1. Central limit theorem: central_limit.py is a demo of the central limit theorem on exponential distributions. Re-write the code for another distribution to see that it has the same result. i.e. the Binomial distribution. Submit the graph of the distribution and the graph of the distribution means.

2. Introduction to functions: follow the instructions in functions.py and submit a revised copy of the script.

3. Suppose a 60-year-old man who has never smoked cigarettes presents to a physician with symptoms of a chronic cough and occasional breathlessness. The physician becomes concerned and orders the patient admitted to the hospital for a lung biopsy.
   ☐ Define disease states (exclusive events): A_1={normal}; A_2={lung cancer}; A_3={sarcoidosis}
   ☐ Symptom B={chronic cough and occasional breathlessness}
   ☐ Suppose
      ○ $P(B|A_1)$=0.001, $P(B|A_2)$=0.90, $P(B|A_3)$=0.90
      ○ $P(A_1)$=0.99, $P(A_2)$=0.001, $P(A_3)$=0.009 (mutually exclusive and exhaustive events)
   Question: what is the probability of having such symptom for a general 60-year-old man who has never smoked cigarettes in the population?

4. Suppose that 6 out of 15 students in a grade-school class develop influenza, whereas 20% of grade-school students nationwide develop influenza.
   ☐ Is there evidence of an excessive number of cases in the class? That is, what is the probability of obtaining at least 6 cases in this class if the nationwide rate holds true?
   ☐ What is the expected number of students in the class who will develop influenza?

5. Cardiovascular Disease. Serum cholesterol is an important risk factor for coronary disease. We can show that serum cholesterol is approximately normally distributed with mean 219 mg/dL and standard deviation 50 mg/dL.
   ☐ If the clinically desirable range for cholesterol is <200 mg/dL, then what proportion of people have clinically desirable levels of cholesterol?
   ☐ Some investigators feel that only cholesterol levels of over 250mg/dL indicate a high-enough risk for heart disease to warrant treatment. What proportion of the population does this group represent?
   ☐ What proportion of the general population have borderline high-cholesterol levels – that is, >200 but <250 mg/dL?