Skill Demo 7: Analog to Digital Converter

NAME____________________  GTID____________________

Goals:

Understand what a 1-bit analog to digital converter is and how to make one.

Tools/supplies:

Teensy
various resistors
photoresistor
potentiometer (optional – combinations resistors can be used as well, as long as you get to within 0.2V in demo 1 below)
laptop
breadboard
USB cable

Background:

All videos from Skill Demos 1-6
Class lecture

1. Build a voltage divider (depicted below), using a potentiometer. Detect the voltage at which the PIC changes state from a stable 0 to a stable 1 and vice versa (the point may be different going up or down – the “zone of uncertainty”).

Initials__________________ Date______________ Time____________
2. Build an RC circuit (depicted below), such that the voltage reading on the voltmeter reaches full voltage 5 seconds after the switch is closed. Note the diagram of voltage versus time in an RC circuit.

Initials________________ Date________________ Time________________

3. Build an RC circuit (depicted below), which is able to distinguish three states of a light using a photoresistor (i.e., determine how long it takes for the pin to switch from a 0 to a 1 using the capacitor as a timer). This method is called a 1 bit Analog to Digital Converter.

Initials________________ Date________________ Time________________