Lab 6: Relaxation Oscillator

Names:

Experiment 1:

Consider the relaxation oscillator schematic below (and the op amp pin diagram on the back):

Let $C = 1\text{uF}$, $R_1 = 1\text{k}\Omega$. Note that audible frequencies are those in the range 20Hz – 20kHz. With this in mind, we can determine a range of values for $R_2$ such that we can hear the output of the relaxation oscillator when a speaker load is attached: $450\Omega - 4500\Omega$. There are a few options at this point:

- Choose a single value in the above range for $R_2$ that will produce a single frequency tone
- Use a potentiometer (variable resistor) that will allow you to sweep the frequency of your output to create a broad range of tones
- Both!

Construct the relaxation oscillator using $V_{dd} = +5\text{V}$ and $V_{ss} = -5\text{V}$ for the op amp rails. Please don't hesitate to ask a facilitator if you get stuck at any point. When you've built the circuit, notify a facilitator and they'll attach a speaker across the output to test your device. Adjust the potentiometer and observe the effect.

What do you think would happen if you made the rails asymmetric, i.e. $V_{ss} \neq -V_{dd}$? If the $R_1$s were different? It's ok if you're not sure. This is a weird circuit to analyze. If you have enough time, try it! (however, make sure that $V_{ss} < V_{dd}$, or you might burn out the op amp.)