Day 3 Brain Teasers

Batch I - Vikings
Time Limit: 45 Minutes

June 12, 2019

1 Puzzles and Mathematics

1. A school bus travels from Bengaluru to Chennai. There are four children in the bus. Each child has four backpacks with him. There are four dogs sitting in each backpack. Every dog has four puppies with her. All these dogs have four legs, with four toes at each leg. The bus also has 1 driver.
   What is the total number of toes in the bus?

   The puppies: 4 children $\times$ 4 backpacks $\times$ 4 dogs $\times$ 4 puppies $\times$ 4 legs $\times$ 4 toes = 4096
   Plus the dogs: 4 children $\times$ 4 backpacks $\times$ 4 dogs $\times$ 4 legs $\times$ 4 toes = 1024
   Plus the children: 4 children $\times$ 2 legs $\times$ 5 toes = 40
   Plus the driver of the school bus: 2 legs $\times$ 5 toes = 10
   This gives the following total number of toes: 5170

2. You are given 8 identical looking balls. One of them is heavier than the rest of the 7 (all the others weigh exactly the same). You a provided with a simple mechanical balance and you are restricted to only 2 uses. Find the heavier ball.
   Hint: You can weigh multiple balls at the same time!

   For convenience sake, lets name the balls 1-8. First we weigh {1,2,3} on the left and {4,5,6} on the right. There are three scenarios which can arise from this.
   If the left side is heavier, then we know that one of 1, 2 or 3 is the heavier ball.
   Weigh {1} on the left and {2} on the right. By doing this, we will know if 1 or 2 is heavier. If they balance out, then 3 is the heavier one.
   If the right side is heavier, then we know that either 4, 5 or 6 is the heavier ball.
   Weigh {4} on the left and {5} on the right. By doing this we will know if 4 or 5 is heavier. If they balance out, then 6 is the heavier one.
   If {1,2,3} and {4,5,6} balance out, then we know either 7 or 8 is the heavier one.
   Weigh both of them to find out which one is heavier.