**Set-up:**

* Download the Arduino IDE Software:
  + Go to the following link: <https://www.arduino.cc/en/software>
  + Download version 1.8.16, baud rate 9600.
* Once downloaded, connect the Arduino to the computer.
* Inside the application, click on select board if a board is not chosen directly. Once prompted to choose, select **Arduino Nano (or the specific Arduino compiler being used)**.

**Standard operation:**

* Plug in power supply to thermocouple control box.
* Plug in USB cable to PC with Arduino IDE software installed.
* Click on the serial monitor from the top right corner.
* Once in the serial monitor:
  + Choose “No Line Editing” from the drop-down menu.
  + Choose “Toggle Timestamp” to see the time next to each reading.
  + Then, type 1 (any key works but 1 for simplicity) and press enter. The code will then run and should take about 5 seconds for the first entry to be seen in the serial monitor (the code averages multiple readings recorded every 10 milliseconds over 5 seconds and prints the output).
* It will take some time for the thermocouple to reach equilibrium.
* Note: Once multiple readings are within + 0.1 oC, equilibrium is reached.
  + For example: 1st reading could be 34.985 oC, 2nd could be 35.050 oC, 3rd could be 34.973 oC, 4th could be 35.060 oC. This is safe to assume that equilibrium has been reached around 35 oC.
* Note: Due to the inability of the Arduino Nano not being able to read negative voltages, temperatures only above the cold reference junction (i.e., at room temperature) will be able to be read properly. Therefore, temperatures below room temperature will not be resolved.
* Note: Due to the limitation of the Arduino Nano being able to take voltages from 0-5 V, a temperature above 50° C should not be measured as it will create a voltage of over 5 V, which may harm the Arduino.

**Updating the Code:**

* If making any changes to the code, before uploading, verify (checkmark) the code.
  + To verify, click the verify button (checkmark) on the top left corner.
* If verified successfully, it will say “Done Compiling.”
* Then upload the code to the Arduino.
* Once it prints “Done Uploading”, click on the serial monitor from the top right corner.
* Once in the serial monitor:
  + Choose “No Line Editing” from the drop-down menu.
  + Choose “Toggle Timestamp” to see the time next to each reading.
  + Then, type 1 (any key works but 1 for simplicity) and press enter. The code will then run and should take about 5 seconds for the first entry to be seen in the serial monitor (the code averages multiple readings over 5 seconds and prints the output).

**Troubleshoot Errors:**

1. Nothing Happens:
   * If nothing happens once you type 1 in the serial monitor, upload the code again and type 1 in the serial monitor.
2. USB not recognized:
   * Unplug the USB cable from the computer end and re-connect the cable.
   * If that does not work, unplug the USB cable from both the computer and Arduino and verify that the cable works properly.
   * If the cable does not work properly, then re-attempt connection with a new cable.