Investigating Data and Visualization

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Background

The dataset `crabs.csv` contains physical measurements of 200 rock crabs (genus *Leptograpsus*) collected from Western Australia in a 1974 study by Campbell and Mahon [1]. The goal of this study was to critically assess whether there morpholigical differences between *orange* and *blue* color forms of this crab were strong enough to suggest they were different species[1].

For this activity, you will use the browser tool "Shiny Plot" to visualize data from this study. This tool can be found here: https://sjspielman.shinyapps.io/shinyplot/.

Questions

1. In order for a study to be properly *balanced*, there should be roughly the same number of individuals in each examined group. Using the most appropriate type of figure, determine if the study is roughly balanced.
2. Investigate whether this study is also balanced according to *sex*.
3. The authors ask, what is the distribution of carapace lengths among all crabs studied?
4. The authors ask, do orange crabs tend to have longer frontal lobes compared to blue crabs? Make a figure to explore this question. > Hint: there are *two* variables here, crab color and frontal lobe size. Which types of data do these variables contain?
5. The authors ask, is there a strong relationship between rear width and body depth in all crabs? Make a figure to explore this question.
6. The authors ask, how does the distribution of carapace width differ between male and female crabs? Make a figure to explore this question.

[1] Morphology is generally no longer used to perform *species delimitation*, that is, decide whether two populations of organisms are the same or different species. Other biological factors are more commonly used, as we will learn later in the semester.]. All measurements are recorded in millimeters (mm).

References

1. Campbell, N. A. and R. J. Mahon. "A Multivariate Study of Variation in Two Species of Rock Crab of the Genus Leptograpsus." Australian Journal of Zoology 22, no. 3 (1974): 417. https://doi.org/10.1071/ZO9740417.