacked the British ship and looted some rare gems from them. They decided to rest for some time and then divide the gems later. While everyone was resting, two pirates wake up and planned to divide gems equally between the two. When they divided gems equally, one gem was left. So, they decided to wake up the third pirate and divide among three, but alas again one gem was left. They decide to wake up the fourth pirate to divide the gems and again one gem was left. The same happened again with the fifth and sixth. Finally, they woke up the 7th pirate and this time the gems were divided equally.

Answer : 301

Two friends Satyam and Ankit decides to play a game. They have 9 cards lying face up with numbers 1 to 9 written on them. They have to start picking up these cards alternately, without repla­cement. The person with exactly 3 cards which adds up to 15 wins the game. Satyam is given first chance to pick up a card . Does Satyam have a winning strategy?

We see that there are eight subsets of {1,9} that sums up to 15. These are:  
{1, 5, 9}, {2, 8, 5}, {3, 5, 7}, {4, 5, 6}, {1, 6, 8}, {2, 4, 9}, {2, 7, 6} and {3, 8, 4} we can try to form a magic square which can derive combinations that sum to 15 --> 8 1 6/3 5 7/4 9 2 . It is like a tic-tac-toe in which there is no sure shot chance of winning the game.

Boris/Natasha Mailing puzzle:

Faulty postal service puzzle: boris has to send ring to natasha but both have their own padlocks and the key. How he can send the same

Solution : Boris puts the ring in box locks with his padlock keeping the key and tell the same to natasha over the phone then natasha gets the box and again locks the same and sends back. This time boris removes the lock of natasha and return which natasha can open with her key.

3 daughters puzzle:

Given the multiplied result of daughter’s ages find their ages given some other clue as well. Find out the combinations of multiplication, then find the sum. The one in which no two large numbers are equal is the answer.

Balance Puzzle

No. of weights require to weigh 1-40. get the 3 squared powers 1, 3, 9, 27 or you can use 2^n

Blue – eyed Island puzzle/ Monks in Hut puzzle

n people are at certain placed. there is some condition that is applicable to specific people. Those specific people are bound to perform some action depending upon they know that they are the entity in consideration. A given person can see condition of others but not of her/him. How many time it will take for that specific number of people to take that action

Cases:

1 person: Exactly one person is suffering from that condition – he knows there is no one, so he will be

2 people: One person see another one not leaving so he is the culprit

3 people: Similar for 3. One see other 2 not leaving so he has to go and 2 left they will take further 2 days

Hence, n people will leave in n days

Measure 9 mins with 7 and 4 mins hourglasses.

Start with both

After 4 mins 4 mins is full and 3 mins left in 2nd hour glass +4

Flip the 4th one, after 3 mins 1 min left in 4th one and 7th one is full +3

As soon as 7th one is full, flip it till 4th one is completed. Now 4th one is full and 7th one has 6 min left +1

Flip 7th one again till it is full +1

+4+3+1+1 = 9 mins

Puzzle 30 | (Last Palindrome Date Before 10/02/2001)

So what’s the latest year in 1300 that would make a month?

When you first look at it, 12th month comes to mind as we have to find the latest date, so it seems it would be 1321. But we have to keep in mind that we want the maximum year in 1300 century with a valid date, so lets think about 1390 that will give the date as 09/31, is this a valid date…? No, because September has only 30 days, so last will be the 31st August. Which means the correct date would be 08/31/1380. - 31 August 1380

Show days of month using 2 dices. What should be printed

To show 11 and 22 we should have 1 and 2 on both dices also 0 should be present so print [0, 1, 2] on both.

[0, 1, 2] [0, 1, 2] 3 on once dice is enough [0, 1, 2, 3, 6, 7] [0, 1, 2, 4, 5, 8]

10 coins on a table. Arrange them in 2 piles such that both contain equal number of heads.

Solution: Split the pile randomly and flip the coins of 1 lot.

Gabbar Samba puzzle. Both can call any digit 1-10. Whosoever calls 101 wins. From where should Samba start?

Hif sambha wants to win then gabbar should call 91-100, for that sambha needs to

call 90 or 79 or 68 ..... 2. Hence, sambha should start with 2.

3 Missionaries and 3 Cannibals puzzle

3C 3M --------------- X

2C 3M ---------------- 1C

1C 3M -----------------2C

1C 1M ---------------- 2M 2C

2M 2C -----------------1M 1C

3C ----------------------3M

2C ----------------------1C 3M

…

X ---------------------3M 3C

2 eggs 100 floor puzzle

One solution can be drop from floors 0, 10, 20, 30 etc.

We want to have a best average worst case. That is possible if we have number of items in linear search less than previous search as we go upwards and increase the attempt by 1 each time.

We can set up the equation as x + (x-1) + (x-2)+ ... + 1 = n

if n = 100 the equation will spit x = 14

Ages of kids when told that sum < date of month and product = 72 ( Asked via ages of kids )

Solution: Reproduce all solutions with value x,y,z where x\*y\*z = 72, Max probability is of sum = 14 i.e 3+3+8 and 2+2+6, Also given 1 child is older hence solution is 3,3,8

Monks and disease – Black spots

One monk dies on first day, 2 on second day…similarly n monks die on nth day

Reverse the words in string

I am good

good am I

Solution : Reverse the whole string and then reverse each word

Poisoned rat puzzle

You have 240 barrels of wine, one of which has been poisoned. After drinking the poisoned wine, one dies within 24 hours. You have 5 slaves whom you are willing to sacrifice in order to determine which barrel contains the poisoned wine. How do you achieve this in 48 hours?

Let us number the barrels with 5 digit numbers consisting of 0, 1 and 2. Let us number the slaves as 1, 10, 100, 1000, 10000.

Let us say the barrel is numbered 11201. The wine in this barrel is taken on the first day by the slave numbered 10000, 1000 and 1. It is taken on the second day by slave numbered 100. And it is not taken by the slave numbered 10.

So if the slave numbered 10000, 1000 and 1 die within first 24 hours, slave numbered 100 dies in the next 24 hours and the slave numbered 10 does not die, then the poisoned barrel has to be 11201.

This way total number possible is 3 \* 3 \* 3 \* 3 \* 3 = 3^5 = 243 barrels!! So with the help of 5 slaves and within 48 hours we will be able to find a poisoned barrel among 243 barrels.

Another rat and poison puzzle: 1000 bottles, how many rats required:

Total 10 rats required because we need to represent 1000 in binary and hence 10 bits required, with the rat whose bit is set consuming the wine.

Dave winer is stuck on a deserted island, with lots of trees, which is very thin and ten miles long (east to west). large cliffs surround the entire island and if he jumped off, he wouldn’t survive the fall. a fire starts burning at the west side of the island. unfortunately this island always has a west to east blowing wind blowing at 2 mph and this moves the fire slowly toward dave at 1mph. (so he only has ten hours left)

Dave pick a branch from east side light it up from west side and burns the tree 1 mile from east direction that will leave 1 mile vegetation consumed so he can change the direction now

FFFTTTTTTTTTD

FFFFTTTTDFFFF

FFFFFFFTD\_\_\_\_

62 board puzzle

all will be filled in white-black fashion except the 2 black that are on either side of chess board

Policeman decided to punish the Prisoner and asked him to make a statement. The Prisoner should make such a statement so that he would be alive. If the statement is held true by Policeman, the Prisoner will be hanged to death and if the statement is held false, the Prisoner will be shot dead.

Solution: The Prisoner said, ‘I will be shot dead’

Next palindrome after 10/02/2001

08/31/1380

Cake any my friend: He would be getting **chunk of cakes pieces in boxes of 7, 11 or 17**. Obviously he could purchase exactly 18 pieces by buying a box of 7 and a box of 11. Hearing this, he started imagining the largest number for which it is**impossible** to purchase exactly that number of pieces using above combination

37

Colling star puzzle: Two type of stars – ‘X’ and ‘Y’

Initially 2 stars, now 144. How many big bangs?

Solution: 9 big bangs

Car Wheel puzzle

20k miles each tyre. You have 4 fitted and 1 spare. How far can you go?

Rotate spare tyre among all wheels - 25k miles

A one armed surgeon with a hand wound needs to operate on three patients. the surgeon only has two gloves.

Reverse the glove after operating on 2 patients

There are three ants on a triangle, one at each corner. at a given moment in time, they all set off for a different corner at random. what is the probability that they don’t collide?

Total movements 2^3 = 8, no collision only when anti or clockwise = 2/8 = .25

Paint a cube   
6!/(6\*4) = 30, where we can select 1 color pointing northwards then the south one is fixed we can choose 4 colors for sideways, giving total combination of 24 colors

### Boys and Girls

In a country in which people only want boys, every family continues to have children until they have a boy. if they have a girl, they have another child. if they have a boy, they stop. what is the proportion of boys to girls in the country?

Prob = 1\*(1/2)^2 + 1\*(1/2)^3 + 1\*(1/2)^4 + 1\*(1/2)^5…+1\*(1/2)^infinite

Prob =(¼)(1- ½ ) = ½

It will be 1:1

N = N/2 boys + N/2 girls of which N/2 ones again try to get boys then they get girl again

so it will be 1:1

0s in 100!

10 + 10 + 1 + 3 = 24

Camel and Bananas

A person has 3000 bananas and a camel. The person wants to transport maximum number of bananas to a destination which is 1000 KMs away, using only the camel as a mode of transportation. The camel cannot carry more than 1000 bananas at a time and eats a banana every km it travels. What is the maximum number of bananas that can be transferred to the destination using only camel.

Solution: 533 1/3

Since there are 3000 bananas and the Camel can only carry 1000 bananas, he will have to make 3 trips to carry them all to any point in between.

When bananas are reduced to 2000 then the Camel can shift them to another point in 2 trips and when the number of bananas left are <= 1000, then he should not return and only move forward.

In the first part, P1, to shift the bananas by 1Km, the Camel will have to

Move forward with 1000 bananas – Will eat up 1 banana in the way forward

Leave 998 banana after 1 km and return with 1 banana – will eat up 1 banana in the way back

Pick up the next 1000 bananas and move forward – Will eat up 1 banana in the way forward

Leave 998 banana after 1 km and return with 1 banana - will eat up 1 banana in the way back

Will carry the last 1000 bananas from point a and move forward – will eat up 1 banana

Note: After point 5 the Camel does not need to return to point A again.

So to shift 3000 bananas by 1km, the Camel will eat up 5 bananas.

After moving to 200 km the Camel would have eaten up 1000 bananas and is now left with 2000 bananas.

Hence the length of part P1 is 200 Km.

Now in the Part P2, the Camel needs to do the following to shift the Bananas by 1km.

Move forward with 1000 bananas - Will eat up 1 banana in the way forward

Leave 998 banana after 1 km and return with 1 banana - will eat up this 1 banana in the way back

Pick up the next 1000 bananas and move forward - Will eat up 1 banana in the way forward

Note: After point 3 the Camel does not need to return to the starting point of P2.

So to shift 2000 bananas by 1km, the Camel will eat up 3 bananas.

After moving to 333 km the camel would have eaten up 1000 bananas and is now left with the last 1000 bananas.

The Camel will actually be able to cover 333.33 km, I have ignored the decimal part because it will not make a difference in this example.

Hence the length of part P2 is 333 Km.

Now, for the last part, P3, the Camel only has to move forward. He has already covered 533 (200+333) out of 1000 km in Parts P1 & P2. Now he has to cover only 467 km and he has 1000 bananas.

He will eat up 467 bananas on the way forward, and at point B the Camel will be left with only 533 Bananas.

3 doors and heaven

X = 1/3 \* 0 + 1/3 \* (1 + X) + 1/3 \* (2 + X)

= 0 + 1/3 + X/3 + 2/3 + X/3

= 1 + 2X/3

//integer palindrome

n = num;  
 rev = 0;  
 while (num > 0)  
 {No  
 dig = num % 10;  
 rev = rev \* 10 + dig;  
 num = num / 10;  
 }

//integer to binary

int i = 32, n;

while(i>=0)

if((i&n) == 0)

print “0”;

else

print “1”;

i = i>>1;

Car Crossing :

Probability of Car crossing a junction in 20 mins is 609/625. what is it 5 mins

now here take the contradiction… car not visible in 5 mins so we get

1-(1-609/625)^¼ = ⅗

cube puzzle :

Number of different cubes with color painted;

Actual comb : 6!

now to find the number of cubes with same alignment take one side of the

you have 6 options now you can rotate the cube around this side so you have 4 options for the same.

Ans is 6!/6\*4 = 30

Two calendar cubes which digits to put so that you can show all months and date

0, 1, 2, 3, 4, 5 && 0, 1, 2, 6, 7, 8

you can get 9 by inverting 6

When I had two coins H and T.. if I say that I have 1 H whats the probability of getting H

that is 33% ignore TT we have HH, HT, TH

Three coworkers would like to know their average salary. how can they do it, without disclosing their own salaries?

Solution: Let the employees be X, Y and Z. X adds some random number to his salary and tells to Y, Y too adds and tell this to Z. Z add his too and tell this to X. X will remove his and tell that to Y. Y will remove his and tell that to Z. Z will remove his and announce the number.

Gold bar puzzle

You have a guy employing whom you have to get some work done. You have a gold bar that can be cut into 7 pieces. How many cuts you have to make to the bar such that you have to give 1/7th of [gold@EOD](mailto:gold@EOD)

Solution : just 2 cuts required

\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

just 2 cuts : | \_\_\_| |\_\_\_|\_\_\_| |\_\_\_\_|\_\_\_\_|\_\_\_|\_\_\_|

Day1 – give 1

Day2 - take back 1, give 2

Day3 – give1

Day4 - take back 1 and 2 give 4

Day5 – give1

Day6 – take back 1 give2

Day7 – give 1

You have two types of pills, A & B. You need to take one of each pill in the morning, and you can't take extras because it will make you sick. One morning you open the A pills up and drop one in your hand. Then you open up the B pills and by mistake drop two in your hand. The problem is the pills look exactly the same and they got mixed up in your hand. The question is, how do you make sure that you take one A pill and one B pill without wasting any pills?

Take (1) Pill A from the bottle and add it to the 3 unknown pills. You now have (2) Pill A and (2) Pill B in your pile.

- Take each of the 4 pills and cut them in half.

- For each pill, put one of the halves in a pile on the right and one of the halves in a pile on the left.

- Each pile now contains 2 halves of Pill A and 2 halves of Pill B, which is the same as (1) Pill A and (1) Pill B in each pile.

Josephus Problem:

Consider this Eg : n=5 and k=2.

Start from the 1st person (Let a=1). You need to kill Kth person from 'a'. Since 'a' himself is the 1st person you need to kill a+(k-1)th person. ( see line 14 of my iterative code)

Now the next starting position is the person next to this dead fellow. ie. next starting position is (a+k-1) + 1.

But if dead fellow is 5, the next starting pos is 6, which is out of range for n=5. So we take (a+k-1) % (no. of remaining/alive people) + 1.

Hence for the iterative method a=(a+k-1)%i+1 , where 'i' represents the no. of alive people .

So basically, a+k-1 => says who will be killed.

(a+k-1)%i+1 => who will be the next person to start from.

In the final iteration that next person is obviously the winner :)

This can recurse as return (f(n,k-1)+k-1)%n+1 where f(1,k) = 1.

And (f(n,k-1)+k)%n works if f(1,k) = 0.

int josephusIteration(int n,int k) {

int a=1;

for(int i=1;i<=n;i++) {

a=(a+k-1)%i+1;

}

return a;

}

10 trees,4 lines puzzle

put it in star with trees at intersecting point and at main points

Each house connected to all wells

three houses on top and 3 wells at bottom

Create a pipeline that passes through all houses takes a turn and then connects all wells

A man works on the 10th floor and always takes the elevator down to ground level at the end of the day.  
  
Yet every morning, he only takes the elevator to the 7th floor and then walks up the stairs to the 10th floor, even when in a hurry.  
  
But he will go all the way to the 10th floor when others are in the elevator with him or on a rainy day.

Solution : He is a dwarf man

Given 50 white balls and 50 red balls and 2 empty bowls. Distribute white balls so that probability of getting it is highest

Solution: Put 1 white ball in first bowl and 49 in second. Prob = ½\*1 + ½\*(49/99) = ¾

Strategy for 2 player coin game. A board contains even number of coins of various denominations. Players are allowed to pick coins from corners, one at a time. the player who has the max sum wins.

Solution: The player who wants to win will count the coins placed at even places and the coins placed at odd places. Whichever is the maximum, the player can start from that side and make sure that he block his opponent.

Josephus problem :

100 people standing in a circle, first kills second, second kills 3rd and so on who will survive

Solution : find the nearest power of 2 < number of people in circle and subtract that from number of people let x be that number then 2 \* x + 1 is the requisite position.

Detailed Solution : If 2^n numbers of people are in circle, then whoever has the sword will survives at the last (because each time half of people remains which is even no {2^n-1} so each time same person gets the sword)

Ex. if there are 128 person in circle and No 3 person starts killing process then No. 3 will survive at the last.

In the given question total person are not equal to 2^n, then find the nearest 2^n which is less than total person (eg. for total 100 people, nearest 2^n no is 64 which is less than 100)

In the first round of killing process, when the number of people remains 64 at this moment who has the sword will survive at last.

Now needs to find who has the sword when the 64 person are in circle.

At this time total 36 people has been killed (100-64).

If 1 has sword at beginning then 1 kills 2, 3 kills 4, and 71 kills 36th person who is 72 and gives the sword to 73. Now 73 has sword and 64 people in circle so 73 will survive at the last.

**For interviews, store numbers in array 1->n, traverse array deleting alternate entries till last person left. Last index will be 73**

Planes around the world puzzle

Qn. You intend to fly non-stop around the world.

But you can only go halfway around the world on a full tank.

However you can arrange many planes exactly like yours to assist with refuelling.

Assuming refueling can be done mid-air, ignoring refuelling and turning time, and without crashing any plane, what is the minimum number of planes you will need?

Solution : 3 planes are required

Explanation : All 3 planes start off with full fuel tank. When all reaches 1/8th first one refuels the other 2 and returns. When they have reaches 1/4th of the distance both the 2 planes will have 75% fuel. Here second plane refuels the first one and returns home safely. The first plane can reach 3/4th of the distance meanwhile another plane starts and meet that plane and fuels second one to 1/4th so they reaches 7/8th of the distance in that time third plane arrives and takes all of them safely @home.

# You have 10 jars containing 100 marbles each. One jar

*has marbles weighing 1.1 grams. The other jars have marbles weighing 1.0 grams. The marbles all look alike. What is the minimum number of weighs on a scale to find out which jar has the heavy marbles*

Answer = 1 weigh. You line up the jars in order and take 1 marble from the first jar, 2 marbles from the second jar...and 10 marbles from the 10th jar. What ever decimal the scale reads, that tells you which jar has the 1.1 gram marbles. So if it's 0.5, then it's the 5th jar.

Mr A and B are playing cards, suddently there was an electric cur. In the dark Mr A inverted 15 cards and shuffled the lot and gave the stack to Mr. B and asked him to divide such that nunber of inverted cards on both sides are equal. What Mr. B should have done ?

Solution : He inverted 15 cards and then mixed with other 37 and distributed them equally

1000 coins and 10 bags puzzle – Divide 1000 coins over 10 bags so that any number of coins can be measured

Solution : Make each bag contain coins equal to power of 2 in increasing order

2^0+2^1+2^2+…+2^9 + (leftover)

Arrange 10 coins as 5 row, each having 4 coins

Place the coins in star formation.

Chessboard and Dominos Puzzle: There is an 8 by 8 chessboard in which two diagonally opposite corners have been cut off.You are given 31 dominos, and a single domino can cover exactly two squares. Can you use the 31 dominos to cover the entire board?

Not possible, for each domino, we need 1 black and 1 white. But on cutting corners, we have removed 2 whites. Hence, not possible

There are twenty coins sitting on the table, ten are currently heads and tens are currently tails. You are sitting at the table with a blindfold and gloves on. You are able to feel where the coins are, but are unable to see or feel if they heads or tails. You must create two sets of coins. Each set must have the same number of heads and tails as the other group. You can only move or flip the coins, you are unable to determine their current state.

Solution : Divide the coins in 2 sets. Invert the coin in 1 set and leave 2nd set as such ,now both will contain equal number of heads and tails

How many runs a batsman can score in 50 overs?

Solution: 1653 (6\*5 +3) till 1-49 overs and 36 in last over

Place the 8 balls such that 2 consecutive aren't placed together

3 5

7 1 8 2

4 6

Given 2 jugs, one measuring 4 liter and another measuring 3 liter. Get 2 liter of water in 4 liter jug

Steps:

* Fill 4 jug with water and empty out in 3 litre just, leaving 4 litre jug with 1 litre water
* Empty out 3 litre jug and pour 1 litre from 4 litre jug to 3 litre jug
* Fill the 4 litre jug again and pour it in 3 litre jug till that becomes full, 4 litre jug will have 2 litre water

Boy with Marbles: A boy has just bought some marbles and with that he visits his 20 friends where he gave away ½ of the marbles and take back 1. How many marbles that guy bought

Solution: 2

Probability of getting second child on Tuesday - 13/27

To get the solution, draw a matrix with 14 rows (b+g) and 14 columns(b+g). The solution conditions will be the entries of form 'bb' which are 13 while there are 27 for b and g combinations

Prove that a number between 2 primes is always divisible by 6

all prime numbers are of the form 6x+1 or 6x-1   
so to be twin primes they should be 6x-1 and 6x+1 for some x   
so the number netween them is 6x which is divided by 6

Imagine an analog clock set to 12 o’clock. Note that the hour and minute hands overlap. How many times each day do both the hour and minute hands overlap? How would you determine the exact times of the day that this occurs?

A: The answer is 23.

Common sense first: When a minute hand move around the circle for one lap, it definitely will met once with the hour hand. That means for each hour there will be once and only once overlap for each hour. And also we start from 12 p’clock. So there will be total 23 overlaps in one day.

Calculation: Assume the overlapped hour is h and minute is m. Using geometry, when overlapping, the degree of hour hand and minute hand to 12 o’clock marker will be the same. So

(h+ m/60)=m/5=> h=11x/60.Here 0 =<h<23

Suppose you had 8 billiard balls, and one of them was slightly heavier, but the only way to tell was by putting it on a scale against another. What’s the fewest number of times you’d have to use the scale to find the heavier ball?

A: Twice.

First, put three on one side and another three on the other side. If they weigh the same, then the heavier one in the remaining two balls next can find the heavier one in one more measurement.

Second, if the two sides don’t weigh the same, then the heavier on e is in the heavier side. So choose any two of the three balls and put them on the scale. It can be found which one is heavier right now.

100 prisoners in jail are standing in a queue facing in one direction. Each prisoner is wearing a hat of color either black or red. A prisoner can see hats of all prisoners in front of him in the queue, but cannot see his hat and hats of prisoners standing behind him.The jailer is going to ask color of each prisoner’s hat starting from the last prisoner in queue. If a prisoner tells the correct color, then is saved, otherwise executed. How many prisoners can be saved at most if they are allowed to discuss a strategy before the jailer starts asking colors of their hats.

Solution: At least 99 will be saved while the last one has 50-50 chances of living. The strategy they decide that their response will be figured around number of red hats in front of them. If a prisoner says red it means there are even number of red hats in front of him, but if he says black he finds odd number of red hats. The prisoner standing in front decides based on that. If 100th one says red that means number of from 1-99 there are even hats If 99 finds odd number of red hats in front of him then he is wearing the red else he is wearing black and then counts and tells the same to 98th one. While the everybody is saved, the last one has 50-50 chance of living.

Three Prisoners Puzzle: 4 prisoners are standing in one line A.B.C on 1 side and D on the other side. Any of them should squeal out his colour of hat find out who will.

EXPLANATION: If prisoners B and C had the same colour hat on, prisoner A would have known immediately that his hat was the other colour (there are only two hats of each colour). Since prisoner A was silent, prisoners B and C must have different coloured hats. Prisoner B realized this and knew that his hat was not the same colour as prisoner C, therefore his hat must be black!

This is a famous puzzle based on the show "Let's make a deal".

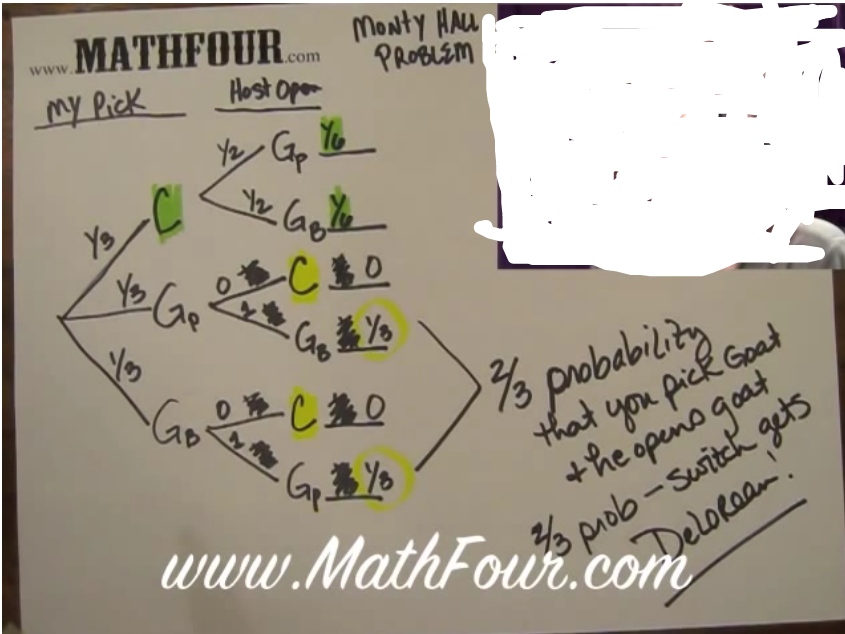
The host, Monty Hall, offers you a choice of three doors. Behind one is a sports car, but behind the other two are goats. After you have chosen one door, he reveals one of the other two doors behind which is a goat (he wouldn't reveal a car). Now he gives you the chance to switch to the other unrevealed door or stay at your initial choice. You will then get what is behind that door.

You cannot hear the goats from behind the doors, or in any way know which door has the prize.

Should you stay, or switch, or doesn't it matter?

Your first choice has a 1/3 chance of having the car, and that does not change.

The other two doors HAD a combined chance of 2/3, but now a Goat has been revealed behind one, all the 2/3 chance is with the other door.



You better switch!

(Unless you really want a goat)

Puzzle to place seven match sticks in order that each match stick crosses the other 6

Make 1000 using 8 8's

There are 2 solutions :

> 888 + 88 + 8 + 8 + 8 and

> ( 8888-888 ) / 8

To find the number of weighings required for balls:

= ceil|log3(2\*num\_of\_balls)|

Find if 2 rectangles overlap -

Rectangles won't overlap if one is above the another or is on the left of 2nd one

// If one rectangle is on left side of other

if (l1.x > r2.x || l2.x > r1.x)

return false;

// If one rectangle is above other

if (l1.y < r2.y || l2.y < r1.y)

return false;

20 coins on table, winning criteria?

Pick 6n + 2 coin number. E.g winning numbers are 2,8,14. First turn pick 2 . opponent can pick max 5 so he picks up to 7. Now u pick one and make it to 8(6n + 2)..up to 14. Opponent can pick max 5 so he leaves at 19.pick last one and win.

Find defective coin:

We are given 5 coins, a group of 4 coins out of which one coin is defective (we don’t know whether it is heavier or lighter), and one coin is genuine. How many weighing are required in worst case to figure out the odd coin whether it is heavier or lighter?

We can best group them as [(G1, 23) and (4)].

Two men will wait between 1 - 2 PM and no one will wait > 15 mins for the other . Find the probability that they will meet

As 15 minutes is quarter of the time between 1 pm and 2 pm, the required probability in this situation is the area of the shaded region - the set of all points satisfying |X-Y|=1/4

There will be shaded area in square with 2 triangles, each of edge 3/4 units 1-2(1/2\*3/4\*3/4)=1-9/16=7/16=43.75%

3 friends A, B, C are playing with paper balls. In the game A, B, and C will hit each other in sequence with paper balls.The person who got hit is eliminated from the game. A, B and C has hit probability of 0.3, 0.5 and 1. What strategy should A employ to win the game.

Solution: A should miss his first target. In that case B will hit C and if that is successful. 'A' will have the next chance to hit 'B'. If hit fails 'C' will go after 'B' and 'A' will get the chance to hit 'C'

Stars Collision: two type starts collide and result of new star. In 1800, the count of new was 144. How many collisions have been happened by then?

Solution: 9 collision, The pattern follows a Fibonacci number 1, 1, 2, 3, 5, 8, 13 ... 144

A seller has a very unique arrangement for cakes in boxes of 7, 11 or 17. Exactly 18 pieces by buying a box of 7 and a box of 11. What is the largest number for which it is impossible to purchase exactly that number of pieces using above combination?

Solution: The largest number that would be impossible to buy using above combination is 37.

Uphill, Flat land, Downhill

Create 2 equations and add them, all coefficients will be the same so we can easily find (a+b+c)

Person A chooses the number 1 to 10000, person B has to guess what person A has chosen. Person A will tell how much greater or lesser is the number guesses by person B. Which strategy can make the number of guesses lesser?

When Ankur chooses a number between 1 and n, here n=10000, Vijay should start guessing vn, 2sqrt(n), 3sqrt(n), 4sqrt(n), and so on.

A king wants his daughter to marry one of 3 young princes, so he devises an intelligence test. The princes are gathered into a room and are shown 2 black hats and 3 white hats. They are blindfolded, and 1 hat is placed on each of their heads, with the remaining hats hidden in a different room. The king tells them that the first prince to deduce the color of his hat without removing it or looking at it will marry his daughter. A wrong guess will mean death. The blindfolds are then removed. You are one of the princes. You see 2 white hats on the other prince’s heads. After some time you realize that the other princes are unable to guess the color of their hat. What is the color of your hat?

3 cases:

Case 1: 2 Black 1 white:

If this is the case the one of the two could see 1 white and 1 black and can easily deduce, but they can't

Case 2: 1 Black and 2 White

The other could have find after checking that 2 hats are white

Case 3: All hats are white

The other 2 can see 2 white hats, but not sure about the last one, which will be white finally

You have five pieces of chain, each consisting of three links.Breaking open a link costs 1 Rs, and welding an open link costs 3 Rs. Is it possible to make one long chain of the five pieces, if you have just 15 Rs?

Take link 1 and divide it in 3 pieces = 3\*1 = 3

Take individual link and insert it between two complete links = 3\*3 = 9

Total cost = 12

Joey has to arrange 2N sandwiches which are wrapped by different color wrapper in N pairs such that he can feed his N girlfriends. He has to serve them for 2N-1 Days. Girls don’t like repeated pair of color wrapper of their sandwiches.

Design an algorithm for joey so that for 2N-1 days no pair would be same.

For n = 3, make a 2\*N table with the pairs for the first set are given by the columns of this table. and next row laid in reverse manner

1 2 3

6 5 4

Now, fix 1 and rotate clockwise rest of all

1 6 2

5 4 3

Using 1-9 only 1 time make the expression to have sum as 100

123-45-67+89 = 100

Using 2 sand timers of 11 min and 7 min respectively, measure 15 min

Turn down both sand timers simultaneously. When 7 is filled, turn it. When 11 is filled we have 4 left in 7. Turn 7 again so total will come out to be 15 mins

Given n coins for two players playing a game. Each player can pick at least 1 and at most 5 coins in one turn. The player who picks the last coin loses the game. If they play optimally, which player will win the game?

The first player loses if n=6k+1

If n=1, the first player is forced to take it and hence loses. Now that we have identified a losing position, it makes sense to send the opponent to the losing position. Hence if n=2,3,4,5 or 6, the first player can take away n-1 coins and give just 1 coin to the opponent, forcing them to lose.

If n=7, anything that the first player does, the opponent is going to end up with 2,3,4,5 or 6 coins. But as explained earlier, the opponent can then take away the required number of coins to give a single coin to the first player, forcing them to lose. Thus n=7 is a losing position, from which it follows that n=8,9,10,11 and 12 are winning positions.

Consider a two player coin game where each player gets turn one by one. There is a row of even number of coins, and a player on his/her turn can pick a coin from any of the two corners of the row. The player that collects coins with more value wins the game. Develop a strategy for the player making the first turn, such he/she never loses the game.

The idea is to count sum of values of all even coins and odd coins, compare the two values. The player that makes the first move can always make sure that the other player is never able to choose an even coin if sum of even coins is higher. Similarly, he/she can make sure that the other player is never able to choose an odd coin if sum of odd coins is higher.

We are playing Russian roulette, with a standard 6-chamber revolver. I put two bullets in adjacent chambers, spin, point the gun at my head, and pull the trigger. Click. I'm still alive. It's now your turn, and I hand the gun to you, and give you two choices.

B B \_ \_ \_ \_

\_ B B \_ \_ \_

\_ \_ B B \_ \_

\_ \_ \_ B B \_

\_ \_ \_ \_ B B

B \_ \_ \_ \_ B

When 1st shot fails, 1st and last option is ruled out. So, you now have configuration of bullet from 2 to 5 and only one (2nd) among them has bullet so your odds of surviving are 75%, but in case if you spin chance of survival are 67% (4/6). Hence, better don’t spin.

There are 2187 balls, out of them 1 is heavy. Find the minimum number of attempts the balls have to be weighed for finding out the heavy ball.

7 times.

2187 = 3^7

Always divide balls in a group of 3. -> 729\*2 -> 243\*3 -> 81\*3 -> 27\*3 -> 3\*3 ->1\*3 ->last among 3 balls.

Seven men and two boys need to cross a river. The one canoe is tiny and can carry either one man or two boys. How many times does the boat have to cross the river for everyone to get to the other side?

Solution: 29 (Each man takes 4 rounds to travel courtesy 2 boys, 4\*7 + 1(For boys to reach another side)

N pens and N caps puzzle

Find the pen for a given cap given that there is no pen-2-pen and cap-2-cap comparison allowed?

Solution: Use Quicksort. Compare the cap with pens and partition the pens depending upon whether it is tight or loose. Max complexity is O(nlogn)

Maximum number of Kings on Chessboard without under check

Given a 8×8 chessboard, figure out the maximum number of kings that can be placed on the chessboard so that no two kings attack each other,

Solution: Two kings will clash if they are inside 2\*2 square. such number of squares are (8\*8)/(2\*2) = 16 positions

100 seat aeroplane puzzle - People are waiting in line to board a 100-seat airplane. Ajay is the first person in the line. Ajay gets on the plane but he forgets his seat number, so he picks a seat at random. After that, each person who gets on the plane sits in his assigned seat if it’s available otherwise chooses an open seat at random to sit in. The flight is full and you are last in line. What is the probability that you get to sit in your assigned seat?

Solution: You either ends up in your seat or in Ajay's seat if he has taken yours. So, probability is ½

Find the equation when hour and minute hands in a clock overlap

Angle made by hour hand - 0.5\*(60\*hours + minutes) and by minute hand - 6\*minutes

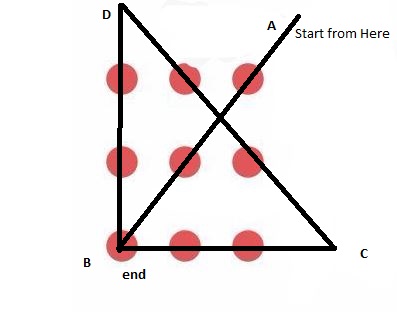
There is a mother who wishes to cross a river but she is not alone. She also has 5 daughters of age 6, 7, 8, 9 and 10.There is only one boat available which can support the woman and either two of the daughters. So at a time, the boat can have only three objects (woman and two other). But the problem is that when the mother is absent, daughters with one year difference in age will fight each other.

Solution: Ultimate motive is to transfer girls of age 6, 8 and 10 with her. First, start with daughters of age 7 and 9. Bring 6 and 8 with her, leaving 7 and 9. Then take the daughter 10. Finally, she returns and pick 7 and 9.

If I add 7 to a number I get 46. However, if I subtract 7 I get 30.

Number is 37 (in Base 8)

Draw 4 straight line in 3\*3 matrix (9 dots)



3 Thieves have to cross a river namely A, B and C with bag of 1000, 700 and 300 coins respectively. If a thief is left with coin > his own, he will take that away

Solution:

> Thief B crosses first with his bag of 700 coins. He will keep the bag there and will return back.

> Thief A will now cross the river with the bag which has 300 coins. He will keep the bag and return back.

> Now thief B and C cross the river and thief C will return back with his bag of 300 coins.

> Now thief **A goes to the other side with his bag of 1000 coins** and thief B will return back with his bag of 700 coins.

> Now thief B and C cross the river together and thief A return back empty handed. Thief A takes the bag of 300 coins and cross the river then thief B is sent to collect his bag of 700 coins.

You have 20 white and 13 black balls in a bag. You pull out 2 balls one after another. If the balls are of same color, then you replace them with a white ball – but if they are of different color, you replace them with a black ball. Once you take out the balls, you do not put them back in the bag – so the balls keep reducing. What would be the color of the last ball remaining in the bag.

Number of black balls will always be odd in number. So, black ball will be there at last.

The probability of a truck passing a certain intersection in a 20 minute windows is 0.9. What is the probability of a truck passing the intersection in a 5 minute window? (

Let p be the probability of a truck passing the intersection in a 5 minute window.

Probability of a truck passing in a 20 minute window = 1 – (probability of no truck passing in a 20 minute window)

Probability of a truck passing in a 20 minute window = 1 – (1 – probability of a truck passing in a 5 minute window)^4

0.9 = 1 – (1 – p)^4

(1 – p)^4 = 0.1

1 – p = 10^(-0.25)

p = 1 – 10^(-0.25) = 0.4377

2 parachutes puzzle - Both robots will move slower towards west. We have to put a condition wherein if a robot finds a parachute, he will move faster while the one who landed in LHS will move slower and ultimately will be caught by robot on write. Pseudo code:

10 Go right

20 Go left

30 Go right

40 If Not Parachute GOTO 10

50 Go right

60 GOTO 50

There are 20 red and blue balls in bag, balls are picked and replaced as per 2 rules:

> if 2 are same color, replaced by red ball

> if different , replaced by blue ball

find last ball to remain

Answer: Red ball

here are even number of blue balls and blue balls can only be reduced by **two**, so at any stage of replacement you will be left with either 0 or 2 or 4….(even number) of blue balls in the bag. There will never be such a condition when blue balls are in odd number of quantity in the bag.

2 gatekeepers liar and truthful  
What would the other guard say if I ask which way is to the hell ?”

( Q + U + I + C + K) ^ 3 = QUICK

Answer: 19683

A Japanese ship was sailing in the Pacific Ocean. Japanese captain of the ship decided to take a shower. He kept his diamond chain and golden watch in the table shelf and went for shower and returned in 10 minutes.

Now , when he returns he is shocked to see that neither his watch nor his chain is there.

Answer: Srilankan who was correcting the flag which got upside down is the thief because ship was of Japan and japanese flag is orientation agnostic.

lion eats the sheep and become sheep itself  
Even number of lions

3 mislabelled jars

Pick ball from the jar which mentions mixture

7 Pirates and gems  
While other sleeping 2 wake up and divide among them but 1 left, they wake up 3rd guy and again divide by alas 1 again left. It continued until last one was woken up. Min. Gems?  
Solution - 301

Bit Magic

> To multiply a number by 37 -

result = (N<<5) + (N<<2) + N

> To find missing number in array of size n-1 that contains 1 to n

Do XOR of 1 to n - X1 and do XOR of array - X2

result = X1^X2

> To find a number which is repeated once in an array in which all other elements are repeated thrice

Solution: **This approach will has O(32\*n) running time. It is based on simple idea that for each bit position, either ‘1’ or ‘0’ will have count 3\*x+1, using that information we can create an integer whose each bit is derived by the count of ‘1’ and ‘0’ at that position.**

To divide two numbers using bitwse bits:

**Initially we will find 2th power quotients and sum them up, subtracting dividend with maximum value of divisor which is less than dividend.**

**For example: To divide 77 by 6**

**We can shift 6<<3 to get 48 not further because 96 will be greater than 77...quotient till now - 8, dividend becomes 29(77-48)**

**We can shift 6<<2 because 36 will be greater than 29...quotient till now - 8+4, dividend becomes 5(29-24)**

**Now dividend (5) is less than divisor (6), we will terminate our operation here and the left dividend is the remainder.**

To find the min XOR of 2 numbers in array.

**Sort them and then find min among adjacent ones**

City of truth and city of lies

A road is divided into two ways of which one leads to City of truth and other leads to City of Lies. All the peo­ple of City of Truth always tell truth and all the people from City of Lies always lie. There are two people standing at the division one from City of Truth and other from City of Lies. You don’t know who belongs to which city. You can ask only one question from any of the two people standing there to determine which way leads to city of truth and which leads to city of lies.

Ask anyone, “Which city do you belong too?”.  
In this case, the person belonging to City of Truth always tell the truth and will tell you the way to his city, while the person belonging to City of Lieswill lie and point in the direction of City of Truth.

Mathematics

GCD or HCF of a number

int gcd(int a, int b)

{

if (b==0)

return a;

return gcd(b, a%b);

}

Also, HCF X LCM = a X b;

Others:

Design a Parking lot;

Take a class Vehicle and derive bus, car and motorcycle from it

Take ParkingSpot as class with size in it

Design a Recommendation System

Heuristic Solution : Recommend the user the videos by same uploader or similar title

Collaborative Filtering: Find common set between that user and other users who watched a certain videos. The user B probably like the videos watched by user A if both have watched a substantial number of sae videos.

Explicit Features : Subscription, Watch time, Freshness