ANLY-511 Homework assigned on 11/22/15
Email a pdf file with solutions (preferred)
or hand it in at my office door by Sunday, 11/29/15 11:59PM.
Five "short" and three "long" problems.

Explain your work and give concise reasoning. Attach `R` code with comments if applicable. Do not print out any data or any detailed results of simulations. Your solutions for this homework set should fit on no more than six pages including graphs. In problems requiring graphs, you are allowed to just give the code to make the graphs and to describe them, without actually including them.

To do this problem set, read through chapter 7 of Chihara / Hesterberg.

73. (2 points) Write an `R` function that computes the t-formula confidence interval in (7.8) from sample mean, sample standard deviation, sample size, and confidence level, and use it to do exercise 7.6 #6 in Chihara/Hesterberg.

74. (2 points) Exercise 7.6 #9 in Chihara/Hesterberg. Exploratory plots may include boxplots and histograms. Describe what you see in the plots (symmetry? skewedness?) in a sentence or two and give the confidence interval in a sentence that can be understood by somebody who does not know statistics.

75. (2 points) Exercise 7.6 #10 in Chihara/Hesterberg.

76. (2 points) Exercise 7.6 #12 in Chihara/Hasterberg.

77. (2 points) Exercise 7.6 #20 in Chihara/Hesterberg. *Do this exercise with `prop.test()`. State your conclusions in sentences.*

78. (5 points) Exercise 7.6 #30 in Chihara/Hesterberg.

79. (5 points) It is a known fact that if a random sample from a $N(\mu.\sigma^2)$ distribution is given, then $Y = \frac{(n-1)S^2}{\sigma^2}$ has a χ^2 distribution with $n-1$ degrees of freedom, where S^2 is the sample variance.
Use this fact to derive a formula for an upper confidence bound with confidence level α for σ^2, if a random sample is given and μ is unknown. The formula should depend on S^2, the confidence level, and the sample size. Then write an `R` function that implements the formula. Finally compute a 90% upper confidence bound for σ^2 from the sample $0.556, 7.267, 1.939, 1.907, 2.124, 1.334, 4.024, 0.455$, which comes from a normal distribution.

80. (5 points) We now have two methods for making confidence intervals for population means: We can use the bootstrap or the formula (7.8), i.e. `t.test()`.

a) Apply both methods to make 95% confidence intervals for the mean repair times for ILEC customers (see the `verizon` data). How different are the two intervals? Can you explain the difference? Which answer would you report if you were doing a study?
b) Make the same confidence intervals and answer the same questions for repair times for CLEC customers from the same dataset.