1. Consider the following RC networks.
   a. Derive the transfer function for each.
   b. Make a Bode plot (i.e., amplitude and phase vs. freq.) for each using Excel, Matlab, or other software with graphing capability. Let \( C = 0.47 \, \mu F \) and \( R = 1 \, k\Omega \).
   c. What is the corner frequency (in Hz) of these filters?

2. The signal from a sensor looks like the figure below.
   a. Design an RC filter that removes (that is, attenuates by 90\%) the high frequency component from the signal below. Assume that your filter will drive a load of 20 k\( \Omega \) (Hint: What are you going to have to consider in choosing the resistor value in your filter?).
   b. What is the corner frequency of the filter you designed?

3. Visit the Parallax website (www.parallax.com) and look at the Basic Stamp Manual (go to downloads, Basic Stamp Documentation, Basic Stamp Manual ver. 2.0c) or look over next week’s lab instructions, and answer the following questions:
   a. Which pins on the OEM Basic Stamp 2 correspond to “power” and “ground”
   b. What is the voltage range that you can safely apply to power the Basic Stamp 2?
   c. What is the voltage at the pin \( V_{dd} \) with respect to the common ground?