**Assignment #12**

1. Cooking pots and dietary iron. Iron deficiency anemia is the most common form of malnutrition in developing courtiers. Researcher postulated that the change from cooking in iron pots to aluminum pots is one of the reasons for this deficiency

The data below was sampled in random in Ethiopia.

Aluminum 1.7700 2.3600 1.9600 2.1400

Clay 2.2700 1.2800 2.4800 2.6800

Iron 5.2700 5.1700 4.0600 4.2200

1. Build a table of the sample sizes, means, and standard deviations for the three conditions.
2. Is it reasonable to pool the variances? What other assumption we need to make in order to perform ANOVA?
3. State the ANOVA hypothesis
4. Perform an ANOVA, report the F statistics, df and P-value. What do you conclude?
5. The presence of harmful insects in farm fields is detected by erecting boards covered with a sticky material and then examining the insects trapped on the board. To investigate which colors are most attractive to cereal leaf beetles, researchers placed six boards of each of four colors in a field of oats in July. The table below gives data on the number of cereal leaf beetles trapped on each board:

Lemon yellow: **45** 59 48 46 38 47

White: 21 12 14 17 13 17

Green: 37 32 15 25 39 41

Blue: 16 11 20 21 14 7

1. Make a table of means and standard deviations for the four colors, and plot the means.
2. Explain in words what ANOVA tests in this setting.
3. Run the ANOVA. What are the statistic and its P-value? What do you conclude?
4. Assume that you incorrectly typed 450 instead 45 as the first value (marked in bold). Repeat the ANOVA analysis. What is the effect of this outlier?
	1. Can you suggest a simple heuristic method that will enable detecting this kind of outlier?
5. The below data is from a study of popcorn brands and popper types (Hogg 1987). The columns of the matrix popcorn are brands (Gourmet, National, and Generic). The rows are popper types oil and air. In the study, researchers popped a batch of each brand three times with each popper (first three lines for the first popper and last three lines for second). The values are the yield in cups of popped popcorn.

popcorn=[

 Gourmet National Generic

Oil 5.5000 4.5000 3.5000

Oil 5.5000 4.5000 4.0000

Oil 6.0000 4.0000 3.0000

Air 6.5000 5.0000 4.0000

Air 7.0000 5.5000 5.0000

Air 7.0000 5.0000 4.5000]

1. Define the anova hypotheses
2. Check the anova requirments
3. Find if there is a significant different between the means of the brands and popper types (use matlab or any other program)
4. Are there interactions?
5. For each brand, plot the mean yield per popper type and discuss the results
6. For each popper type, plot the mean yield per brand and discuss the results