**Statistician: Daniel Chartrand Version: F**

**Directions**

The final exam will consist of several questions related to the following topics – univariate EDA (quantitative & categorical), bivariate EDA (quantitative & categorical), linear regression, one-sample t-test, two-sample t-test, and chi-square. You will be asked to answer questions from results that you prepared prior to the exam using R.

The data that you will examine is introduced below, including actual questions that will be on the exam. You should use R to create output that can be used to answer each question. Your R input and output should be printed and brought to the exam to be used to answer the exam questions. The document that you bring to the exam must meet the following strict criteria:

* The document must be produced by you and you alone!! You may not ask anyone but me (including the tutors) for specific help on using R. If you have questions, I will be available in my office or via e-mail.
* The document can only contain R commands related to expressions, assignments, functions, or objects; R output; or R created graphics. You may not type or write ***any other*** material on the document (including labeling figures, tables, output, or sections). You may not type any “notes” (i.e., non-R-related expressions, assignments, functions or objects) as “R code.” You cannot use R comments. The document should contain no code that results in errors.
* The document must be produced by compiling your script in RStudio (as described in a FAQ on the class webpage).

Failure to follow all of these criteria will result in a 0 for the final exam!!

**Data Set – LaysanFinch**

Conant (1988) studied populations of the Laysan finch (*Telespyza contans*) on Laysan Island and on islands in Pearl and Hermes Reef (Hawaii) to which they have been translocated. They recorded a wide variety of morphological variables about the finches at these locations. The data are in **LaysanFinch.csv** and information about the data are in **LaysanFinch\_meta.txt**. You should prepare results for each of these items …

1. Univariate EDA for beak, tarsus, and sternum lengths and location.

2. Bivariate EDA for each pair of beak length, tarsus length, and width of the lower mandible. [M*ay use one graph and one table.]*

3. Bivariate EDA for sex and location of capture.

4. Linear regression results (equation results and r2) for predicting weight from beak length.

5. Results for testing the following research hypotheses (use 5% level for each)

a. The mean weight of a Laysan finch is less than 33 g.

b. The mean sternum length is different between male and female finches.

c. The mean beak length differs between finches captured in **locations B and C**.

d. The distribution of individuals into the three locations differs between male and female finches.

e. The mean tarsus length for **MALE** finches is greater than 2.6 cm.

1. Describe the importance of statistics (as a field of study or a collection of methods). Make sure you **DESCRIBE** the two major goals of statistics, at least three major concepts or ideas of statistics, and how methods that you learned this semester illustrate or are related to why you think statistics is important. [*This question is not specific to these data. An answer with <400 thoughtful words is probably inadequate.*]