1. BMW Company is testing the top speed of its new model X70  
   It has tested 100 units and found the avg top speed to be 230Km/hr with a std dev of 10km/hr Whereas company believes the avg top speed to be 260Km/hr.  
   Company asks: Do you think being in Indian Road affects the top speed?

**Ans:** Yes, Indian conditions and roads affected the top speed as the vehicle isn't built keeping these conditions in mind and also to perform in the best possible way in Indian roads. That's the reason the car couldn't achieve the top speed of 260 Km/hr as believed by the company and a disparity was seen in the observed values. Thus Indian roads did affect the top speed.

1. On an average, males drink 2L water per day with standard deviation σ = 0.7L. We are planning for a full day trip for 50 Men with 110L of water.

▪ What is the probability that we will run out of water?  
▪ With a Significance level of 5 %, can we say that we will run of water?

**Ans:**

1. **P (run out)**

P (use more than 110L)

P (average value usage per man is >2.2L/m) (110/50 = 2.2L)

σ= 0.7l

Sampling distribution of the sample mean when n = 50

Mean

Standard deviation of sample means

=0.7/

=0.099

Average litre –mean

=2.2l-2l =0.2l

0.2l/0.099 = 2.020

P (sample mean) will be more than 2.020 of standard deviation above the mean.

Z table score of 2.02 = 0.9783

1. 0.9783 = 0.0217

= 2.17%

1. The significance level, also denoted as alpha or α, is the probability of rejecting the null hypothesis when it is true. For example, a significance level of 0.05 indicates a 5% risk of concluding that a difference exists when there is no actual difference.