Stat 21 Homework 5
Problem 3 Solution

Problem 3

Suppose we are interested in studying the effectiveness of the recycling/composting programs at Swarthmore. I.e. we are investigating the waste that is disposed in the trash/recycle/compost bins across campus. Use your imagination to come up with three different research questions related to this topic in the case where

1. We have two numerical variables of interest;

2. We have one numerical variable of interest and one categorical variable of interest;

3. We have two categorical variables of interest.

For each setting clearly state the variables of interest, the roles of the variables (predictor/response), and the statistical research question you wish to answer. Each research question you come up with should be answerable by one of: a simple linear regression, an ANOVA model, or a chi-squared test.

Rubric

There are many possible valid solutions for this problem. For full credit, the student must provide for each setting

- the variables and their roles (if applicable)

- a statistical question answerable by the appropriate method.

To analyze two numerical variables, we have covered SLR models where there is a response and a predictor variable. Alternatively, the student could instead state that we are interested in the correlation (or the strength of a linear relationship) between the two variables.

To analyze one numerical variable and one categorical variable, we have covered one-way ANOVA models that test for a difference in the mean value of the numerical variable over the different levels of the categorical variable.

To analyze two categorical variables we have covered two different chi-squared procedures, the test for homogeneity or the test for independence. If a student is using the test for homogeneity, then one of the categorical variables must be binary.