HW 3: Statistics (80 points total)

Due: Thursday 2/24 at beginning of class
Please type narrative responses. Show plots where they are helpful.

0. (0 pts.) Look at your 2-point discrimination data. Since you have so few data, don’t bother doing any data conditioning; just pretend it’s all good.

1. (10 pts.) Are the discrimination thresholds different for the two locations you tested?
   a. You should use a t-test. Why? What kind of t-test? Two/one-tailed?
   b. Report your results in the proper format.
   c. Plot the results, with error bars. What kind of error bars did you choose, and why?

2. (10 pts.) Look at the class data for the palm, index finger and forearm (see the “1-Way ANOVA data” tab, units in mm, in the provided Excel document). Do some data conditioning.
   a. Should you throw out any data? Why or why not?
   b. Should you transform the data? Why or why not?
   c. What is wrong with these data/the experiment design that makes them poorly suited for statistical tests?

3. (15 pts.) Perform an ANOVA on the class data (see the “1-Way ANOVA data” tab in the provided Excel document).
   a. What kind of an ANOVA did you use? Why?
   b. Show the ANOVA table and report the results in the proper format.
   c. Plot the results, with error bars. What kind of error bars did you choose?

4. (15+ pts.) Perform some sort of post-hoc analysis. There are a lot of methods you can use, ranging from simple to very hard. Feel free to check a text book or the web for additional information on some of the methods we talked about in class. Five to ten points of extra credit will be given if you do something particularly fancy (hence the “+” after the 15 points possible for this problem).
   a. What kind of post-hoc analysis did you choose? Why?
   b. Report the results.
   c. Interpret the results. Is there anything surprising about the results?
5. (15 pts.) Three experimenters collected data from the palm and index finger (see the “2-Way ANOVA data” tab in the provided Excel document). Perform an ANOVA looking at two factors: Tests location (palm/finger) and Experimenter (1/2/3)
   a. What kind of an ANOVA did you use? Why?
   b. Show the ANOVA table and report the results in the proper format.
   c. Plot the results, with error bars. What kind of error bars did you choose?

6. (15+ pts.) Perform some sort of post-hoc analysis, as in #4. Five to ten points of extra credit will be given if you do something particularly fancy (hence the “+” after the 15 points possible for this problem).
   a. What kind of post-hoc analysis did you choose? Why?
   b. Report the results.
   c. Interpret the results? Is there anything surprising about the results?