

## Project Part 2

### Sketches and Questions

#### 1. What is the Most Profitable City in the State of Tennessee

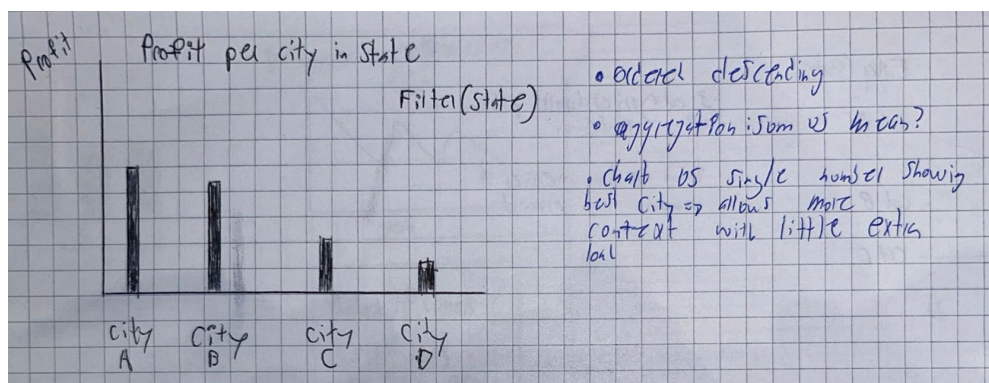
To answer this question, I had to make a decision between the two most suitable options (in my opinion).

The first, a simple field reading "Most profitable city in [State] is [Best City] with Profit [Profit Aggregated]. The user could filter on the state they are interested in. This has the advantage of being physically small, quick to read and difficult to misunderstand (since it is writing requiring little interpretation). However, by showing only the most profitable city, a lot of information is missed out on.

This is why I went for the second option: a bar chart with aggregated profit on the x-axis, the cities ordered descending on the y-axis, still filterable. The descending order allows the most important city (highest) to be picked first in a left to right read. While the chart does add complexity, this added complexity is justified by the extra context provided by including all cities in the chart. The user can pick out much more nuance to answer follow up questions such as:

- How is the profit in the state distributed across cities?
- Were there any negative profit cities?
- In how many cities in this state is our product sold?

The bar chart is simple enough that any person who has made it to management should understand it with no extra instruction. The only thing which needs to be made clear in the title is the aggregation used (sum over years vs average over years).



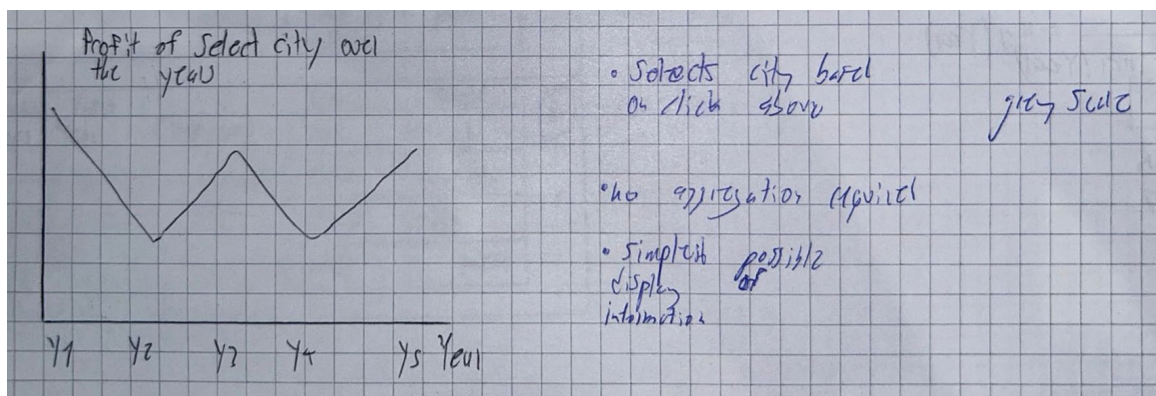
#### 2. What's the average annual profit for that city across all years in that city?

Since here we are talking about developments (profit) over time (years), a line chart with profit (x-axis) and time (y-axis) is a suitable choice. This time, it is almost required since to show profit over time using text, would require a lot of text boxes, anyways almost matching the complexity of a graph.

The main complexity that needs to be communicated with the user is that they can select the city which they would like to have a further look at. Again here, instead of automatically having the dashboard show more details on only the top city in terms of profit, the user can look at any city of interest. This is more complex, but again the added complexity is more than justified by the insight unlocked. Management may in fact be interested in cities where:

- There is underperforming,
- Had a recent management change
- New marketing campaign.

By allowing the user to click on a city in Graph 1 and receive the drill down in Graph 2, more information is unlocked.

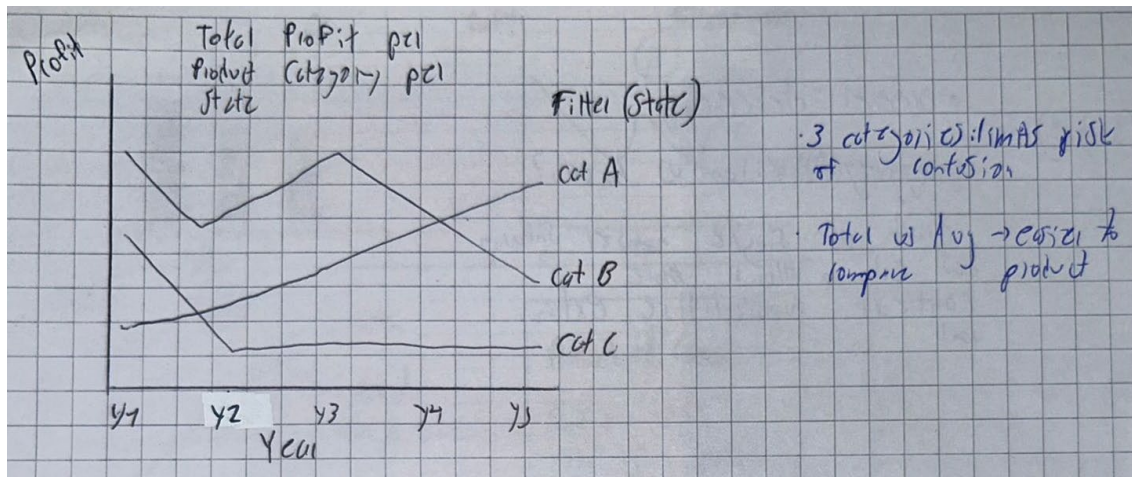


### 3. What's the most profitable product category on average in Iowa across all years?

I would push back strongly on using the average profit of a product category rather than the sum of profit for a product category. If you sell a product with a \$1 profit 100 times and a product with a \$100 profit once, these should carry identical values to the business. The former is not worth less because you had to sell more since we know nothing about how difficult each sale was. And the fact that we are looking at profit per product and not revenue means that any difference in costs is already accounted for.

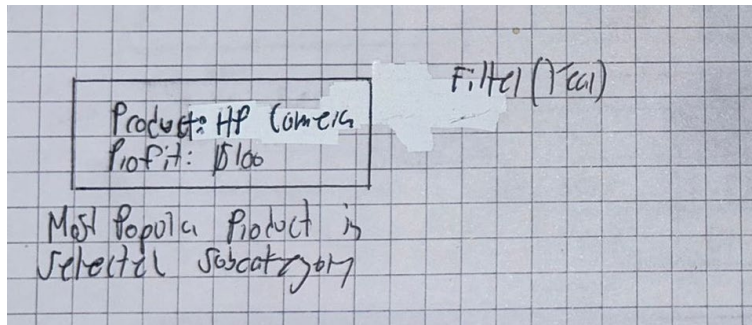
Since we are looking at developments over time, a line chart will be used with profit (X-axis) and Time / Year (Y-axis). Management is interested in the profitability of product categories across states, they may filter on the state. The lack of coloring means that the labelling must be done by tacking on the product category's name at the end of the final line. While this increases the risk of the user confusing the lines it is mitigated by the small numbers of product categories sold by the company (3).

**Note:** After experimenting and thinking about what the question is asking, I decided to for the simpler approach which you see in the completed dashboard.



#### 4. What was the most popular product in that category across all states in 2016

This question will be solved with a simple textbook displaying the information required and filtering based on Graphic 3's filtering block. While it would be possible to add more details, I do not believe in this case it is worth the extra complexity of including it in the graph. The main reason is that there are so many product categories that it would be difficult fit them neatly on the dashboard as is possible with other graphics. Secondly, if the management is interested in the whole list of products by profit this is something that can relatively easily be included by some kind of automatic SQL tool accessible by the manager.

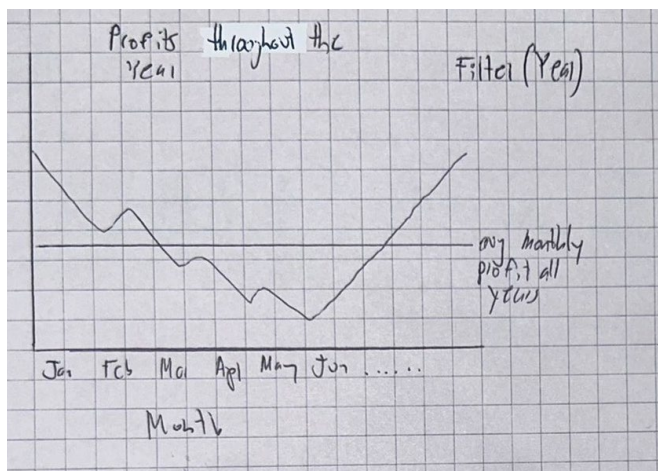


**Note:** I could not technically get this to work, something about the Top-N always caused an error. Therefore I went with a bar chart.

#### 5. What was the most profitable month in 2018 overall?

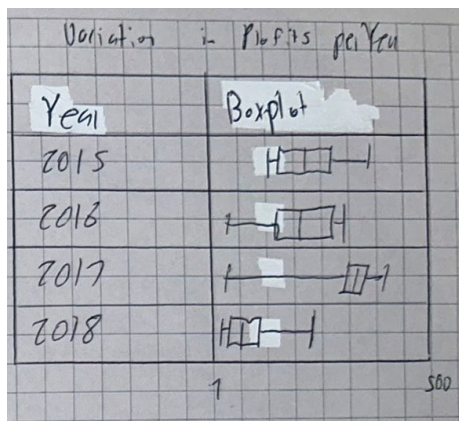
We are looking again at the development of a continuous variable (profit, X-axis) over time (months, Y-axis) – the line chart is the most suitable way to represent this data. Since the user would like to evaluate the profits at a yearly level, the filter provided does just that. The inclusion of the visual element of the line chart allows changes within a year to be evaluated.

However, this can be misleading when switching between the years (the eyes of the user are drawn towards the pattern, not the number seen for profit. If all numbers double for example, the pattern will look the same, even though the numbers are different. For this reason, a straight line is inserted in the graph representing the monthly profit average of all years. In our made-up scenario of all numbers doubling, the line representing this number would move down on the graph, signaling a big change of one year to the previous in terms of the quantity of profit.



### 6. How widely did monthly profits vary in 2018?

The final graphic will show boxplot summary statistics for each year's profit, divided up into a neat table. While the boxplot is a more complicated instrument to read, with limited introduction anyone can understand it, even if the first time they may need to look it up. A simple standard deviation or Interquartile Range summary, while absolutely communicating the desired information miss out on the context of the distribution, but more importantly the midpoint of the data, which may be more relevant in an organization like a company who's financial goals are likely measured yearly, not monthly (shareholders usually get an annual letter, not a monthly letter).



**Note:** Technical issues prevent this exact vision, but something conceptually very similar was created.



## Wireframe

\*See Wireframe on next page.

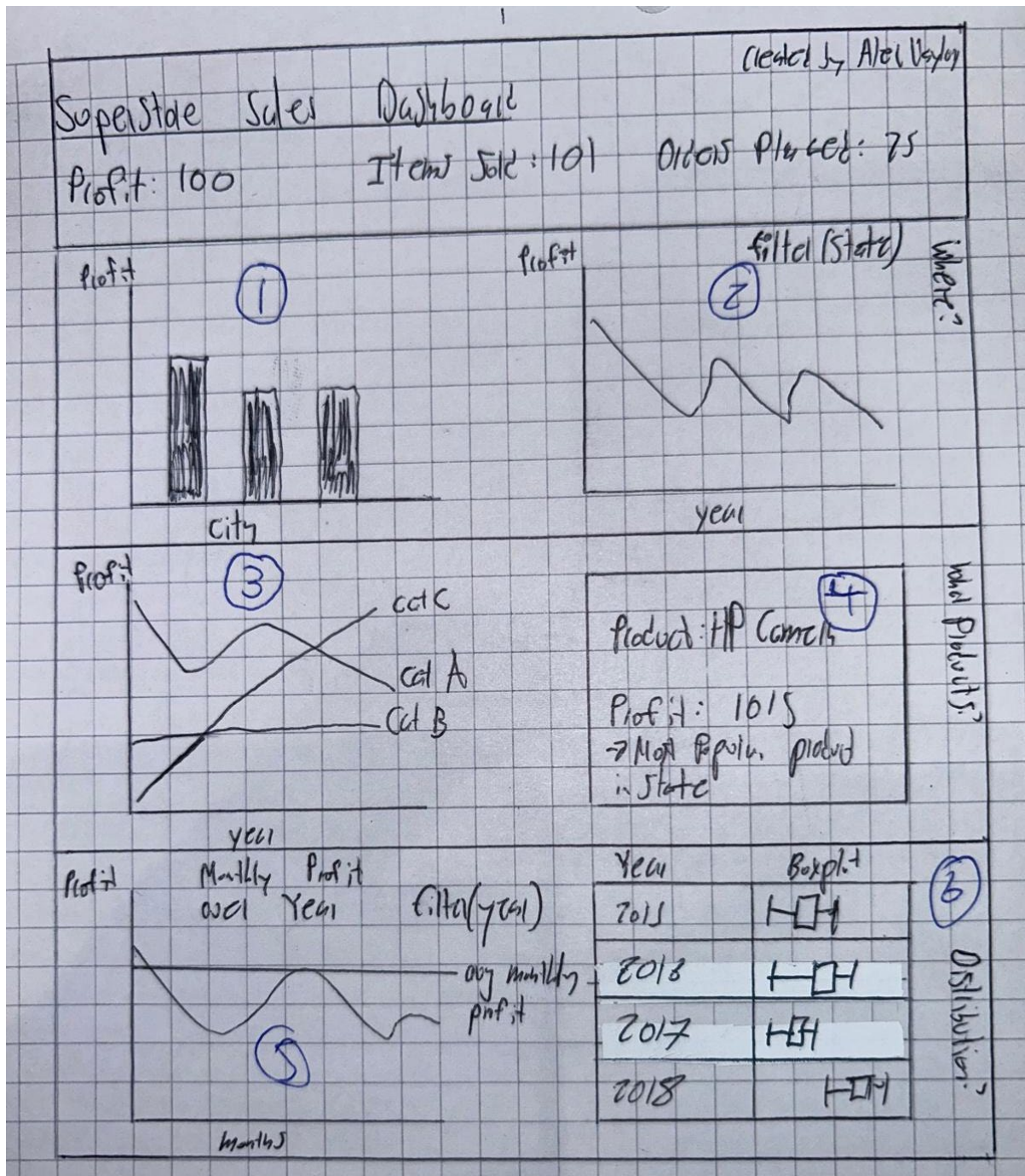
The numbers written in Blue (not considered part of the actual sketch) correspond to the questions being answered.

Question Nr	How is it being answered?
1	Looking at leftmost bar chart after filtering shows the most profitable city across all years in the selected state
2	Clicking on the bar chart gives the profit trend of that city.
3	The graphic shows the most profitable state on average (real dashboard) over years (sketch), thereby answering the question of the most profitable product category in a filtered state.
4	Real dashboard: The graphic shows the products in the clicked (graphic 3) category according to their profitability. Sketch: The graphic shows the most popular product of the clicked (graphic 3) category.
5	The line chart shows monthly profits of a selected year, the user may clear the State filter first if they are interested in all states.
6	The user sees a boxplot of the distribution for each year.

**Alternative Wireframes?** The below set up was chosen because it divides the charts logically by the questions they answer. Q1 and Q2 are related to *where* profits are being made. Q3 and Q4 are related to *which products* are making the profits. Q5 and Q6 are related to the *spread* of money over the time. In fact, this can be made explicit by adding a keyword at the end (seen written vertically).

**Storytelling title?** Since this dashboard is intended to be dynamic, the titles will be descriptive of the data's structure, but not of the story they tell. This is because with more data theoretically being added in the future, it is unsure if the same story will be told in the future.

**Management's Questions First?** Conventional Logic would dictate directly answering management's questions. However, the inclusion of some KPI's is commonplace in dashboards and gives a professional look. While looking professionally is not the most important, it increases confidence in the data and the decisions being made. Both strengthens management's position in negotiations with investors or the public, perhaps even if the data is being used as part of a presentation.



## Proof of Concept Dashboard

### Access

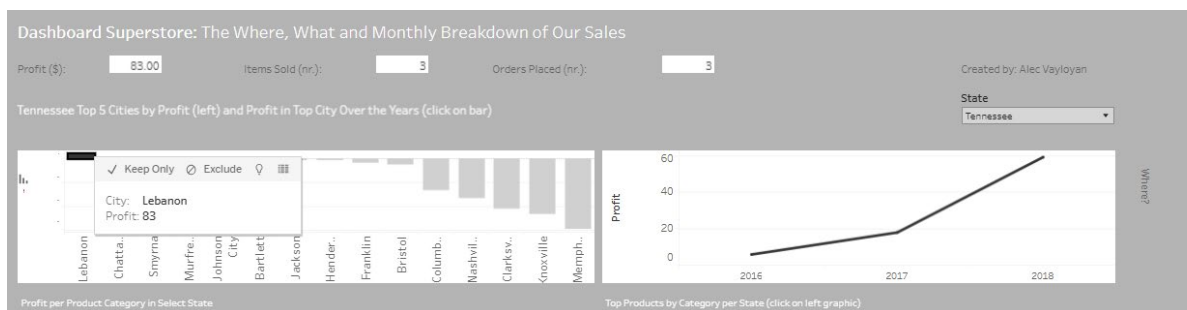
[Click Here](#)

In case of access problems, please e-mail: [vayloyanalec49@gmail.com](mailto:vayloyanalec49@gmail.com)

### Answering Questions

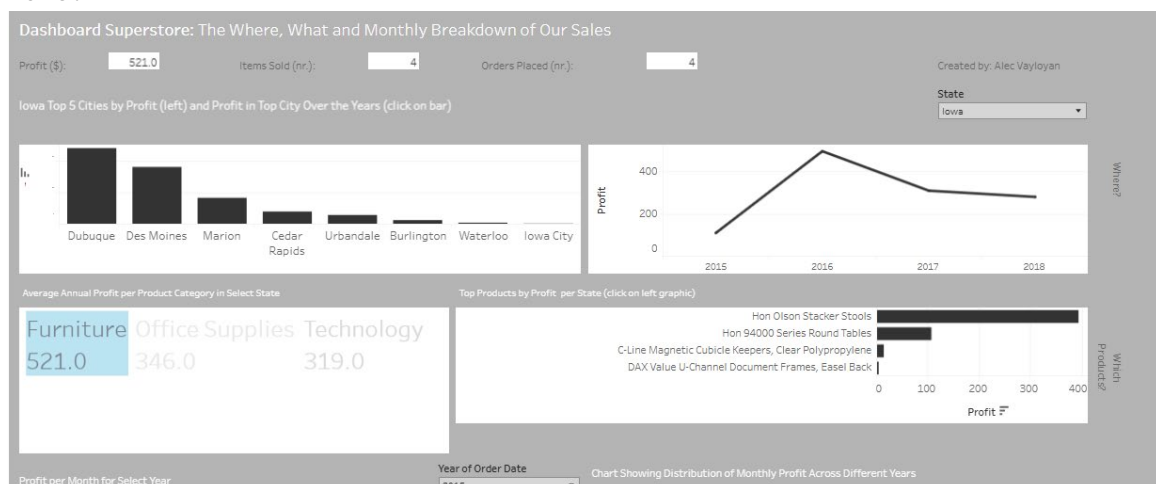
This section demonstrates how the prototype Dashboard answers the questions of management

- 1. What is the most profitable City in the State of Tennessee?**
- 2. What's the average annual profit for that city across all years in that city?**

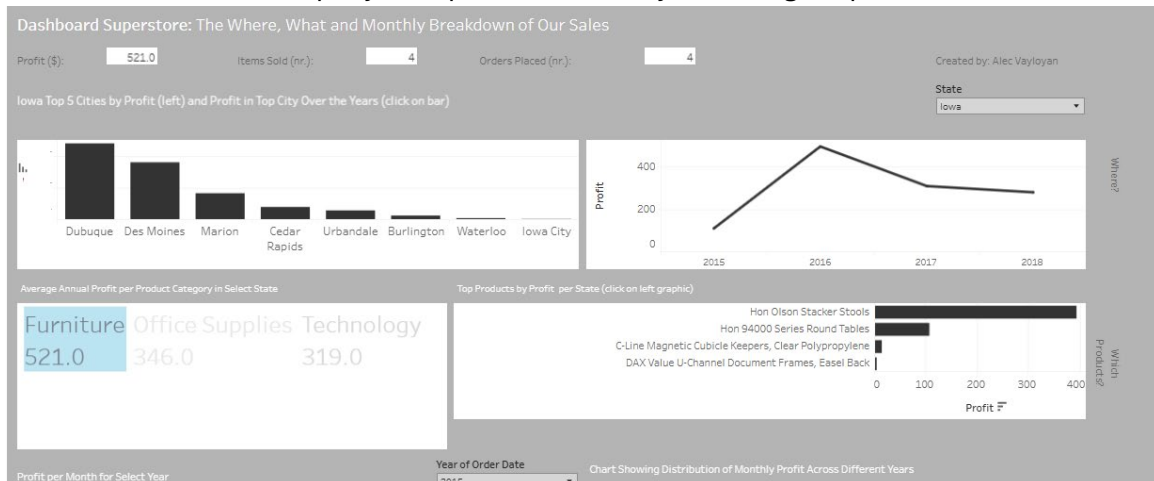


By filtering for State = Tennessee and then looking at the leftmost bar in the top left graphic the user can see Lebanon, TN has brought in most revenue since records began. By looking at the top right graphic, *after* clicking on the bar for Lebanon in the top left chart, the top right will show the development of the annual profit (same as annual average profit, assumed to be redundant wording) over time in that city, or any city which the user may be interested in.

- 3. What's the most profitable product category on average in Iowa across all years?"**
- 4. What was the most popular product in that category across all states in 2016?"**

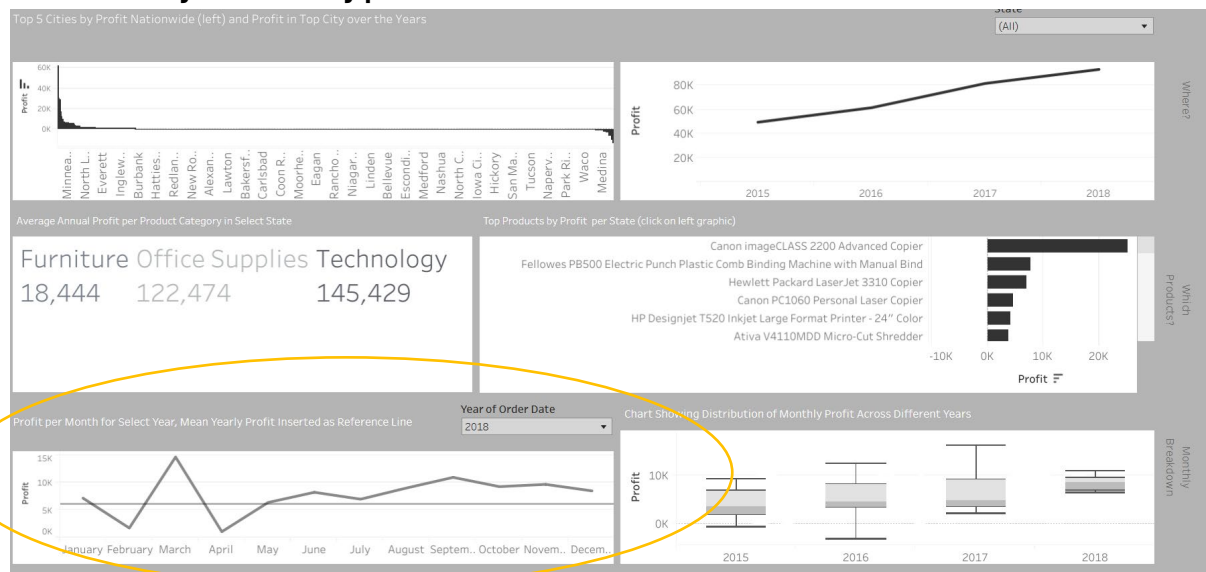


By selecting Iowa in the state, the profitability breakdown of each product category in Iowa can be seen. By clicking on the product which the user is interested in they will see a breakdown on the middle right chart. This shows the exact product which was most popular (**according to profit**) from that category in Iowa. It makes more sense to look according to profit rather than numbers, since this company sells products in a very wide range of prices.



5. What was the most profitable month in 2018 overall?

6. How widely did monthly profits varied in 2018?



By looking at the bottom left chart and selecting 2018, the user can see that March was the most profitable month in 2018. By shifting their gaze left (should happen naturally), they can then see a boxplot (with a viewable Tooltip containing more information) giving information on the distribution of the monthly profits. The user sees visually how the distribution varies over time.