**Assignment 4**

Write code that performs the following functions or that answers the question. Feel free to do this in R, then copy + paste your code into the assignment turn in space.

1. We will continue using the finch data from the last assignment. To save time, you can copy/paste code from the previous assignment over.

|  |  |  |
| --- | --- | --- |
| **Column name** | **Description** | **Possible values** |
| species | Finch species | fortis, scandens |
| blength | Beak length (mm) | Numeric values |
| bdepth | Beak depth (mm) | Numeric values |

Create a scatterplot for beak depth vs beak length for the fortis species in 1975, and then another plot for 2012. Does the relationship appear to change over time? Use comments to note any obvious difference in trend, if any.

1. Create linear models for both datasets. Store the linear model for the 1975 data in **q2a** and that of the 2012 data in **q2b**.

1. Obtain a summary on both linear models. In variables, store the following:

|  |  |
| --- | --- |
| **Variable name** | **Store** |
| q3a | 1975 linear model slope |
| q3b | 1975 linear model intercept |
| q3c | 1975 linear model slope R^2 value |
| q3d | 2012 linear model slope |
| q3e | 2012 linear model intercept |
| q3f | 2012 linear model slope R^2 value |

1. Use a t-test to determine if beak *lengths* between the 1975 and 2012 datasets have significantly changed. Assume equal variances. Store the p-value that results in **q4**.
2. We hypothesized in the last assignment that beak *depth* between 8-9 mm is “most fit.” Mean beak depth in 1975 was 9.17 mm. So, we want to know if beak depth has decreased since 2012. Perform a t-test to test if there has been such a decrease. Store the p-value in **q5**.

References for data:

<https://www.kaggle.com/crbelhekar619/darwins-finches-evolution-dataset>

<https://www.kaggle.com/crbelhekar619/darwins-finches-evolution-dataset?select=finch_beaks_2012.csv>