

**ORIE 3120**  
**Homework 6**  
**Due Wednesday, April 15 at 2:30pm**

Submit a pdf to Gradescope. This assignment builds off of this week's recitation, which can be found [here](#), and uses the same dataset (which can be found [here](#)).

**1. Thematic Map of UPC 1093 Sales by ZipCode**

Create a thematic map of sales for UPC 1093 by zipcode similar to the one you produced in the recitation assignment, except for this UPC only.

- a. Include a screenshot of your thematic map.
- b. Include a screenshot of how your tables are joined together and note the fields they are joined together by.
- c. What is different about the geographical distribution of sales for this collection of parts from the general sales distribution from recitation?  
[Hint: compare the two thematic maps to where the larger cities are. To see where larger cities are, you can use background maps, whose layers can be modified under Maps > Map Layers in the menu bar. For instance, you can add layers such as cities and major highways, while removing layers such as terrain to enhance visibility. One of the maps has a larger fraction of its sales in areas away from big cities.]
- d. Print out a few of the part descriptions of parts in UPC 1093. [Hint: Click on the map and then hit Ctrl-A (or Cmd-A on a Mac). Now that you've selected the data, right clicking and selecting "View Data" allows you to view both a summary and the full underlying data table for the points on the map.] What 3-word abbreviation do you see repeated in most of these parts descriptions? What do you think this stands for? [Hint: Do a google search for some of the parts descriptions]s]
- e. Explain why these types of parts might have a different geographical sales distribution.  
[Hint 1: People in rural areas drive trucks more than people in urban areas, and also tend to drive longer distances and carry heavier payloads. Hint 2: Larger vehicles that drive longer distances and carry heavier payloads tend to have hotter oil. See, for example, this URL: <https://www.hardworkingtrucks.com/engine-oil-coolers/>.]

**2. Distinguishing Order Type**

Building off of the map from question 1 - we want to better understand the differences between EO and RR. Answer the following questions about the order types with explanation, and provide screenshots of any visualizations that aid answering the questions.

- a. Which of the two has higher average SalesValue per order?
- b. Which order type has a larger range in SalesValue per order?
- c. What month has the highest volume of orders for EO orders? For RO?

- d. What commentary can you make about customer behavior from the visualizations you made to answer the previous parts of this question?

### 3. Coverage of Pilot Distribution Center in Birmingham, AL

Suppose we locate a pilot distribution center in Birmingham AL (zipcode=35216). We want to figure out how many dealers, and how much sales, are within 150 miles of this location.

- a. Include in your pdf a screenshot of a thematic map of those dealers within 150 miles of Birmingham, AL, with circles at these dealers whose size indicate the total dollar value of the dealers' sales. [Hint #2: You may assume that 1 degree of latitude corresponds to 69 miles, and 1 degree of longitude at a latitude of lat corresponds to  $69 * \cos(\text{lat})$  miles. For details, [see this URL](#). You can hard-code  $\cos(\text{lat})$  using the latitude of Birmingham, since  $\cos(\text{lat})$  varies only a small amount over the zipcodes in the dataset.]
- b. Include the formulas inputted into Tableau for the calculated values, (or SQL queries, if you choose to alter the data in SQL and pull it in) in your pdf.