TABLEAU SUPERSTORE ADS ASSIGNMENT

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PART 1

Data Understanding

1. data from 2014-01-03 to 2017-12-30

2. data from https://www.kaggle.com/datasets/vivek468/superstore-dataset-final

3. data dictionary

4. The dataset has 21 columns and 9994 rows.

5. Dictionary:

- Row ID => Unique ID for each row.

- Order ID => Unique Order ID for each Customer.

- Order Date => Order Date of the product.

- Ship Date => Shipping Date of the Product.

- Ship Mode=> Shipping Mode specified by the Customer.

- Customer ID => Unique ID to identify each Customer.

- Customer Name => Name of the Customer.

- Segment => The segment where the Customer belongs.

- Country => Country of residence of the Customer.

- City => City of residence of of the Customer.

- State => State of residence of the Customer.

- Postal Code => Postal Code of every Customer.

- Region => Region where the Customer belong.

- Product ID => Unique ID of the Product.

- Category => Category of the product ordered.

- Sub-Category => Sub-Category of the product ordered.

- Product Name => Name of the Product

- Sales => Sales of the Product.

- Quantity => Quantity of the Product.

- Discount => Discount provided.

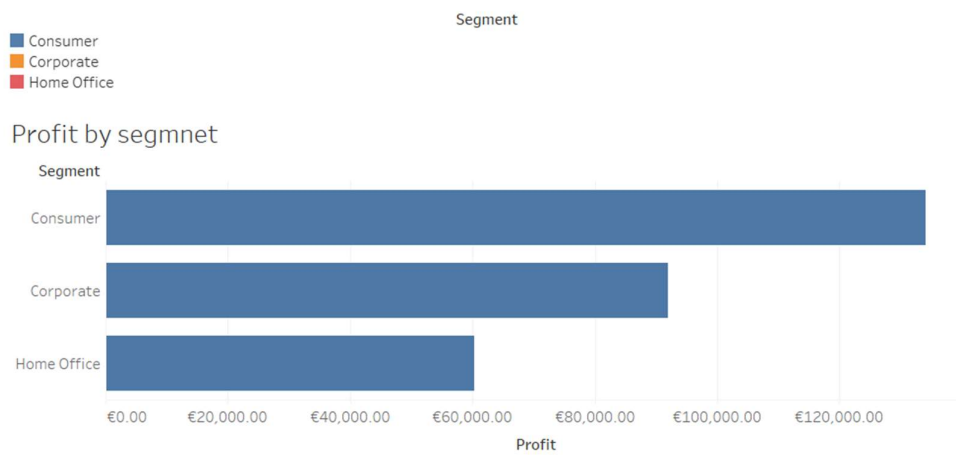**- Profit => Profit/Loss incurred.**

Data Cleansing

 - data didn't have missing or duplicate value

Goals/ Business Questions

- how much monthly sales by Category?
- what the most profitable category?
- what the most favourite Mode Shipping?
- How about recommendation based on customer segmentation?
- Where is Superstore Unprofitable?
- What is common shipping mode preferred?
- What segmentation gives more profit to store?
- Which state(city) specifically should store invest more?
- Forecasting future profit estimates for different categories

DASHBOARD 1

- All 3 Segment — consumer, Corporate and Home Office Perfomance on Sales ,Quantity,and Profit
- As Consumers are top in the least in all Fields than Corporate And then Home office
  - Now We can Move to Category which Category making more money.

Segment

■ Consumer
■ Corporate
■ Home Office

Profit by segmnet

Segment

Consumer	
Corporate	
Home Office	

€0.00   €20,000.00   €40,000.00   €60,000.00   €80,000.00   €100,000.00   €120,000.00

Profit

Quantity by Segment

sales by segment

Consumer   Corporate

Home
Office

DASHBOARD 2

- All 3 categories — Furniture, Office Supplies and Technology make similar amount of sales.

  - Technology is Best Selling and it's good to know that this category is the Most Profitable too. Only minimal quantity is sold as these products are usually one-off purchases that can last at least 4–5 years.

- Although Furniture makes similar sales as Technology, it is the least profitable and quantity sold are at a minimum too.

- Office Supplies sells the most in terms of quantity as it is relatively cheap product.
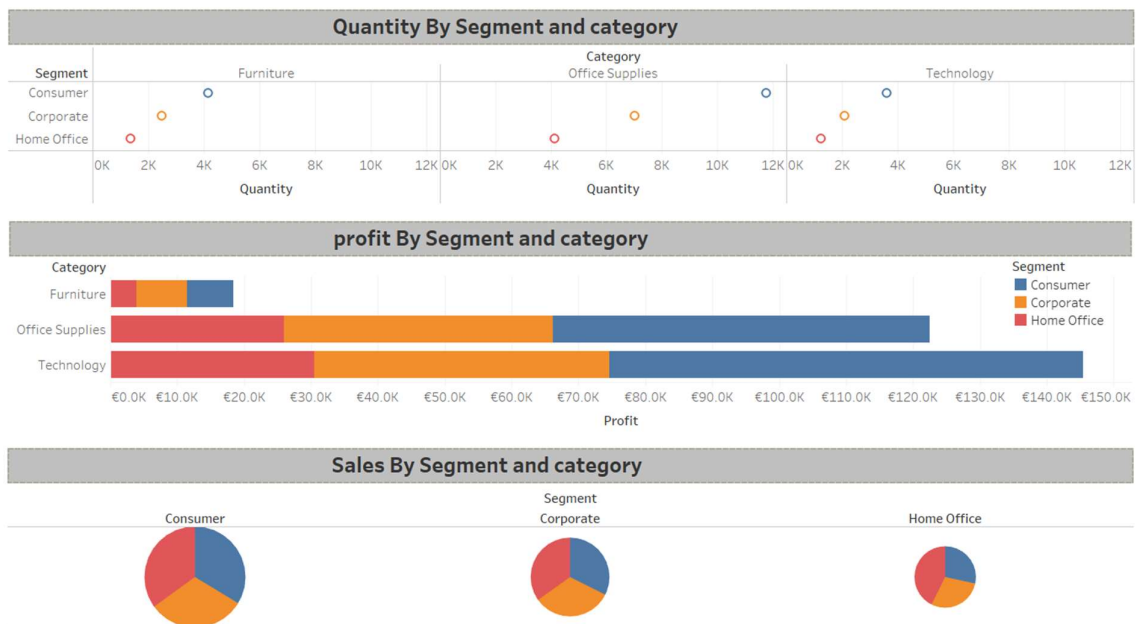
DASHBOARD 3

- There are Top 10 States As per record
- California and New York are Top 2 in the list of profit, sales, and quantity,
- While Pennsylvania taking more quantity than Washington, but it is lower than in sales and not even list in Top10 profit States
- On the other hand Texas, Illinois, and Ohio are in Top 10 in the Sales and quantity But not make it in Top 10 Profit States
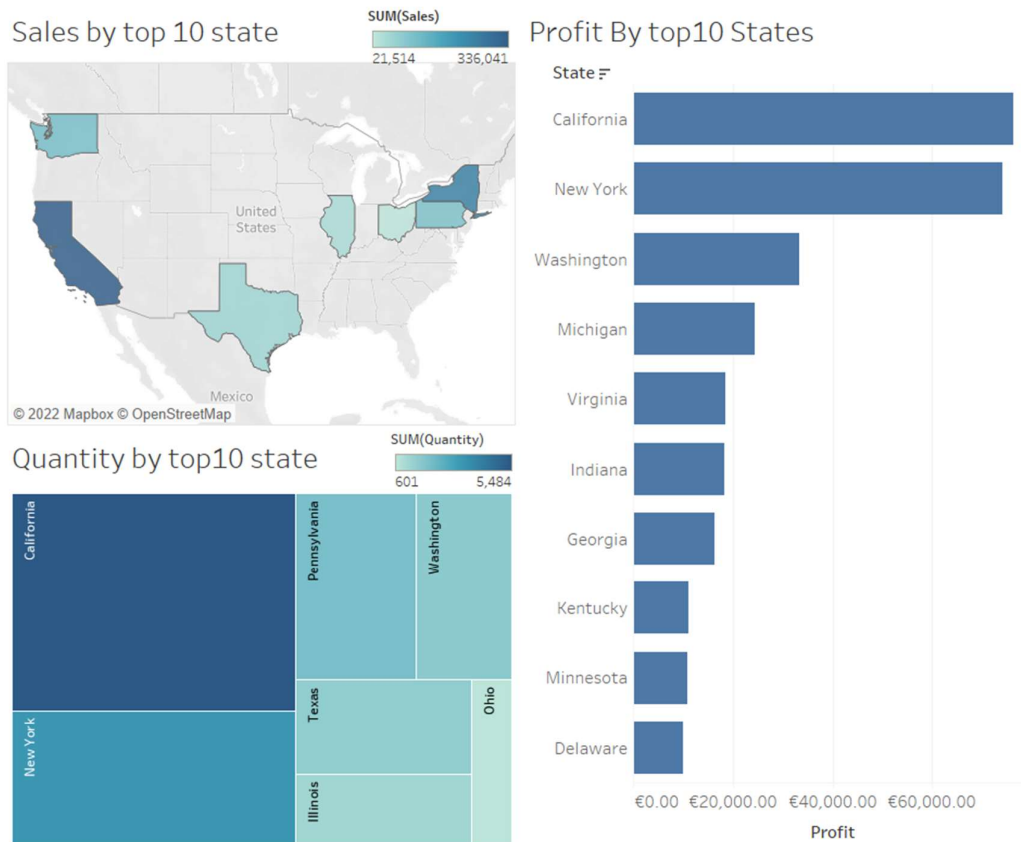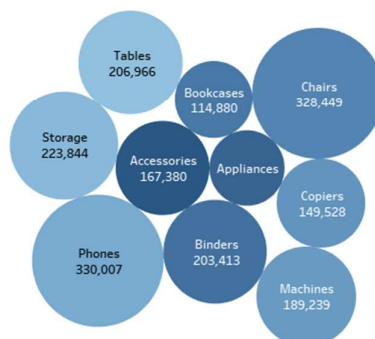
DASHBOARD 4

- Phones and Chairs are Top 2 bestselling sub-category.

- Copiers produces most profit, followed by Phones, Accessories, Papers and Binders. The marketing strategy must focus on marketing these products.

- On the other end of the, Machines, Bookcases and Tables make close to zero margin to losses. These are products that Super Store can consider dropping from the product catalogue or increase the sale price and profit margin or bargain for a lower price from the supplier. While they need to Reduce discount on Tables so they can manage to finished with no loss no profit in Tables sub-category.

profit by top10 sub-category

Sub-Category
- Accessories
- Appliances
- Binders
- Bookcases
- Chairs
- Copiers
- Machines
- Phones
- Storage
- Tables

Profit

sales by top10 sub-category

Tables 206,966
Bookcases 114,880
Chairs 328,449
Storage 223,844
Accessories 167,380
Appliances
Copiers 149,528
Phones 330,007
Binders 203,413
Machines 189,239
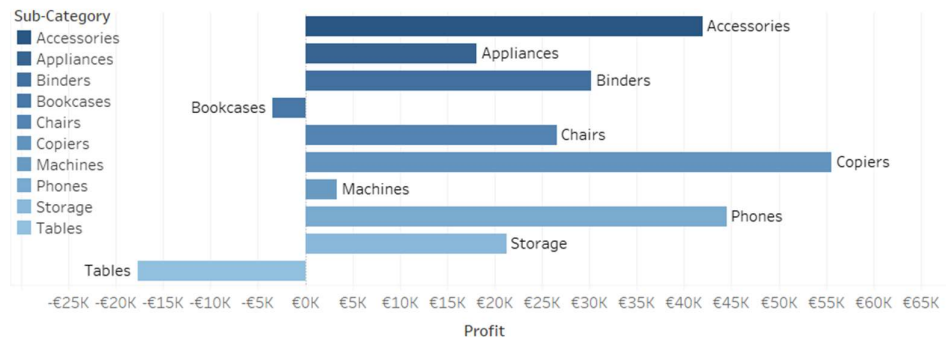
Discount on top 10 Sub-category

Tables 83%
Accessories 61%
Art 60%
Appliances 78%
Bookcases 48%
Labels 25%
Envelopes 20%
Storage 63%
Machines 35%
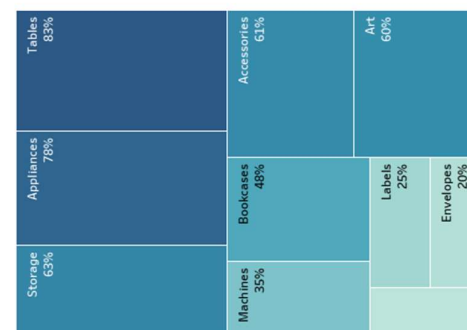
DASHBOARD 5

- As per the Bar chart report Sales all on different ship mode increasing gradually.

- While the quantity bought by EAST and CENTRAL region were same in 2014 compare to 2017 it was slightly increase in EAST region

- On the other hand profit in region from all shipment are very volatile

- Like southern region are making losses in same-day ship mode

- While Eastern region are surpassing western region in standard class ship mode in Profit

Profit on shipmode By Region

Sales on shipmode by Region
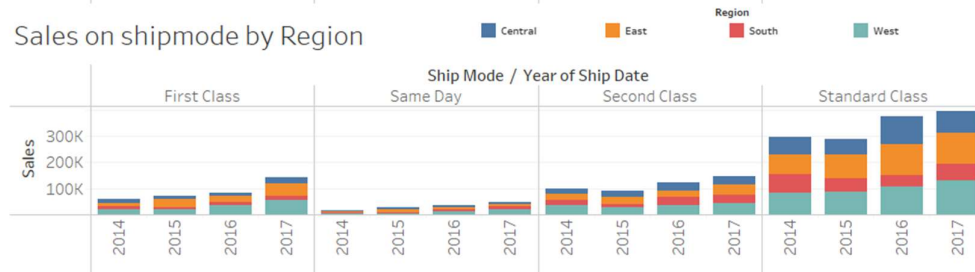
qunatity in shipmode by Region

DASHBOARD 6

- I have added Summary table for checking Discount, Profit, Quantity, Sales, of segment in details using with Filters by segment, region, sub-category, category.
  - On the other hand, sales are booming up in Mar, Sep, Nov, Dec month.
- As Sales Dipping in Feb and Oct Month so the marketing Strategist more to focus on this months.

- Profit more Volatile each year, but March month has high sales every year but they are lacking in profit in March.

Executive Sales

Segment	Discount	Profit	Quantity	Sales
Consumer	821	€134K	19,521	1,161K
Corporate	478	€92K	11,608	706K
Home Offi..	262	€60K	6,744	430K

Segment
(All)

Region
(All)

Sub-Category
(All)

Category
(All)

Sales perfomance by month

Profit perfomance by month

Dashboard 7

- I have added overview table to Show Distinct Count of Customer of Profit and Sales by Region
- In Customer Ranking Sean miller Top in Sales but he is not make it in top 10 Profit Customer
- Tamara chand Top in Profit and 2nd in Sales
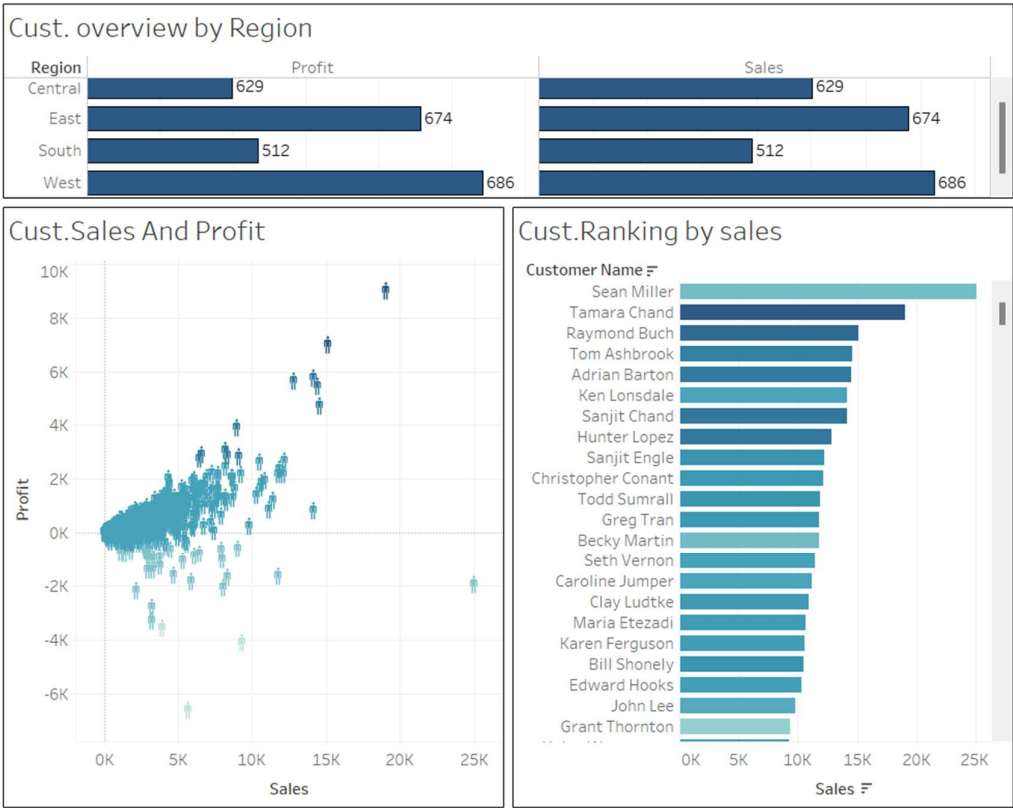
Dashboard 8

- I have added overview table to Show Distinct Count of Segment and Customer of Profit and Sales by Region.
- Showing AVG. of Profit and Sales of every State.
- Showing every Segments Profit and Sales by Yearly and Quarterly Order Date.
- Where Consumer And Home office Gradually Making Profit and Sales every Year.
- On the other hand Corporate Making money till 2016 After That Corporate Dipping out there Sales and Profit.
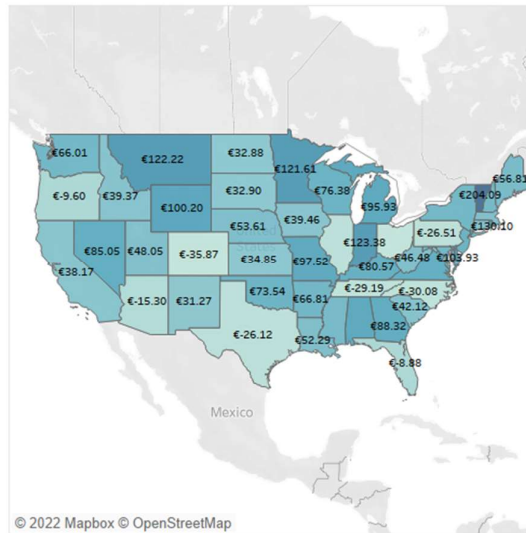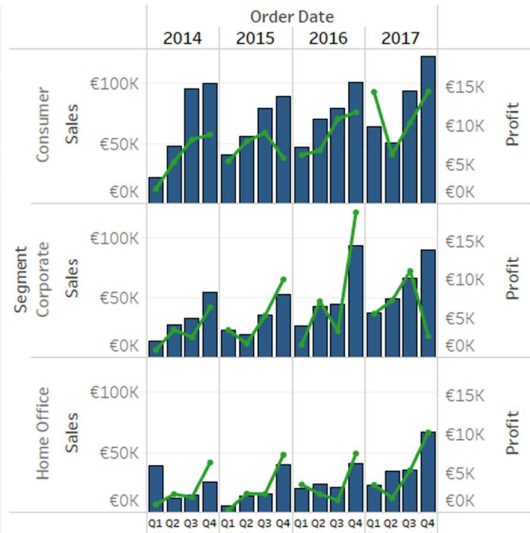
Dashboard 9

- I have added Graph of Shipment mode count by Year and Quarterly
- On the hand I have added Top 10 Product profit which Deliver by Shipment mode where Some Product Making Loss or No Profit on Standard Class Delivery.
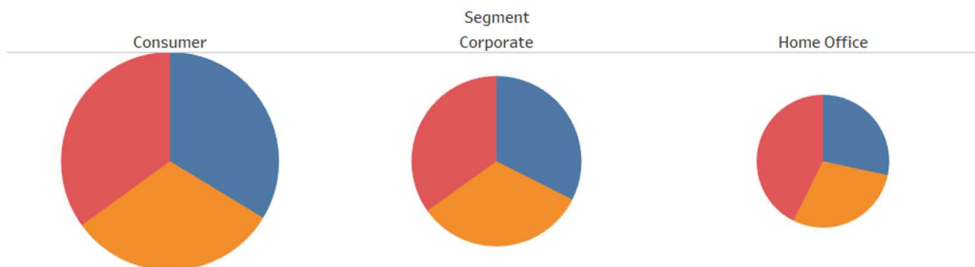- Where in Third Slide Added Count of Ship mode of Top 10 Product.
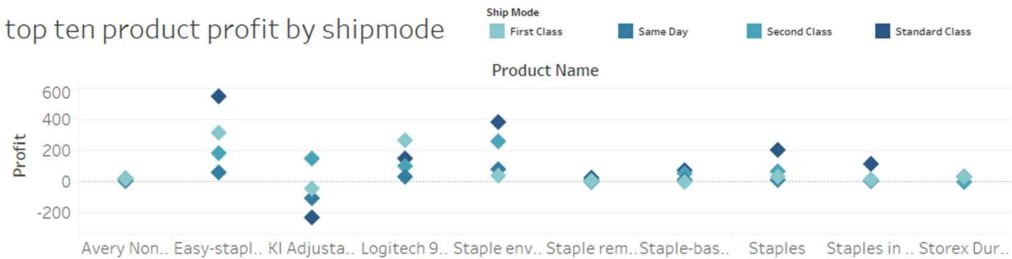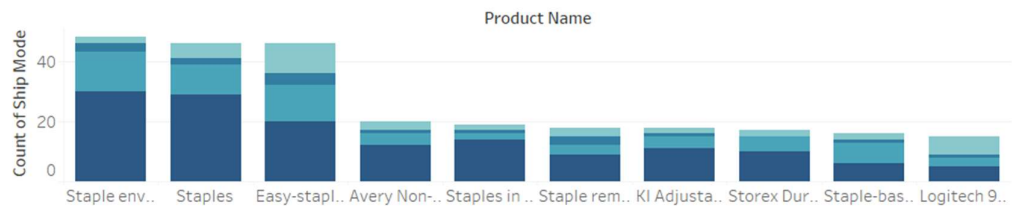
Dashboard 10

- I have added Summary Table of Segment With Discount, Profit, Quantity, Sales.

- Technology is Best Selling and it's good to know that this category is the Most Profitable too. Only minimal quantity is sold as these products are usually one-off purchases that can last at least 4–5 years.

- Although Furniture makes similar sales as Technology, it is the least profitable and quantity sold are at a minimum too.

Summary

Segm..	Discount	Profit	Quantity	Sales
Cons..	821	€134K	19,521	1,161K
Corpo..	478	€92K	11,608	706K
Home..	262	€60K	6,744	430K

Sales By Segment and category

Segment

Consumer   Corporate   Home Office

profit By Segment and category

Category

Segment: Home Office, Corporate, Consumer

Furniture

Office Supplies

Technology

€0.0K €20.0K €40.0K €60.0K €80.0K €100.0K €120.0K €140.0K

Profit

Dashboard 11

- When We Compare Every Year Profit Of Top Sold Products Canon Copier top in the list Where GBC Binding System Making Low profit and loses.
- So Why GBC Making Loss Because They are more in Discount while Canon Giving minimal Discounts.
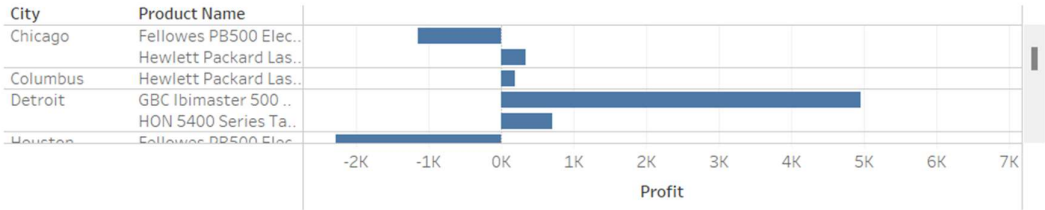
Dashboard 12

- Here I have added Top 10 product Sales in Each City.
- In the second slide Added Top 10 City and Products Profit.
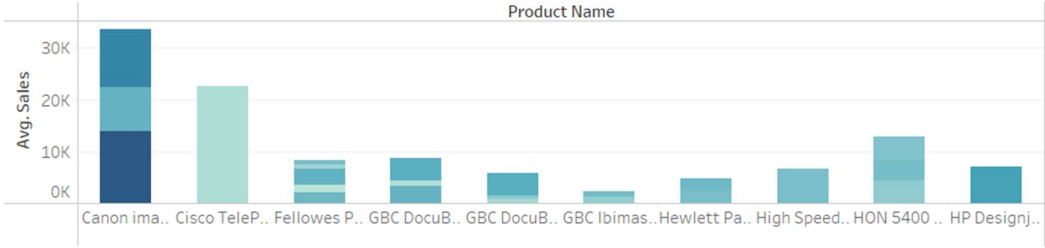- In the last slide Added AVG. Profit and Sales of city and State.
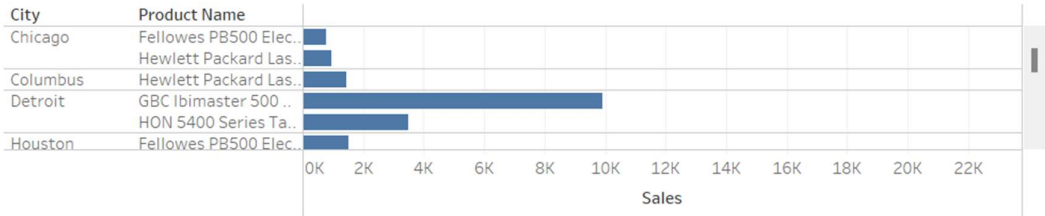
Dashboard 13

- I have added Top 3 city by sales Graphs, Each for Every City.

Dashboard 14

- Here in the first slide showing the Quantity taken by United States.
- Where in the next slide I break that Quantity in Sub-Category which Category top In Quantity.
- In The last slide I have Forecast Quantity for Q4 of next Year where Office Supplies and Furniture estimate to increase but Technology estimate no increment in Quantity.
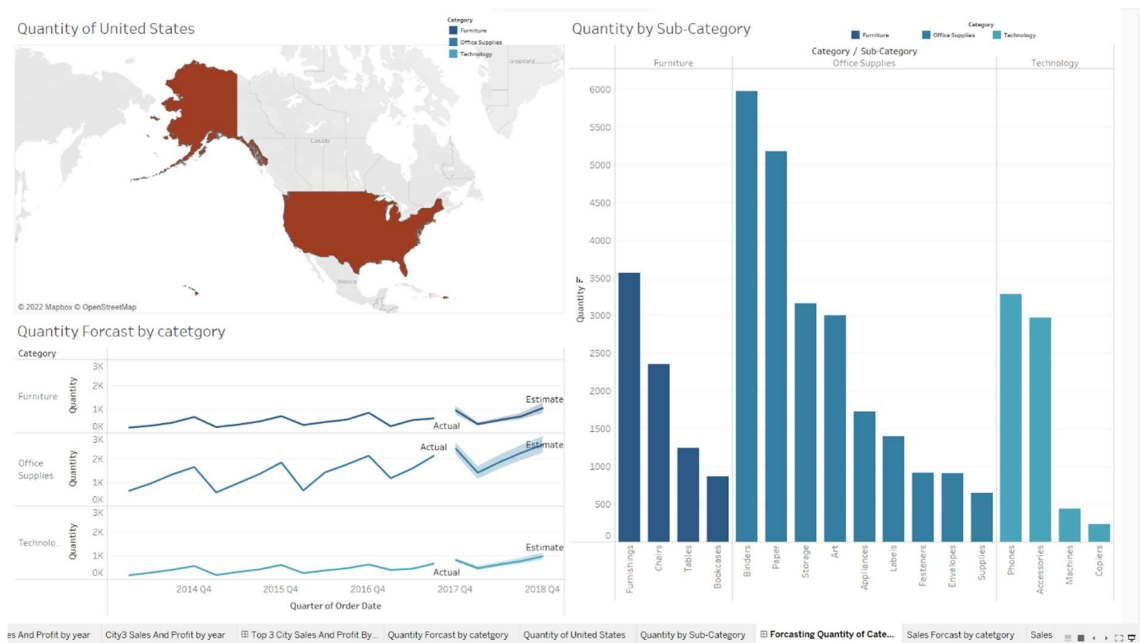
Dashboard 15

- Here in the first slide showing the Profit taken by United States.
- Where in the next slide I break that Profit in Sub-Category which Category making profit.
- On that slide Furniture losing profit in Some product Where Technology making profit in every product.
- In The last slide I have Forecast Profit for Q4 of next Year where Furniture estimate to increase in profit but Technology and Office Supplies estimate no increment in Profit.
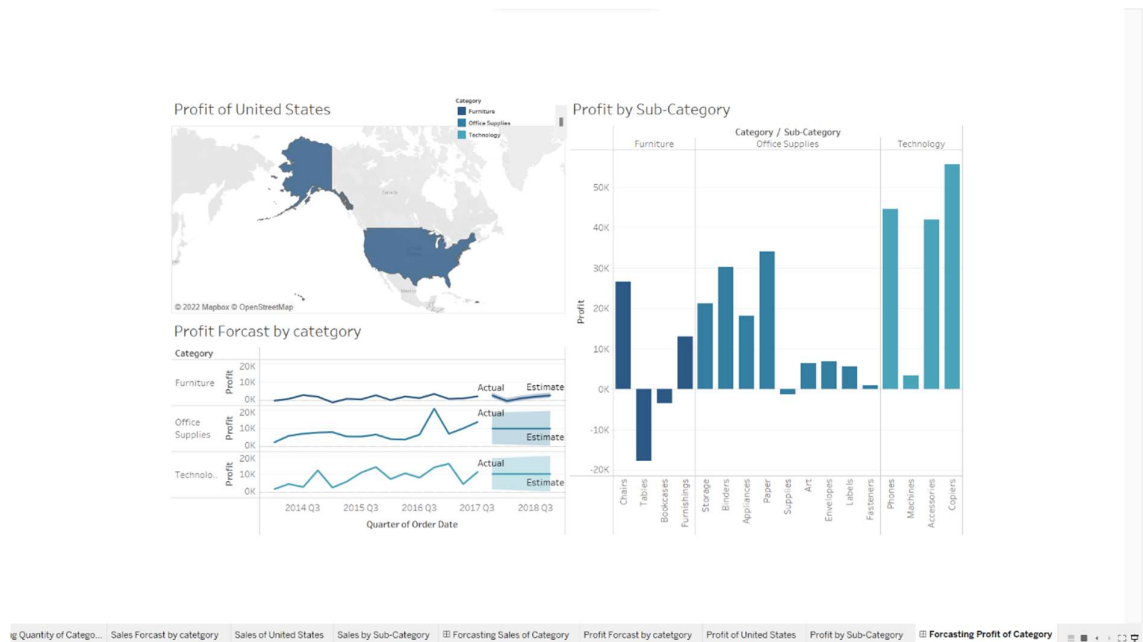
Dashboard 16

- Here in the first slide showing the Sales taken by United States.
- Where in the next slide I break that Sales in Sub-Category which Category top In Sales.
- In that slide Furniture and Technology are taking more Sales than Office Supplies.
- In The last slide I have Forecast Sales for Q4 of next Year where Furniture estimate to increase rapidly. but Office Supplies estimate no increment in Sales.
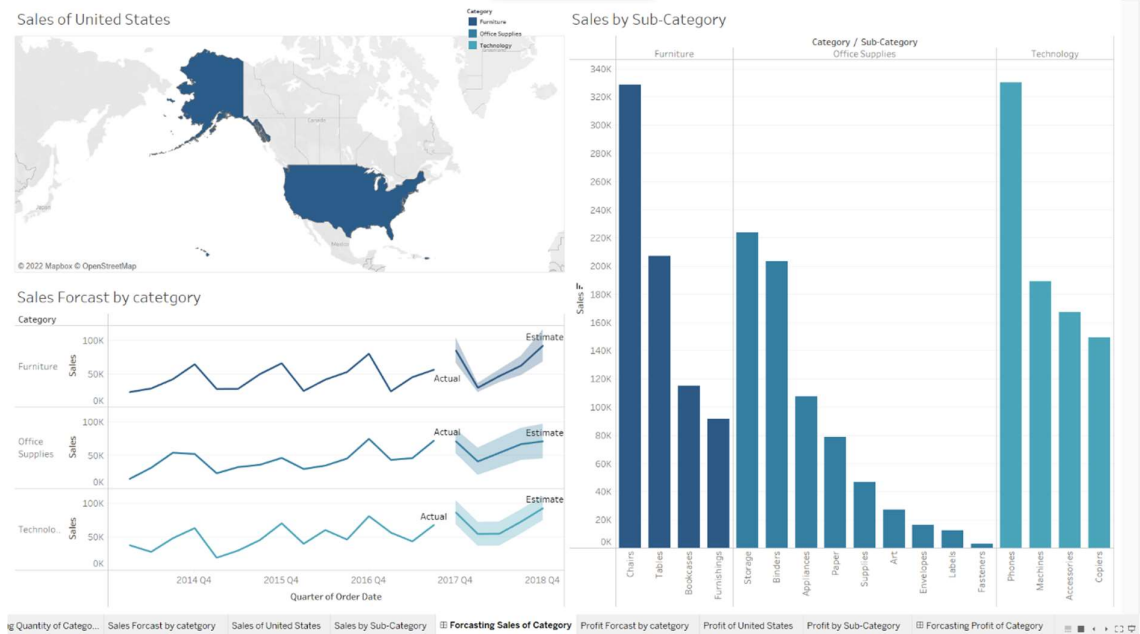
PART 2

(Predictive Analysis & Visualization of Insights)

This part of the assignment we will try to explain the insights gained after performing predictive & prescriptive analytics for the Superstore. After completing the part 1 of the assignment we have gained so much information and actionable intelligence so we can make decision for the future. There can be more question that we can explore using advance analytic techniques in tableau.

Question that can be Explored

- **Forecasting future profit estimates for categories.**
- **What is the projection of sales for categories?**

Data Pre-processing

- This step includes removing columns we do not need, check missing values, aggregate sales by date and so on.
  Row ID, Order ID, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, Country, City, State, Postal Code, Region, Product ID, Category, Sub-Category, Product Name, Quantity, Discount, Profit.

#In 2014 and 2016 it has low sales in the initial months and high sales by the end of the month


In [36]:
```python
# We can also visualize our data using a method called time-series decomposition
# that allows us to decompose our time series into
# three distinct components: trend, seasonality, and noise.
from pylab import rcParams
rcParams['figure.figsize'] = 18, 8
decomposition = sm.tsa.seasonal_decompose(y, model='additive')
fig = decomposition.plot()
plt.show()
#we can clearly say that the plot is not stable
```
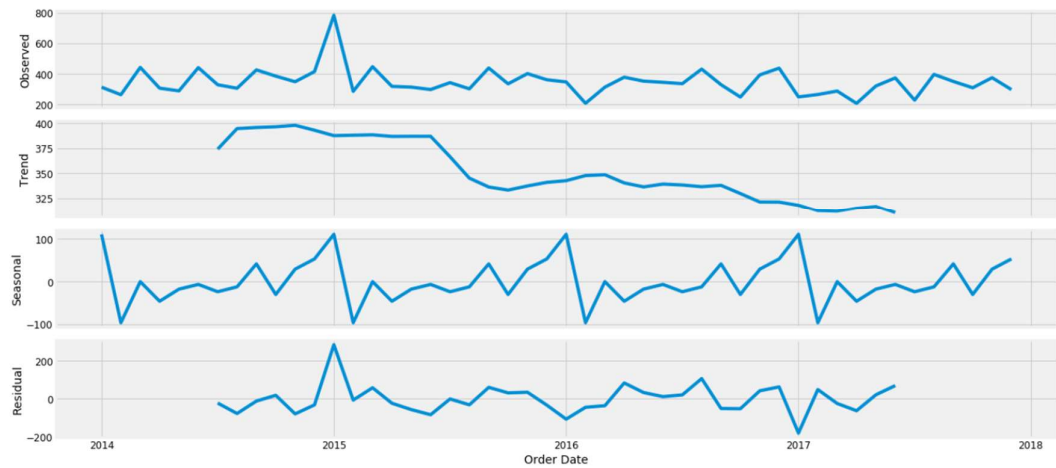
```
# To help us understand the accuracy of our forecasts,
# we compare predicted sales to real sales of the time series,
# and we set forecasts to start at 2017-01-01 to the end of the data.
pred = results.get_prediction(start=pd.to_datetime('2017-01-01'), dynamic=False)
pred_ci = pred.conf_int()
ax = y['2014':].plot(label='observed')
pred.predicted_mean.plot(ax=ax, label='One-step ahead Forecast', alpha=.7, figsize=(14, 7))
ax.fill_between(pred_ci.index,
                pred_ci.iloc[:, 0],
                pred_ci.iloc[:, 1], color='k', alpha=.2)
ax.set_xlabel('Date')
ax.set_ylabel('Furniture Sales')
plt.legend()
plt.show()
```
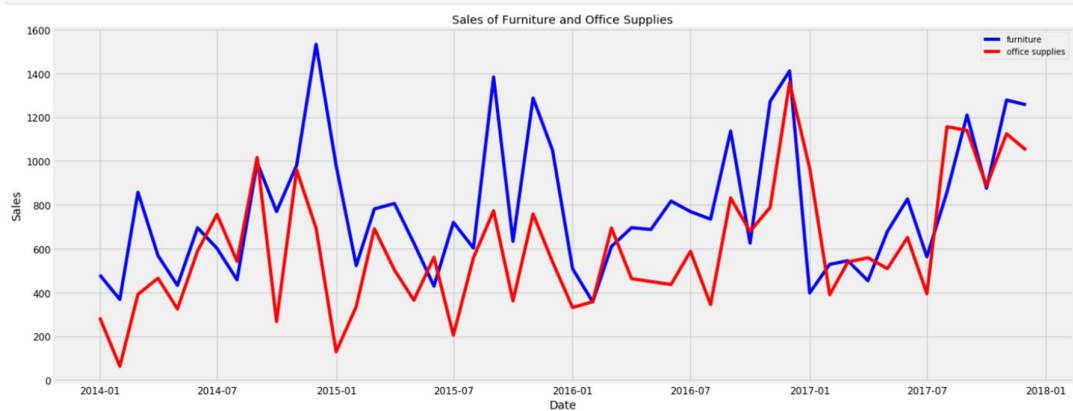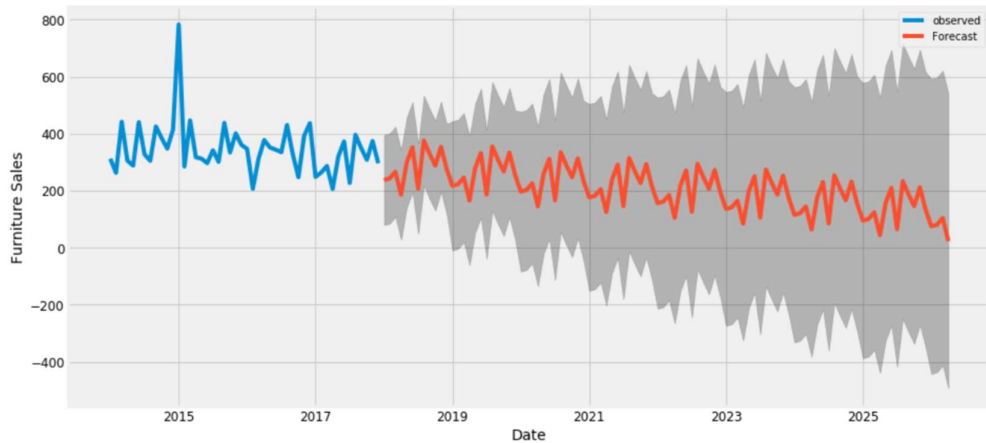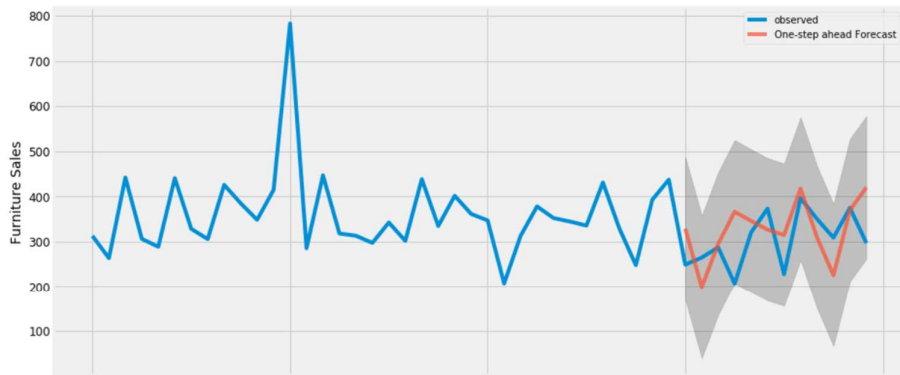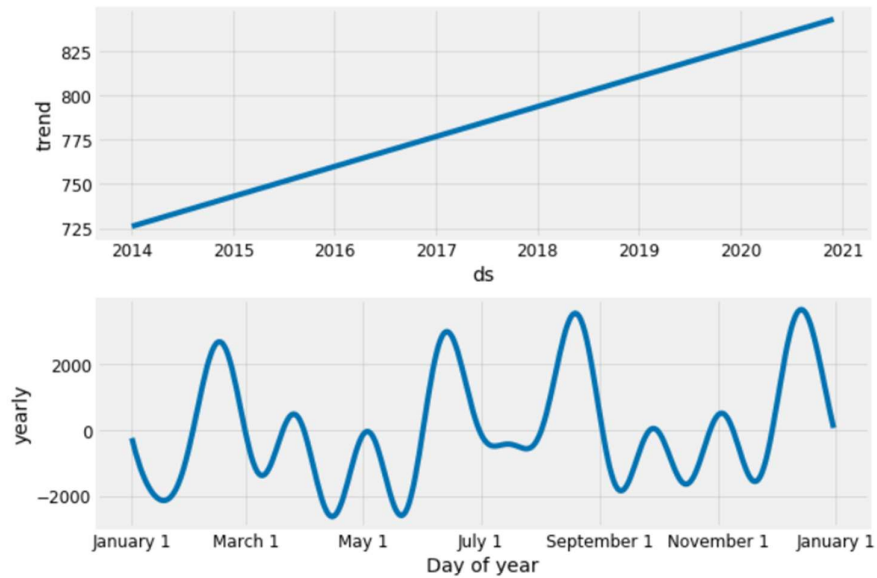
```
# We observe that sales of furniture and office supplies
# shared a similar seasonal pattern.
# Early of the year is the off season for both of the two categories.
# It seems summer time is quiet for office supplies too.
# in addition, average daily sales for furniture are higher than those of office supplies in most of the months.
# It is understandable, as the value of furniture should be much higher than those of office supplies.
```
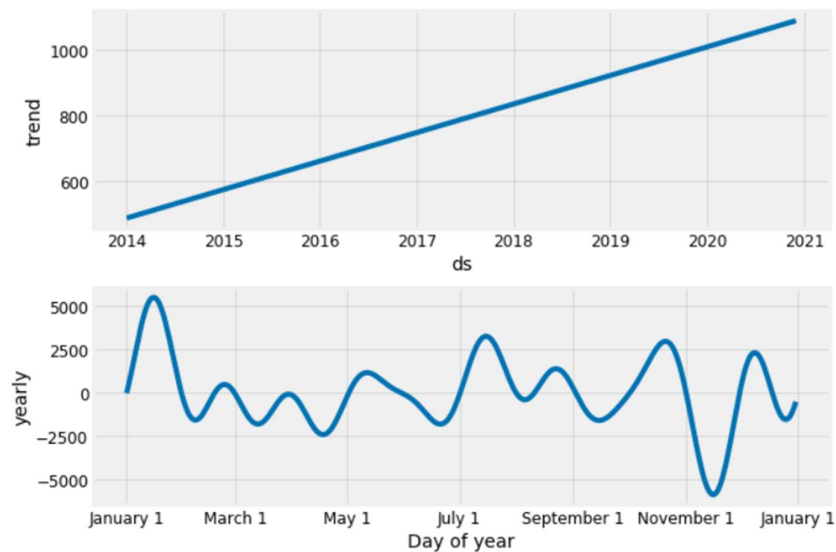
Furniture Sales

Office Supplies Sales

Furniture vs. Office Supplies Sales Trend

Furniture vs. Office Supplies Estimate
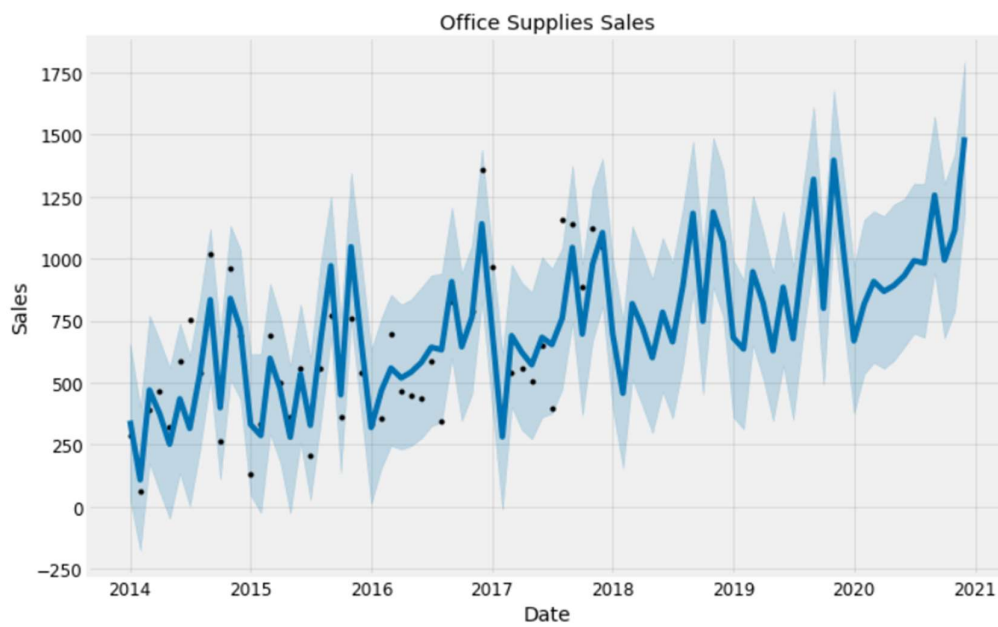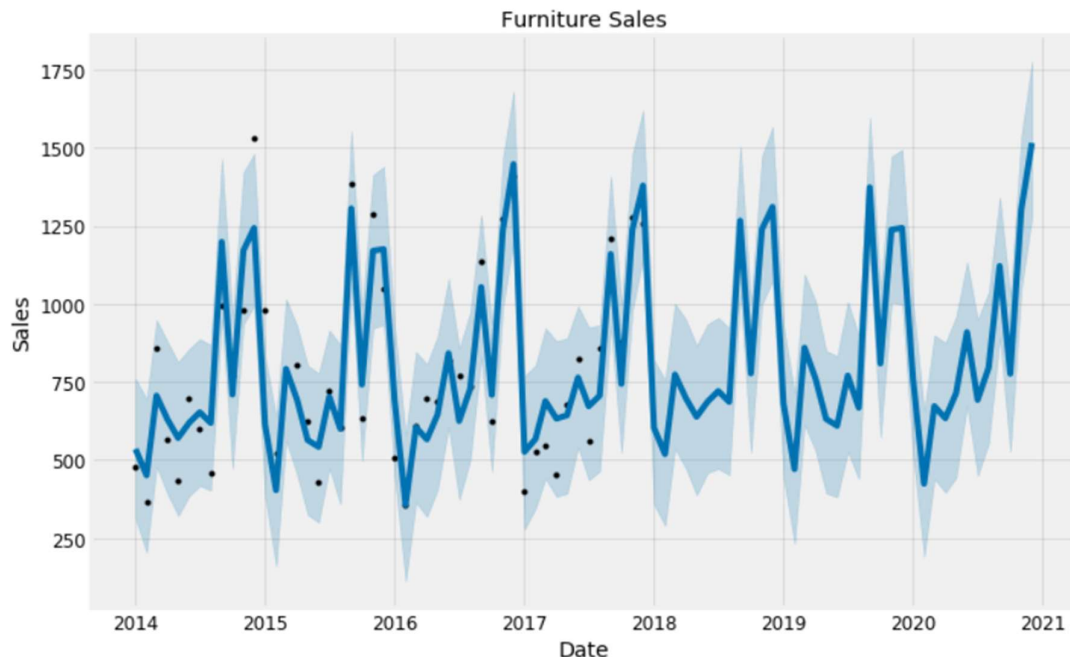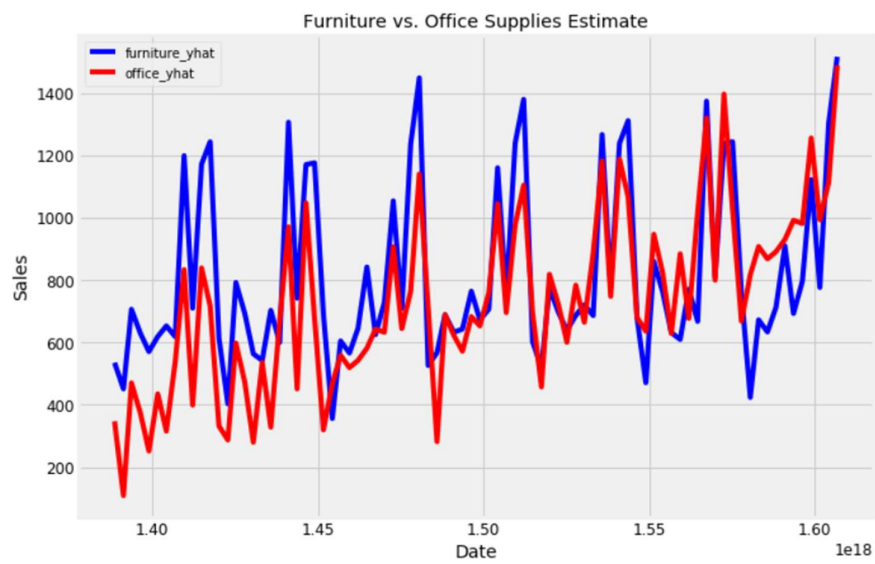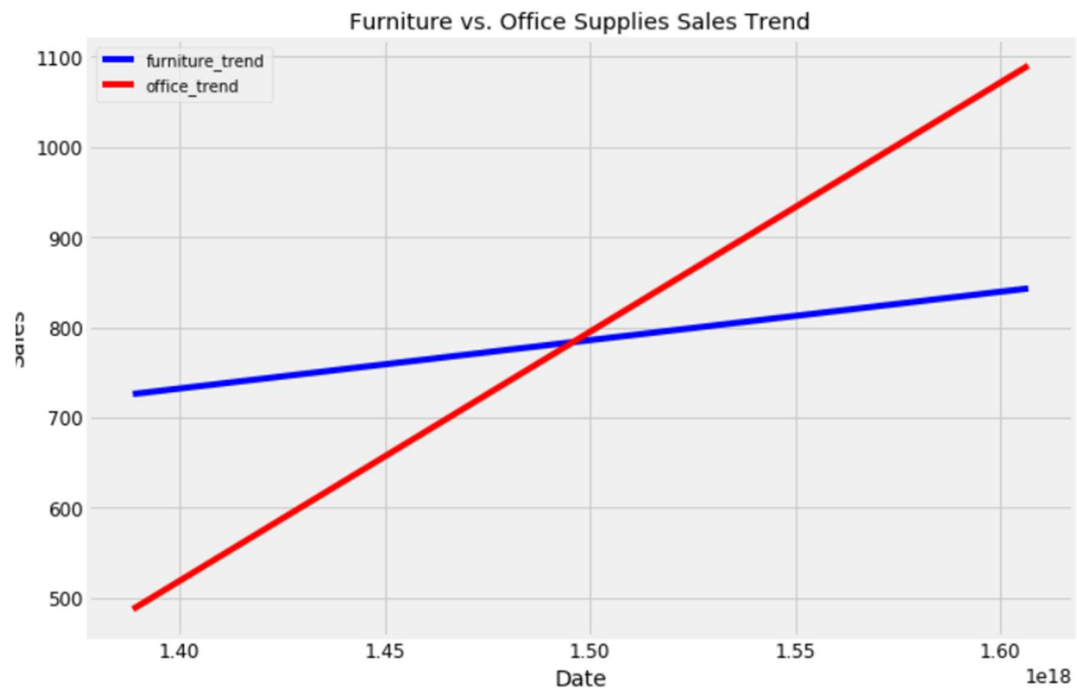
`furniture_model.plot_components(furniture_forecast);`

`office_model.plot_components(office_forecast);`

ARIMA MODEL

- ARIMA is a forecasting technique that projects the future values of a series based entirely on its own inertia.
- Its main application is in the area of short-term forecasting requiring at least 40 historical data points.

CONCLUSION

- The Store should invest more in New York State as it is the highest profit state.
- Furniture sales in 2018 -2025 follow the Volatile trend as the previous year.
- We observe that sales of furniture and office supplies.
- shared a similar seasonal pattern.
- Early of the year is the off season for two categories.
- It seems summertime is quiet for office supplies too.