Homework Assignment:

1. Create a function that outputs the different types of excitations discussed in class. Your function should take total record length, pulse length, number of averages, and excitation type. It should be able to output the following excitation types:
   a. Impulse
   b. CW Pulse
   c. Linear Sine-Sweep
   d. Logarithmic Sine-Sweep
   e. White Noise (use the "Generate Noise" exercise from Topic 0)

2. Calculate, plot, and compare the power spectral density, G_{xx}, and the autocorrelation, R_{xx}, of each of the types of excitation listed above.
   a. What happens when you change the length of the pulse (T_p)?
   b. Why might one type be advantageous over another in different types of tests?

3. Complete Exercise on 2-5 for the CW Pulse (repeated below):
   a. $T = 1\ s, T_p = 0.1\ s, f_s = 12000\ Hz, f = 2000\ Hz$
   b. Create a taper that uses a Hann window to adjust the beginning and end of the pulse. The first half of the Hann window should be used to fade-in, while the second half of the Hann window should be used to fade out.
   c. How does the taper affect the power spectral density?

4. Complete Exercise on 2-7 for the Sine-Sweep pulses (repeated below):
   a. $T = 1\ s, T_p = 0.1\ s, f_s = 12000\ Hz, f_1 = 100\ Hz, f_2 = 5000\ Hz$
   b. Create a taper that uses a Hann window to adjust the beginning and end of the pulse.
   c. How does the taper affect the power spectral density?
   d. What happens when you increase f_2 to 8000 Hz?