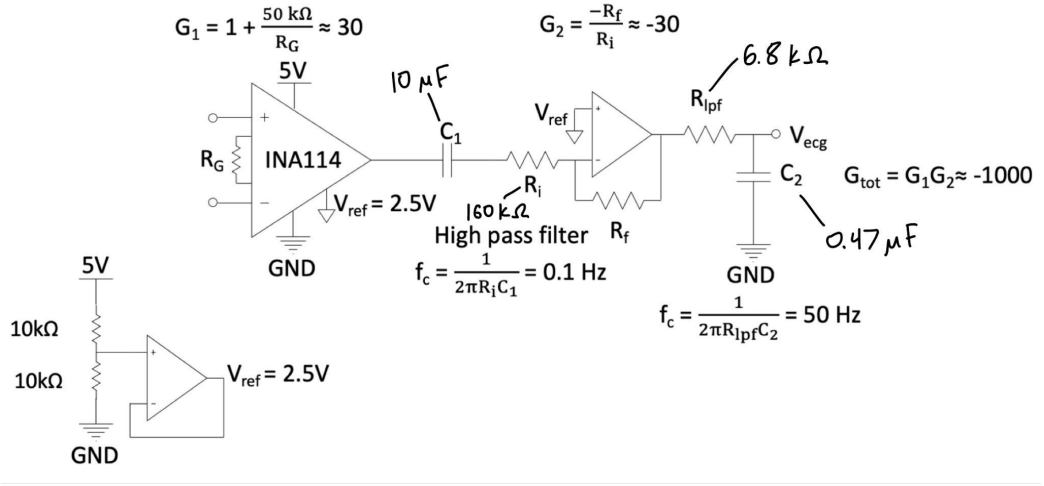
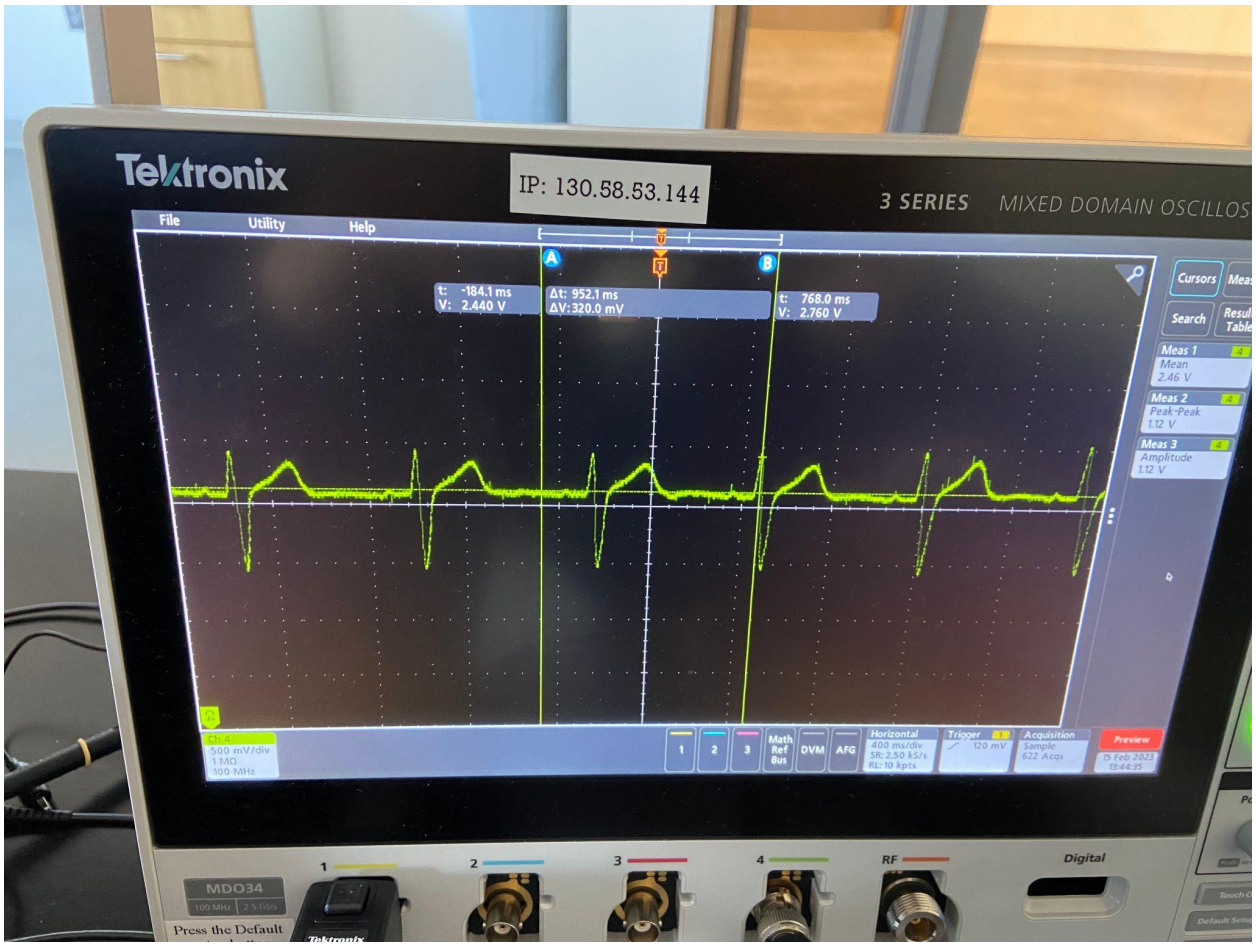
Lab 2 Write Up - Group 5 - Chien, Lee, and Okabayashi

Exercise 1…

Annotated diagram with resistor and capacitor values:





Lab 2 Write Up - Group 5 - Chien, Lee, and Okabayashi

Once it is working, take screen captures of the signal and answer the following questions in your lab writeup:

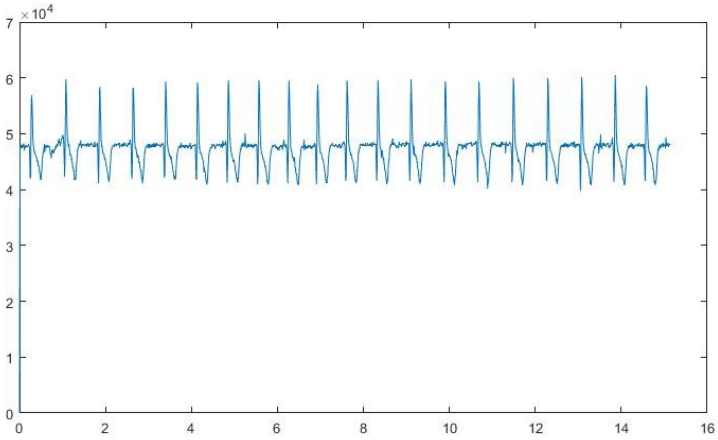
1. What is the actual input signal amplitude based on the measured output? Is it smaller or larger than 1 mV? If your output amplitude is too small, adjust your gain and try again.
    a. Measured output amplitude: 1.12V. This is larger than 1 mV.
2. How does your measured ECG waveform compare to the waveforms presented in class? Comment on the noise and morphology (shape) of the waveform.
    a. Looks like a normal ecg signal, with a high peak, followed by a low peak, followed by a later high peak. The clearest and most consistent signal is when Lonnie holds his breath and sits up straight. There is more noise when Lonnie flexes his pecs. Flexing both at the same time generates more noise than flexing just one pec. Flexing his abs doesn't seem to have as much of an effect on the signal.
3. What is the DC (average) level of your signal, and how does it change over time?
    a. The average level of the signal ranges between 2.1V and 2.7V for the most part. It does seem to change slightly according to Lonnie's body position.

Exercise 2…

Answer the following questions in your lab writeup:

1. Approximately how many bits is your signal?
    - 16 bits, with numbers on the serial monitor showing in the five digit range.
2. Approximately how many samples do you have per beat?
    - Beat 1: 323.59
    - Beat 2: 324.27
    - Beat duration: 680ms
    - Took 1 sample per 10 ms, so 680ms/10ms = 68 samples per beat
3. How does your measured ECG waveform compare to the waveforms presented in class?

Lab 2 Write Up - Group 5 - Chien, Lee, and Okabayashi



- Our ECG waveform is very similar to those we viewed in class. Notably, we swapped the nodes on Lonnies chest to negate the difference so our peak detector could clearly identify the beats, as the secondary bump after each beat was making it hard to distinguish before. Our signal is clearly visible and easy to distinguish.

Exercise 3:

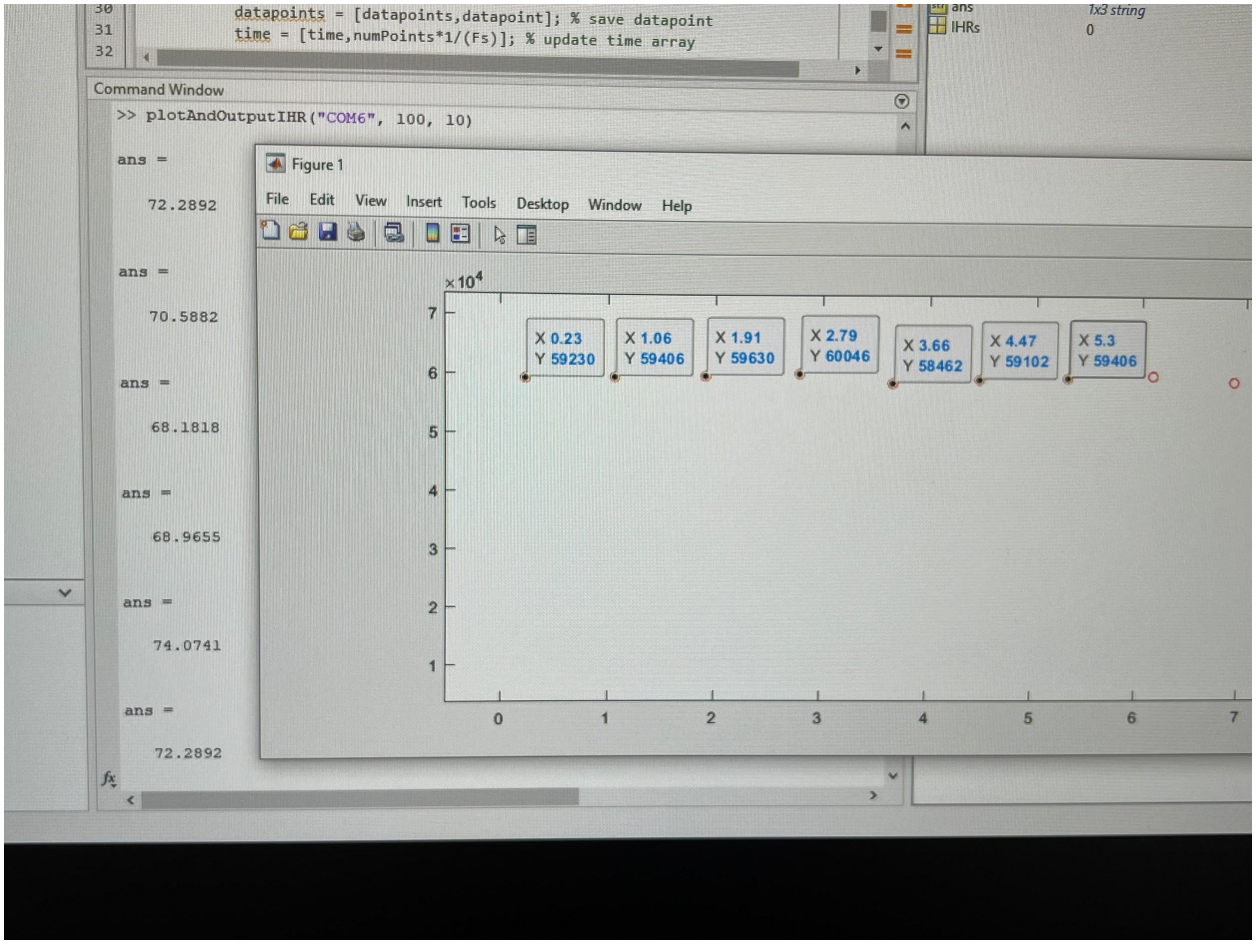
https://drive.google.com/file/d/15xqW3g_zuiYdTj33aPvLsawYGN7id061/view?usp=share_link

Exercise 4:

Committed code to GitHub.

Exercise 5:

Lab 2 Write Up - Group 5 - Chien, Lee, and Okabayashi



Manually calculated IHRs:

1. $60/(1.06 - 0.23) = 72.2891566265$, which matches the printed 72.2892
2. $60/(1.91 - 1.06) = 70.5882352941$, which matches the printed 70.5882
3. $60/(2.79 - 1.91) = 68.1818181818$, which matches the printed 68.1818
4. $60/(3.66 - 2.79) = 68.9655172414$, which matches the printed 68.9655
5. $60/(4.47 - 3.66) = 74.0740740741$, which matches the printed 74.0741
6. $60/(5.30 - 4.47) = 72.2891566265$, which matches the printed 72.2892