Assignment 4: Due to 4 pm, Oct 8th, 2017

*** Please name your homework file as 'Assignment4_Your name.pdf' in pdf format and send it at biostat_sjtu@163.com , thanks for your cooperation.**

1. Following are 16 samples from a normal population with mean μ and unknown standard deviation:

   2.59 2.67 2.16 1.95 2.61 1.11 2.62 2.06 2.06 1.66 2.16 3.35 2.46 2.55 3.12 1.92

(a) Compute an estimate for σ.
(b) Compute an estimate for μ.
(c) Find the 95% confidence interval for μ derived from the 16 samples.
(d) Find the 50% confidence interval for μ derived from the 16 samples.

2. You sample 36 apples from your farm's harvest of over 200,000 apples. The mean weight of the sample is 112 grams (with a 40 gram sample standard deviation). What is the probability that the mean weight of all 200,000 apples is within 100 and 124 grams (Use Z table).

3. A student collected a large amount of demographic data from school children in a depressed area. Since this population was possibly malnourished, she was concerned that the children would have a hemoglobin level below the healthy average. The healthy average is 13 g/dL. She had collected a sample of size 120 children.
   Sample hemoglobin levels: Mean = 11.7 g/dL, Standard deviation = 3.2 g/dL

   Please run a hypothesis test comparing the hemoglobin levels in her sample population to the healthy average value. Please estimate the p-value using simulation, and show your results with graph. Re-run the test with a sample size of 30.