Material:

- 5x Adafruit 2.2” flex sensors 5 x $8
- Glove provided
- LCD stockroom
- Potentiometer stockroom
- Breadboard stockroom
- Resistors stockroom
- PIC18f4321 Microcontroller $2
- MPLAB software provided

  Total = about $50.00 with shipping.

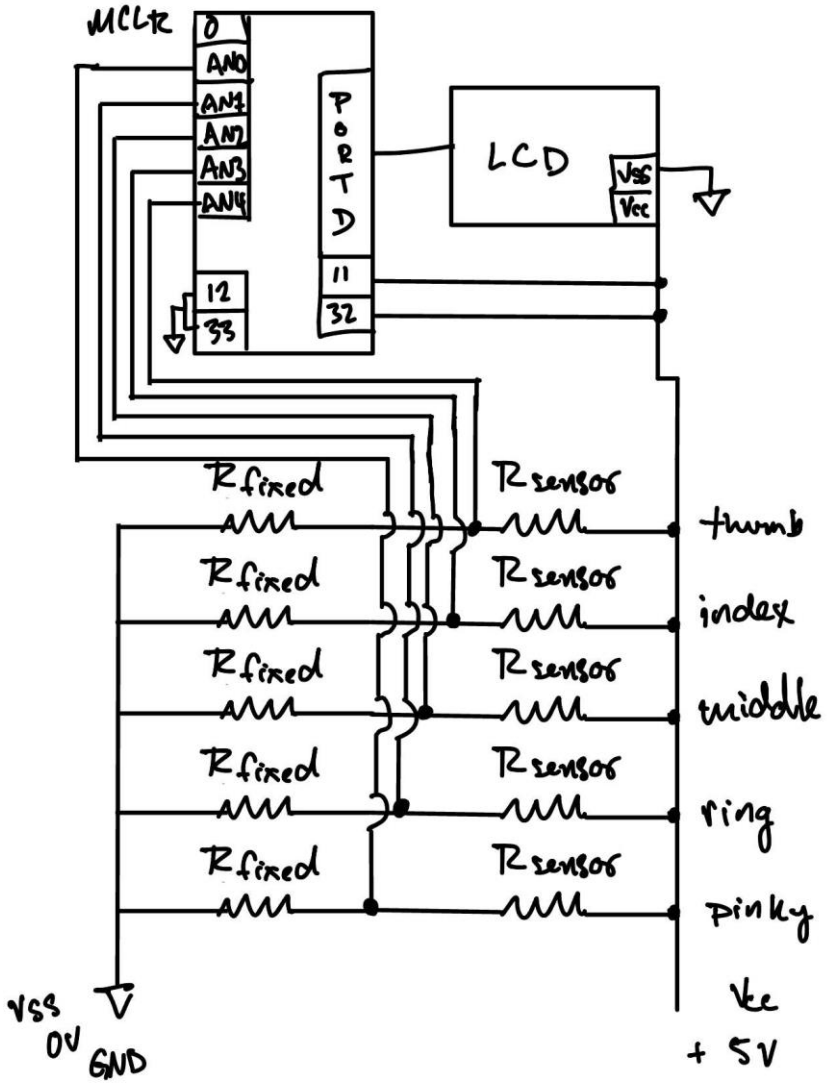
Overall Design:

- Begin with hand and fingers in extended position.
- As fingers bend, so does the flex sensor attached to the glove which increases the voltage divider output.
- The PIC then takes the reading and compares it to an array of values pertaining to letter of the alphabet.
  - Example: $V_0 = V_{ref}\left(\frac{R_{fixed}}{R_{unflexed}+R_{fixed}}\right)$
    - $V_{ref} = V_{CC} = 5\ V$
    - $R_{unflexed} = 30\ k\Omega$
    - $R_{fixed} = 15\ k\Omega$

- Reading: $V_0 = 5\ \frac{15}{15+30} = 1.67\ V$ (for each finger ADC input)
- As the unflexed resistance increases, the output voltage becomes smaller.

- Using basic logic, the ADC value can be matched to a specific position of the fingers to output a ASL letter.

Circuit Design:



Improvements:

Mapping the figure positions to letters should be simple, but I ran out of time. One possible solution would have been to write an array for each finger position to detect which sensor is bent and match them with the sign language equivalent.