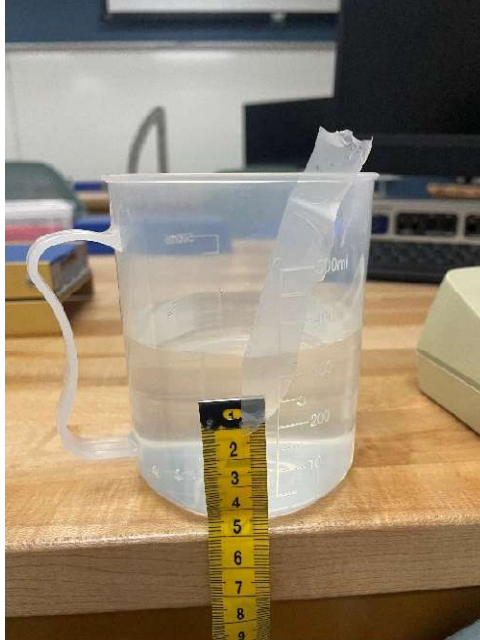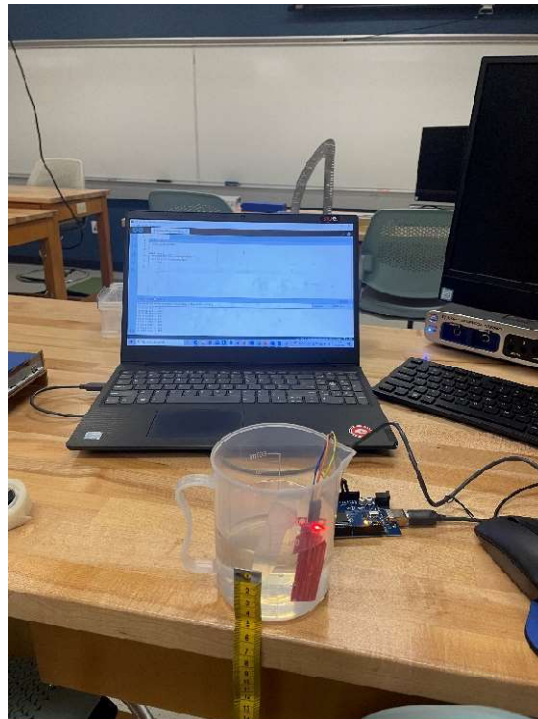This was another sensor whose ground truth was easily measured! For the water level detection sensor, we used a tape rule to measure and mark the ground truths of the length on transparent cup, we then went on to fill water to those levels and used the sensor to once again confirm the ground truth.

Ground truth for water level detection

Testing Setup

For this setup, to get the data needed to rate the testing of the sensor, we varied the water level and measured data recorded by the sensor at those levels.

Like said before to quantify the performance of a sensor, we need to measure/calculate its static characteristics and then analyze. For this sensor, the characteristics we measured (or could try to with the setup we had) were range, sensitivity/Linearity, Resolution, (Accuracy, Precision and Reliability) which we then used to quantify the performance of the sensor as can be seen in the result folder.

Below are the measurement processes of the static characteristics;

- Range
  To measure the range, we submerged the sensor in water and gradually increase the depth until it no longer detected water. We then compared this to the range specified by the data sheet

- Sensitivity/Linearity
  To measure sensitivity, we slowly increased the water level while observing the sensor's output. We did this till we obtained multiple readings, plotted it and then extracted the data we needed to quantify these characteristics

- Resolution
  As mentioned in the proposal, we tried to measure resolution, and to do this we tried making small incremental changes in water level and observing the corresponding changes in the sensor's output. We found this really hard as the uncertainty was once again too high to ignore

- Precision, Accuracy and Repeatability
  To measure this, we obtained multiple readings at same water level (with the water level already premeasured) and then used Excel to calculate the standard deviation of the readings from each other and the ground truth.