Top 20 puzzles for SDE interviews

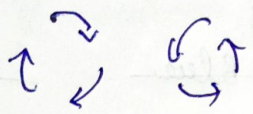
① 3 Ants and triangle

There are 3 ants sitting on three corners of a triangle. All ants randomly pick a direction and start moving along the edge of the Δ.

What is the probability that any two ants collide?

Sol^n every ant has two choices. So ~~that~~ there are 2^3 possibilities.

out of 2^3 possibilities, only 2 don't cause collision



So probability of collision is 6/8 and non-collision 2/8

② Heaven and Hell

two gates
two gatekeepers one on each
~~you~~ you are allowed only one question and you need to find out the gate to heaven.
What is the question?

Sol^n what would the other guard say if I ask which way is to the hell?

③ 10 coins Puzzle

You are blindfolded. 5 coins head up and 5 coins tail up.

can you make two piles of coins each with the same number of heads up? You can flip the coins any number of times.

Yes

HTTTT THHHH
HHHHT HHHHT

④ Mislabeled Jars

given three jars all three are mislabeled

Tell minimum number of eatable(s) that has/have to be picked in order to label jars correctly.

Sol^n 1 pick of an eatable is required from jar C Red and Blue

Red	~~Blue~~	Blue	Red + Blue
Red	Red + Blue	Red	Blue
		~~Red + Blue~~	~~Red~~

⑤ 50 Red marbles and 50 blue marbles

two boxes B_1 and B_2

B_1 have 50 Red marbles

B_2 have 50 Blue Marbles

task is to maximize the probability of selecting a red ball, by reshuffling marbles in both the boxes.

$$P(R) = \frac{1}{2} \times 1 + \frac{1}{2} \times 0 = 0.5$$

$\frac{1}{2}$ → probability of selecting B_1 box

1 → probability of getting red ball from it

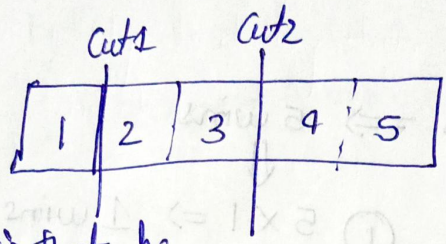
→ transfer 49 red marbles to B2 from B1

$$P(R) = \frac{1}{2} \times \frac{1}{1} + \frac{1}{2} \times \frac{49}{99} = 0.74774$$

⑥ Minimum cut Puzzle

Someone working for five days and you have a gold bar to pay. You must give them a piece of gold at the end of every day. What are fewest no. of cuts to the bar of gold that will allow you to pay him 1/5 the each day?

Answer 2 Cuts



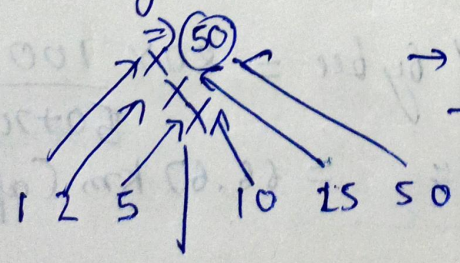
only trick is that he can return you units of gold he have.

⑦ 100 Doors

There are 100 doors initially closed.
In first walks, person toggles every door.
In second walk, 2nd, 4th, 6th, 8th ....
In third walk, 3rd, 6th, 9th, ...
in 100th walk, the person toggles the 100th door.
which doors are open in the end?

Door no.	50	walk 1	walk 2	walk 5	walk 10	walk 25	walk 50
	close	open	close	open	close	open	close

no. of factors - even final state - closed
no. of factors - Odd final state - opened.



→ in case of odd middle × middle = X
→ All the perfect square numbers have odd number of factors
1, 4, 9, 16, 25, 36, 49, 64, 81, 100

(8) Find the fastest 3 horses

There are 25 horses among which you need to find out the fastest 3 horses. You can conduct a race among at most 5 to find out their relative speed. find out the minimum no. of races that are required to get top 3 horses.

Ans 7

$5 \times 5 \Rightarrow$ 5 wins

$\Downarrow$

(5) (1) $5 \times 1 \Rightarrow$ 1 wins $\Rightarrow$ 7 races

$\Downarrow$

$\boxed{5+1+1}$ (1) $5 \times 1 \Rightarrow$ 1 wins

(9) Calculate total distance traveled by the bee

Two trains are on same track and they are coming toward each other. The speed of first train is 50km/h and the speed of second train is 70 Km/h. A bee starts flying b/w the trains when distance b/w two trains is 100km. The bee first flies from first train to second train. Once it reaches the second train, it immediately flies back to first train until trains collide. Calculate total distance travelled by bee. speed of 80km/h.

Sol^n time taken to collide $= \dfrac{d}{u+v}$.

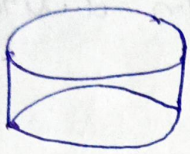
total distance travelled by bee $= 80 \times \dfrac{100}{50+70}$

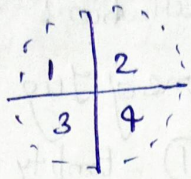
$= 66.67$ Km (approx.)

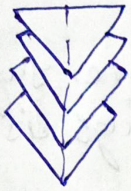
(10) 3 cuts to cut the round cake into 8 equal pieces.

You have a birthday cake and have to cut it into 8 equal pieces by making 3 cuts only. How do you do it?

Ans







⇒ 8 equal pieces.

(11) 20 R, 16 B balls in a bag. pick two balls replace them with one.

1) Same color → red
2) diff. color → blue

Find the last ball to remain after entire process.

Ans. Blue balls → can only be reduced by two and that too if 1) condition is true. in no other way you can reduce blue balls.

Red balls → can be reduced by ~~two~~ one, ~~so at any stage of replacement you will be~~ in 1) condition both RR and in 2) condition

Blues balls are even at any stage left with 0, 2, 4 .. so, answer is red ball

(12) You are given two jug m and n liter where $0<m<n$. You have to use the jugs to measure d liters of water where $d<n$. Determine mini. no. of operations to obtain d liters of water in one of jug

operations:
1. Empty a jug
2. Fill a jug
3. Pour from one jug to other until one of jugs is either empty or full.

State space

$x = 4$
$y = 3$

$\Rightarrow (x,y) \rightarrow (4,y)$

$\Rightarrow (x,y) \rightarrow (x,3)$

$\Rightarrow (x,y) \rightarrow (x-d,y) \quad x>0$

$\Rightarrow (x,y) \rightarrow (x,y-d) \quad y>0$

$\Rightarrow (x,y) \rightarrow (0,y) \quad x>0$

$\Rightarrow (x,y) \rightarrow (4, y-(4-x)) \quad y>0, x+y\geq 4$

$\Rightarrow (x,y) \rightarrow (x-(3-y), 3) \quad x>0, x+y\geq 3$

$\Rightarrow (x,y) \rightarrow (x+y, 0) \quad x+y<=4, y>0$

$\Rightarrow (x,y) \rightarrow (0, x+y) \quad x+y<=3, x>0$

x	y	rule
0	0	–
0	3	2
3	0	8
3	3	2
4	2	6

(13) 3 Bulbs and 3 Switches

→ 3 Bulbs inside room and 3 switches outside
→ once you open the door you can't change them
→ identify each switch with its bulb.

Sol^n

Let the bulbs be X, Y, Z

Turn on switch X for 5 to 10 min. Turn it off and turn on Y. open door.

Bulb which is ON ⇒ Y

Bulb which is HOT ⇒ X

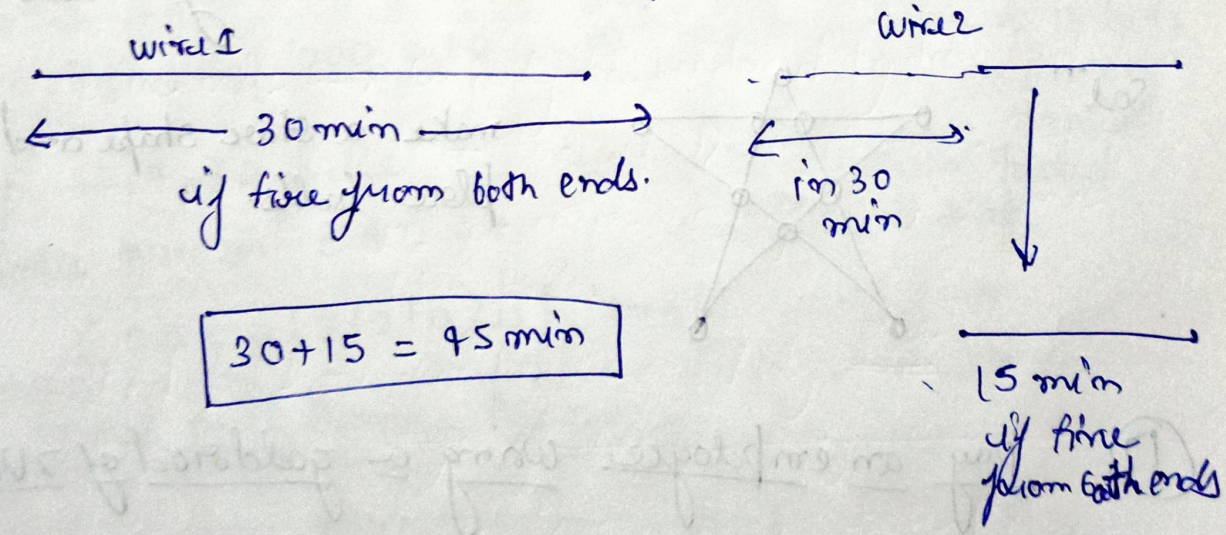
Bulb which is not HOT ⇒ Z

(14) How to measure 45 minutes using two identical wires

each of which takes an hour to burn?

The wires burn non-uniformly.

⇒



$$\boxed{30 + 15 = 45 \text{ min}}$$

(15) Find ages of daughters

1) product of their ages is 72
2) The sum of their ages is equal to house number
3) The aldest girl likes strawberry ice cream.

Ans

$2 * 6 * 6 = 72$ $\quad$ $2+6+6 = 14$

$3 * 3 * 8 = 72$ $\quad$ $3+3+8 = 14$

(all sums are unique except 14)

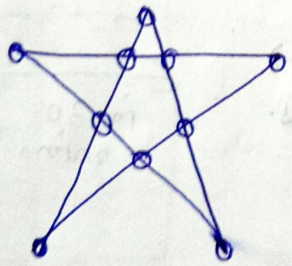
$\Rightarrow$ ALDK has the aldest girl (not two!!)

So, 3, 3, 8.

(16) 10 balls in 5 lines

the task is to place these 10 balls in five lines such that each line contains exactly 4 balls.

Sol^n



make a star shape and place balls.

(17) pay an employee using a galdrod of 7 units?

$\rightarrow$ making 2 cuts $\Rightarrow$ 3 rods 1, 2 and 4

1st day $\Rightarrow$ 1 unit ↑

2nd day $\Rightarrow$ 1 ↓ 2 ↑

3rd day $\Rightarrow$ ~~2 ↓ 4 ↑~~ 1 ↑

4th day 1 ↓ 2 ↓ 4 ↑

5th day 1 ↑

6th day 1 ↓ 2 ↑

7th day 1 ↑

(18) Torch and Bridge

→ A – 1 min, B – 2 min, C – 5 min, D – 8 min

→ atmost 2 person at a time at bridge.

→ they must move at the slower person's pace.

1 — 2 min →
2 — 1 min ←
5 — 8 min →
8 — 2 min ←
2 min →

15 min

trick 5, 8 will go and 2 will return

(19) Poison and Rat

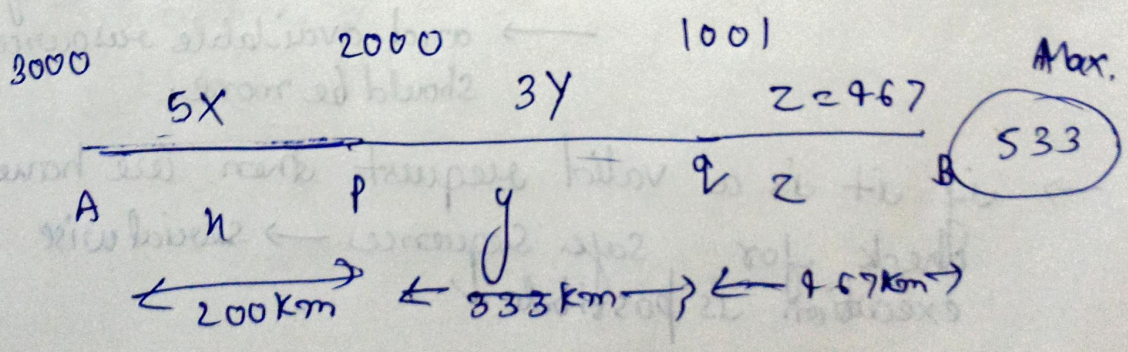
1000 wine bottles, one is poisoned. rat dies after one hour. Minimum no. of rats?

Sol^n 10 rats

$\Rightarrow \log_2 1000 = 10$ ⇒ Bottle number ⇒ 10 bits Binary number

e.g. 2, 4, 6 rat die ⇒ only 1 bit is tasted by each rat.

Bottle number = 42

(0000101010) is poisoned.

(20) Camel and Banana Puzzle