3.1.2 We need a way of reading ADC channels continuously. Create two subroutines: one for setting up an arbitrary ADC port (so the user can specify what port they would like to set up), and one for reading the setup ADC port. Try to make your subroutine as clean and efficient (short and fast) yet also general for any ADC port. So, it is a good idea to have the port (or ports) you are initializing as a parameter you pass to your subroutine. We will post the routine we like best as an example for the rest of the class. One goal of this part is to get practice writing a subroutine that is general so others can use it in arbitrary projects. Use the set and clear macros not the bit manipulation directly. **Optional: write the routines (or add more) that will allow the efficient reading of multiple ADC ports. Submit your well commented code (we will have a separate submission for code). If you use other resources like ChatGPT include your prompt, the output and explain what each part does and how you modified it for this lab.**

3.1.3 Interface the ItsyBitsy with two analog sensors (such as potentiometers) so their positions can be displayed, printing to the USB serial port. Build the sensing side of your Waldo and submit a video of it moving with the position of the joints being moved and the angle being displayed in a serial window on a computer. Submit a link to a video (i.e., youtube, etc.) of your device and the serial window showing the ItsyBitsy values reading motion, including drawings, and any code used. Provide a short discussion of the sensitivity of your device (the number of ADC counts over the full range of motion, linearity and apparent noise sources.)

[Video of 3.1.3 demo]

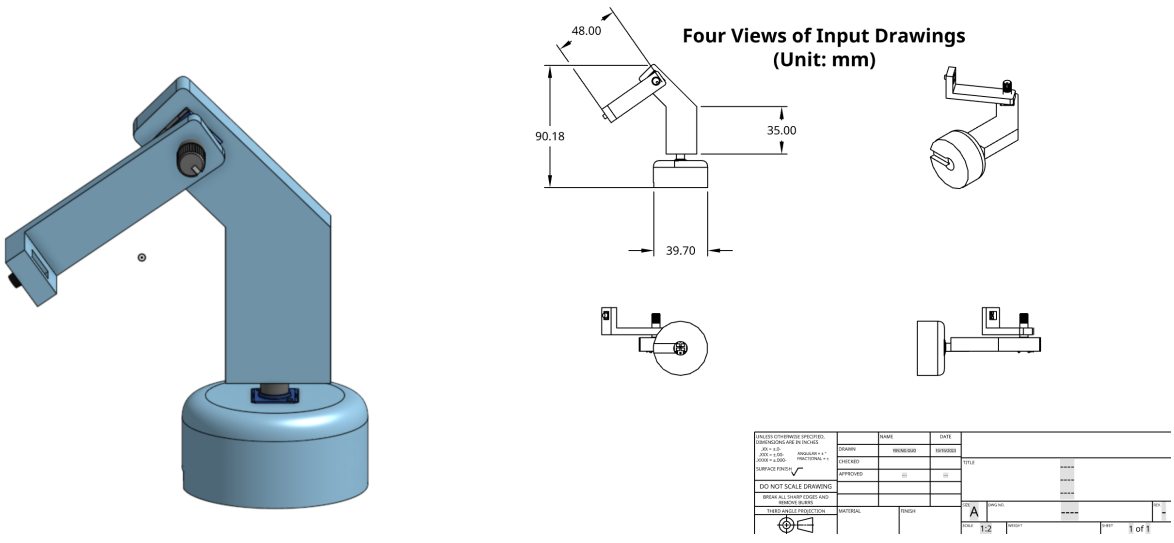

Figure 1. CAD drawing of the input setup

Sensitivity of the device: ADC counts range from 0 to 1023. Angles range from 0 to 279 degrees. The resistance of a potentiometer does change linearly with its physical position. For instance, if you divide the range of the potentiometer into 10 equal segments and turn the knob

accordingly, the change in resistance should be roughly the same for each segment.The major source of noise can be variations in the characteristics of electronic components that can contribute to noise in analog sensor readings.