**Assignment-8 (Confidence Intervals)**

**EXERCISE 1.** Suppose scores on exams in statistics are normally distributed with an unknown population mean and a population standard deviation of 3 points. A random sample of 36 scores is taken and gives a sample mean (sample  mean score) of 68. Find a confidence interval estimate for the population mean exam score (the mean score on all exams).

Find a 90% confidence interval for the true (population) mean of statistics exam scores.

σ = 3 n = 36 X\_bar = 68

SE = 3/6=0.5 for 90 % confidence, zα/2 = 1.645

Lower limit = 68 – 1.645\*0.5= 67.1775 Upper limit = 68 + 1.645\*0.5 = 68.8225

**CI = [67.1775, 68.8225]**

**EXERCISE 2.**What is the normal body temperature for healthy humans? A random sample of 130 healthy human body temperatures provided by Allen Shoemaker7 yielded 98.25 degrees and standard deviation 0.73 degrees.

Give a 99% confidence interval for the average body temperature of healthy people.

n = 130 σ = 0.73 T\_bar = 98.25

SE = 0.73/11.4018 = 0.064 for 99 % confidence, zα/2 = 2.58

Lower limit = 98.25 – 2.58\*0.064= 98.0849 Upper limit = 98.25 + 1.645\*0.5 = 99.0725

**CI = [98.0849, 99.0725]**

**EXERCISE 3.**The administrators for a hospital wished to estimate the average number of days required for inpatient treatment of patients between the ages of 25 and 34. A random sample of 500 hospital patients between these ages produced a mean and standard deviation equal to 5.4 and 3.1 days, respectively.

Construct a 95% confidence interval for the mean length of stay for the population of patients from which the sample was drawn.

n = 500 day\_bar = 5.4 σ = 3.1

SE = 3.1/22.36=0.1386 for 95 % confidence, zα/2 = 1.96

Lower limit = 5.4 – 1.96\*0.1386= 5.1283 Upper limit = 5.4 + 1.96\*0.1386 = 5.6717

CI = [5.1283, 5.6717]