STAT 621 HOMEWORK 4
Due: Friday October 4

1. Consider a sample $U_1, \ldots, U_n \sim$ iid Uniform(0, 1) random variables.

   (a) Let $n = 3$. Find $P\{\max(U_i) > 0.75\}$.

   (b) Use Monte Carlo simulation to estimate $P\{\max(U_i) > 0.75\}$, again with $n = 3$. Use at least $M = 500$ replications.

   (c) How do you suppose this probability depends on n? Will the probability increase or decrease with n? Just write down your hunch.

   (d) Use Monte Carlo simulation to investigate your hunch. Estimate the probability for $n = 1, 2, 3, \ldots, 20$. Make a plot. Was your hunch correct?

2. Complete the attached simulation exercise. Write up a summary describing your simulation. Explain the problem you investigated, how you performed your simulations and discuss your results. Include supporting plots.

3. The Dept. of Education records per pupil spending and graduation rates for all states. Data on spending ($) and graduation rate (%) for a sample of 9 states in the mid-1980's are posted on Blackboard as `states.txt`.

   (a) Compute Spearman's correlation and perform the hypothesis test discussed in class. Interpret your results.

   (b) Compute Kendall's τ and perform the hypothesis test discussed in class. Interpret your results.

   (c) Use the Bootstrap to obtain 90% confidence intervals for both correlation parameters. Compare.