

Puzzle – 14

Q- A Box of Defective Balls Puzzle

You have 10 boxes of balls (each ball weighing exactly 10 gm) with one box with defective balls (each one of the defective balls weigh 9 gm). You are given an electronic weighing machine and only one chance at it. How will find out which box has the defective balls?

My Approach and Solution –

In order to solve this problem, we need to leverage the fact that we know exactly what each good ball is supposed to weigh and what each defective ball is supposed to weigh. We might instinctively think to take one ball out of each box and try to find a way to make it work but no matter how hard we try, it will not work. Trust me, I have tried enough.

The trick is to take different number of balls from each box.

The number of balls you pick from each bag is equal to the box number. For example, pick 1 ball from box 1, 2 balls from box 2 and so on. In total we will have 55 balls. If all of the boxes have good balls, then the total weight of these balls would be 550gm.

If box 1 has defective balls, then the total weight should be 1gm less than expected (only one ball weighing 9 gm). If box 2 has defective balls, then the total weight should be 2gm less than expected (two balls weighing 9 gm).

So once you weigh the set of chosen balls, find out the difference between the total weight and the expected weight.

That number represents the box number which contains the defective balls.