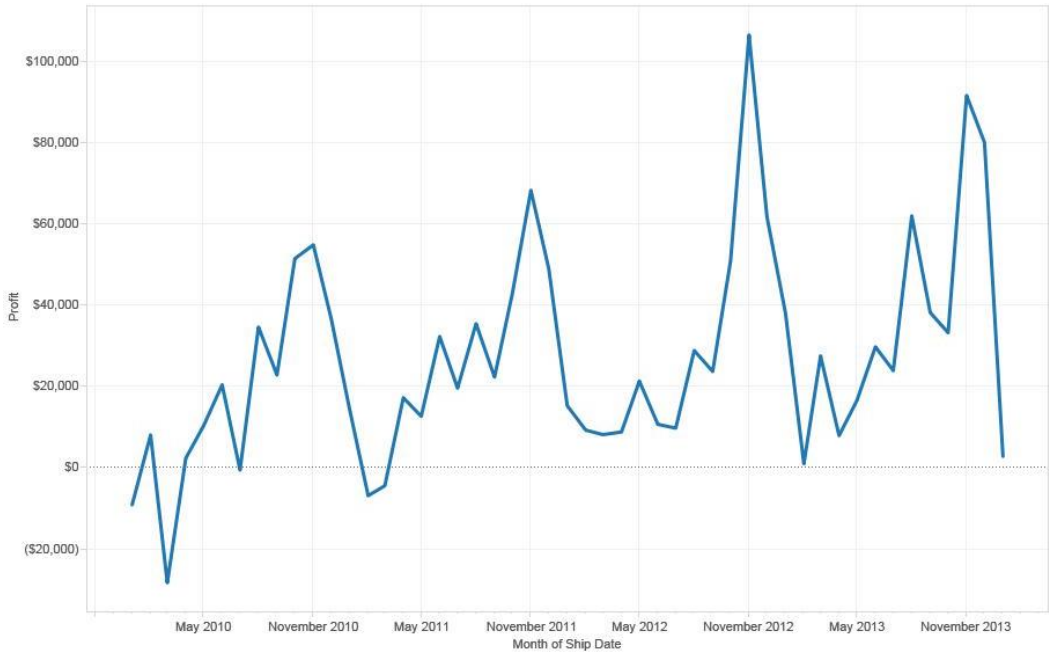
Data Visualization Lab 7– Steven Lin

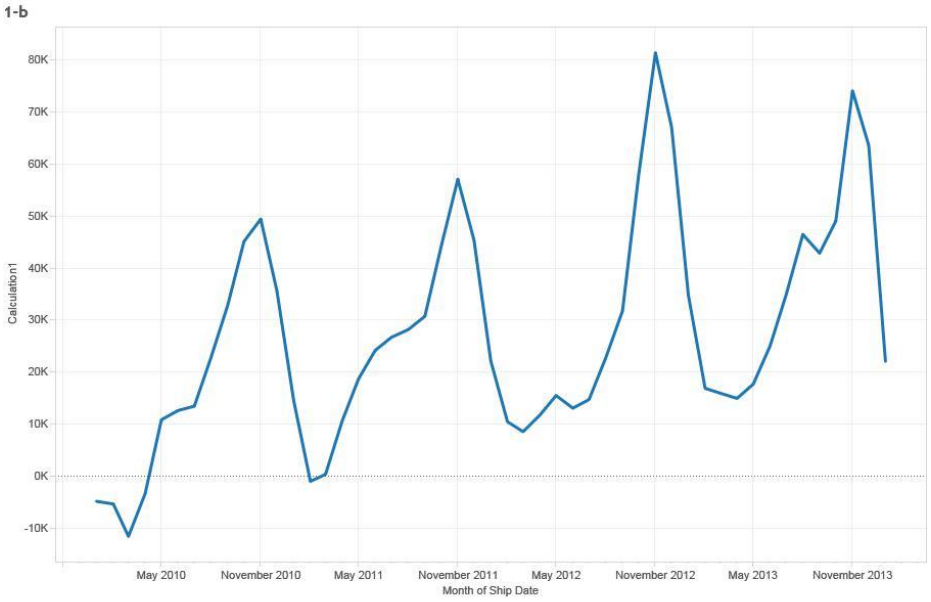
1. Time Series (1 JPEG file per part, i.e. 1 JPEG for (a), 1 JPEG for (b) etc).

(a) Create a time series chart for “Ship Date” (MONTH) versus “SUM(Profit)”. Your chart should include all months from 2010 to 2013.



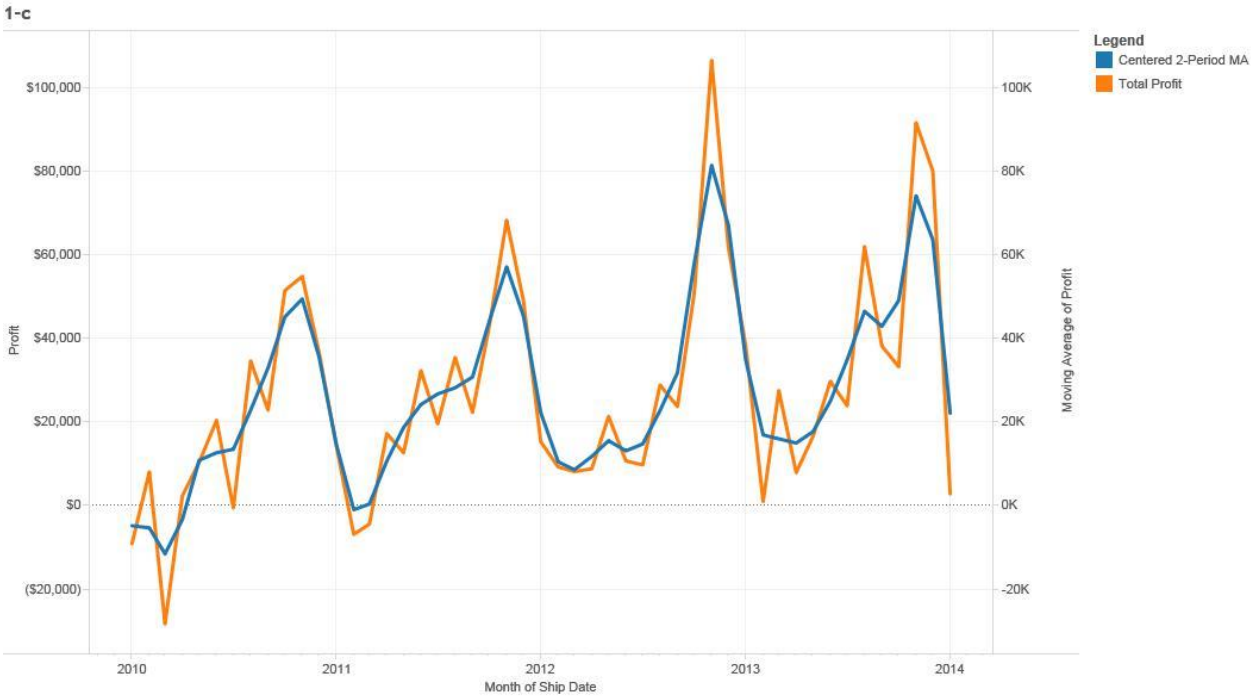
The trend of sum of Profit for Ship Date Month.

(b) Duplicate your time series and create a Centered 2-period Moving Average Smoother.



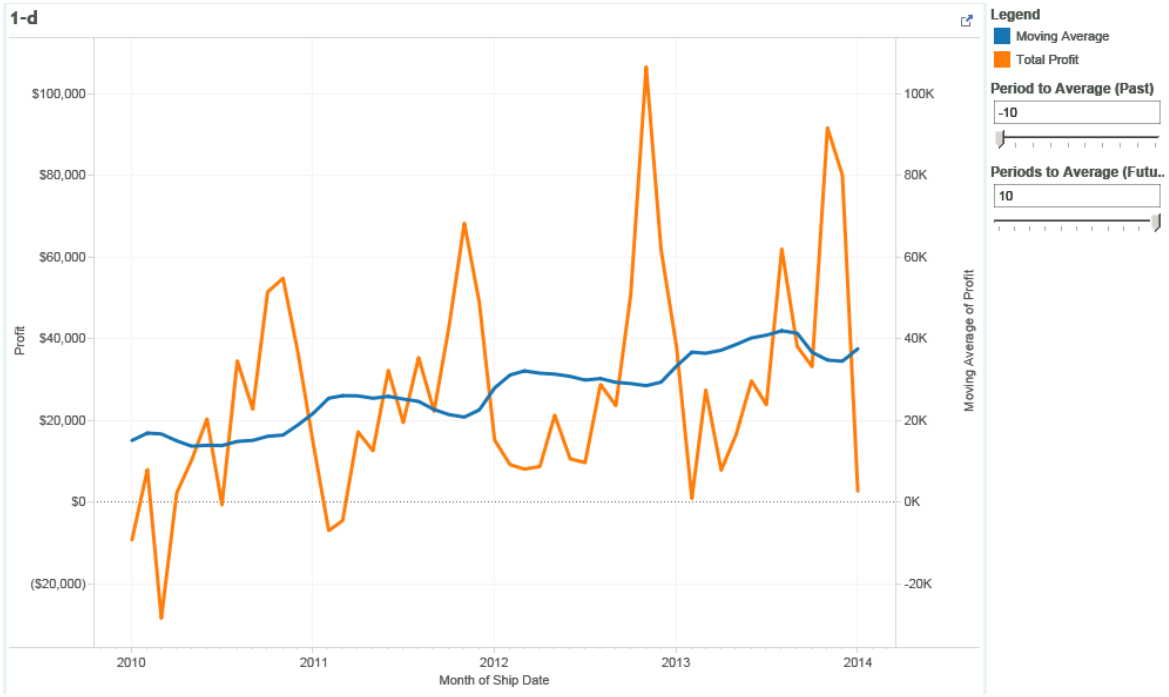
The trend of Centered 2-Period MA for Ship Date Month. Color shows details about Centered 2-Period MA.

(c) Put the Moving Average Smoother on top of the original time series, and change the colors to "blue" and "orange" respectively. Align the "Profit" axis with the "Moving Average of Profit" axis.



The trends of Total Profit and Centered 2-Period MA for Ship Date Month. Color shows details about Total Profit and Centered 2-Period MA.

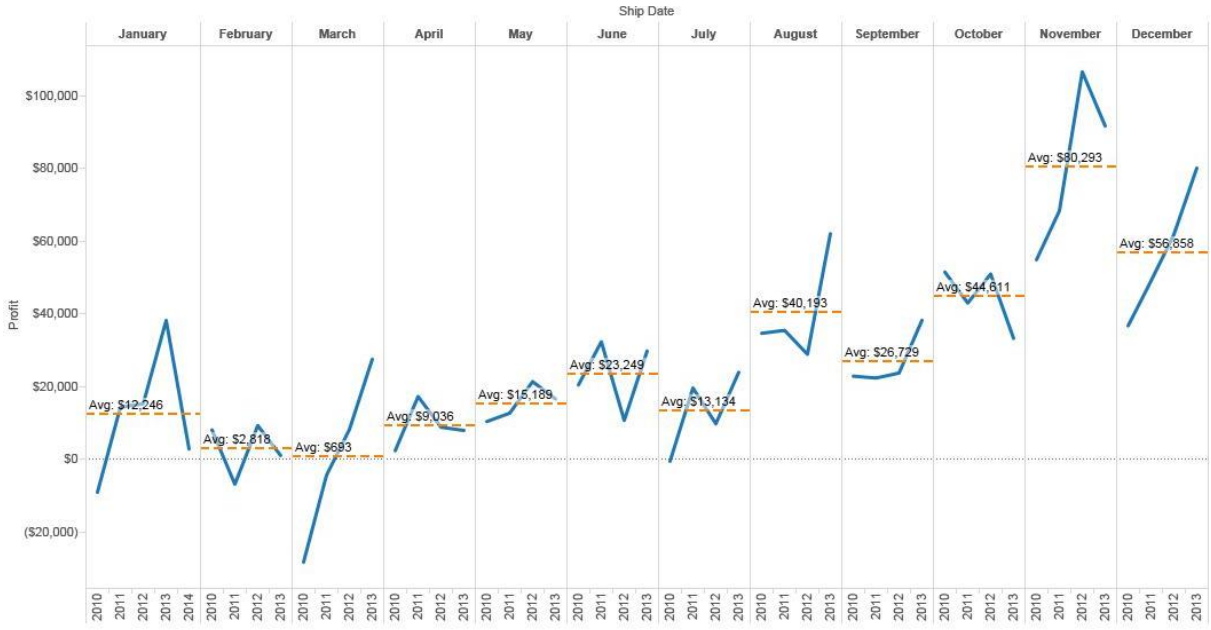
(d) Interactive Moving Averages: create 2 seperate sliders to control how many periods before and after the current value you can use in the Moving Average Smoothing. Make the range of the slider of the past values -10 to -1, and the range of the future values 0 to10.



The trends of Total Profit and Centered 2-Period MA for Ship Date Month. Color shows details about Total Profit and Centered 2-Period MA.

(e) Is there seasonality in the data? Use the approach with the reference line we discussed in class.

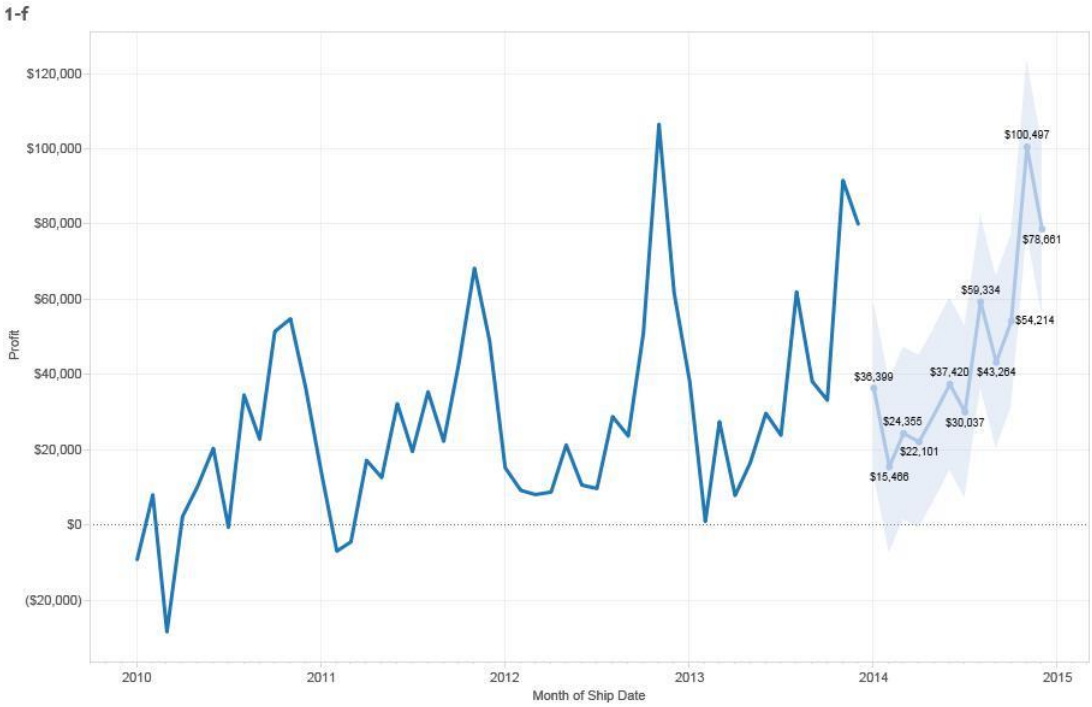
It doesn't look like there is seasonality in the data.



The trend of sum of Profit for Ship Date Year broken down by Ship Date Month.

(f) Create a forecast for the next 6 months using only the "trend and season" option.

Additive trend and additive season option chosen for forecast:

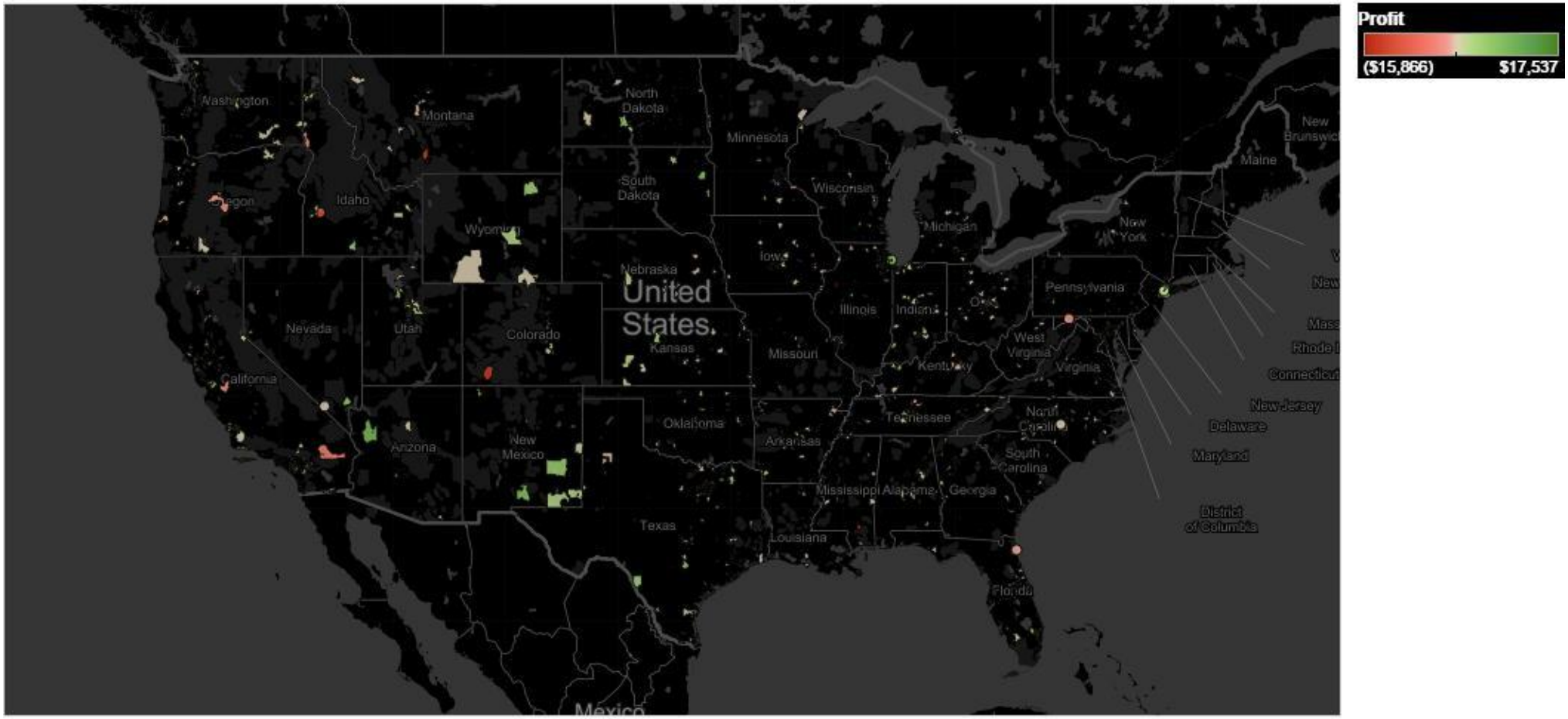


The trend of sum of Profit (actual & forecast) for Ship Date Month. Color shows details about Forecast Indicator.

2. Maps (1 JPEG file per part, i.e. 1 JPEG for (a), 1 JPEG for (b)).

(a) Create a filled map of the US. Include "Postal Codes" as well. The fill color has to show reflect "SUM(Profit)" for every postal code area.

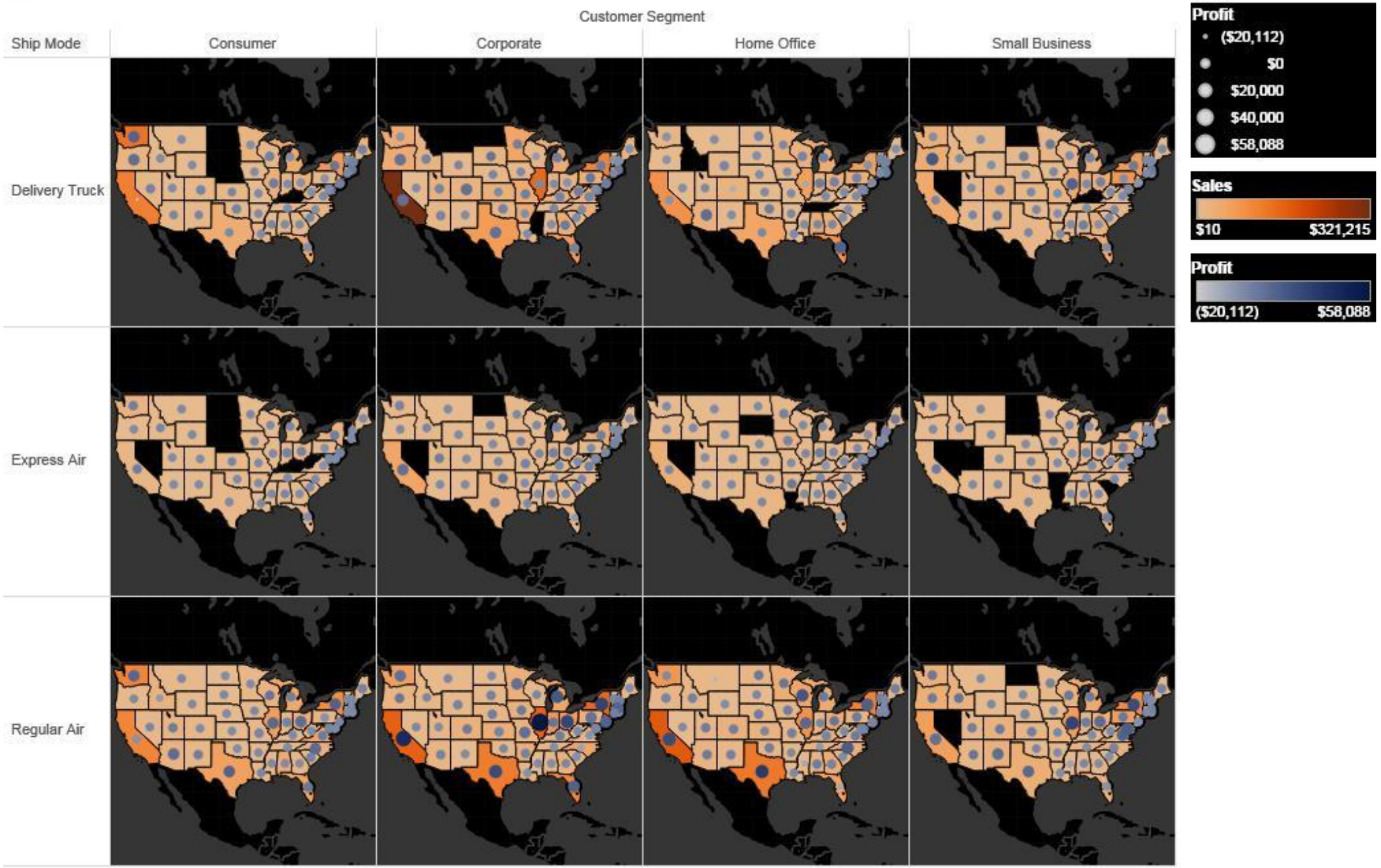
2-a



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Profit. Details are shown for Postal Code.

(b) Create a filled map for "SUM(Sales)". Duplicate it and create a symbol map where the color and size of each circle represents "SUM(Profit)" in that state. For the color of the symbols in the symbol map, create your own custom sequential pallete that contrasts well with the color of the filled map. Create multiple small maps by including Ship Mode (rows) and Customer Segment (columns) into the picture. At this point you should have 24 small maps (or 12 customer segment - ship mode pairs). Combine each symbol and filled map pair to obtain a total of 12 small maps.

2-b



Map based on Longitude (generated) and Longitude (generated) and Latitude (generated) and Latitude (generated) broken down by Customer Segment vs. Ship Mode. Details are shown for State. For pane Longitude (generated): Color shows sum of Sales. For pane Longitude (generated) (2): Color shows sum of Profit. Size shows sum of Profit.

Appendix – Calculations for Moving Average vs . Center Moving Average

Centered m-Period MA Smoother

- For m odd, the centered m-period MA smoother is:

$$\tilde{y}_t = \frac{y_{t-(m-1)/2} + \cdots + y_{t-1} + y_t + y_{t+1} \cdots + y_{t+(m-1)/2}}{m}$$

- For m even, use a "double-centered" MA smoother:

e.g., for $m = 4$:

$$\tilde{y}_t = \frac{\left[\frac{y_{t-2} + y_{t-1} + y_t + y_{t+1}}{4} + \frac{y_{t-1} + y_t + y_{t+1} + y_{t+2}}{4}\right]}{2}$$