



UNITEDWORLD INSTITUTE OF TECHNOLOGY (UIT)

## **End-Semester Practical**

Submitted by  
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### **Data Visualization (21BSCS35C02)**

B. Sc. Computer Science -DS/AIML  
V Semester, July -Nov 2024

# **UIT**

November 2024

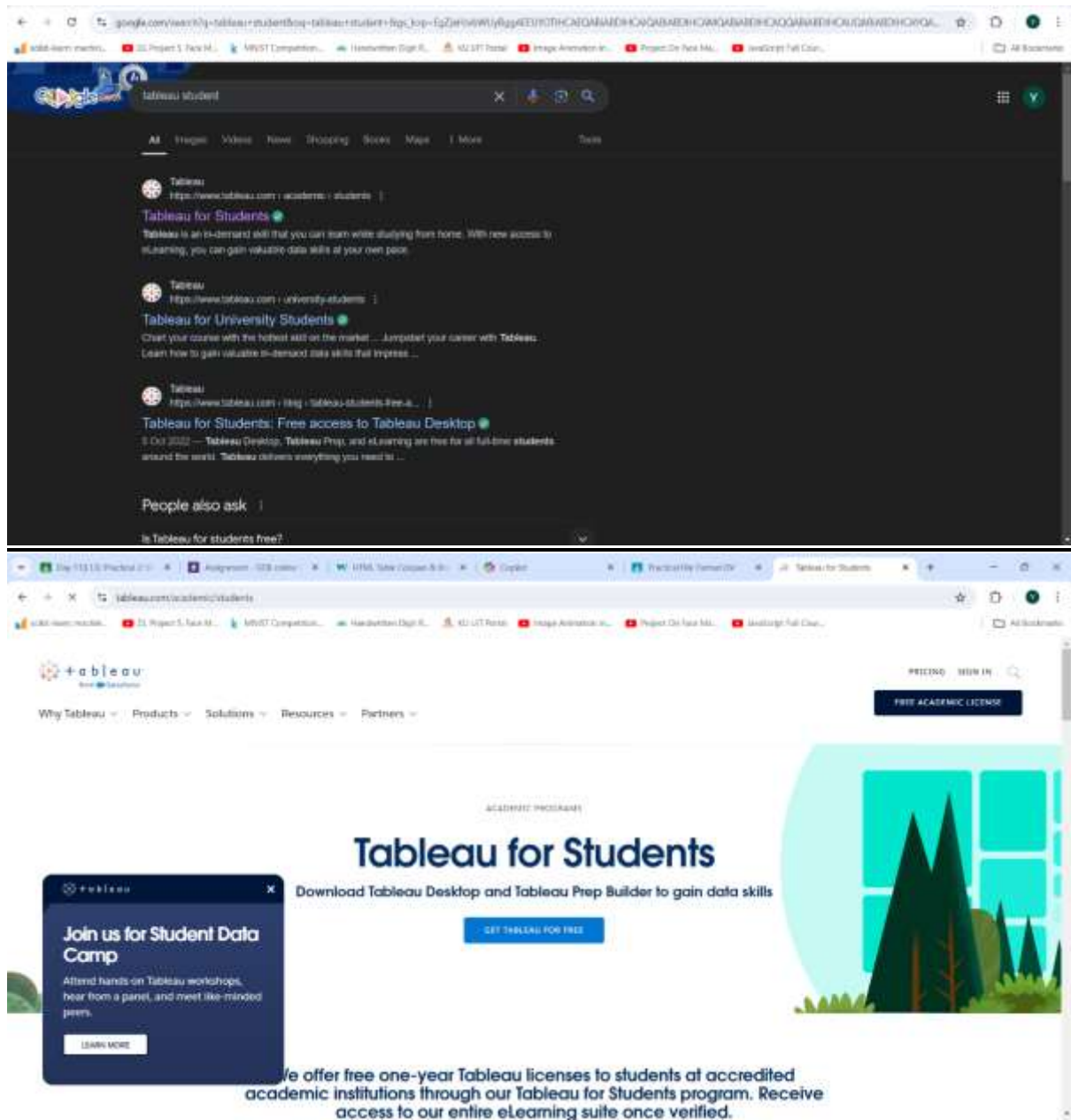
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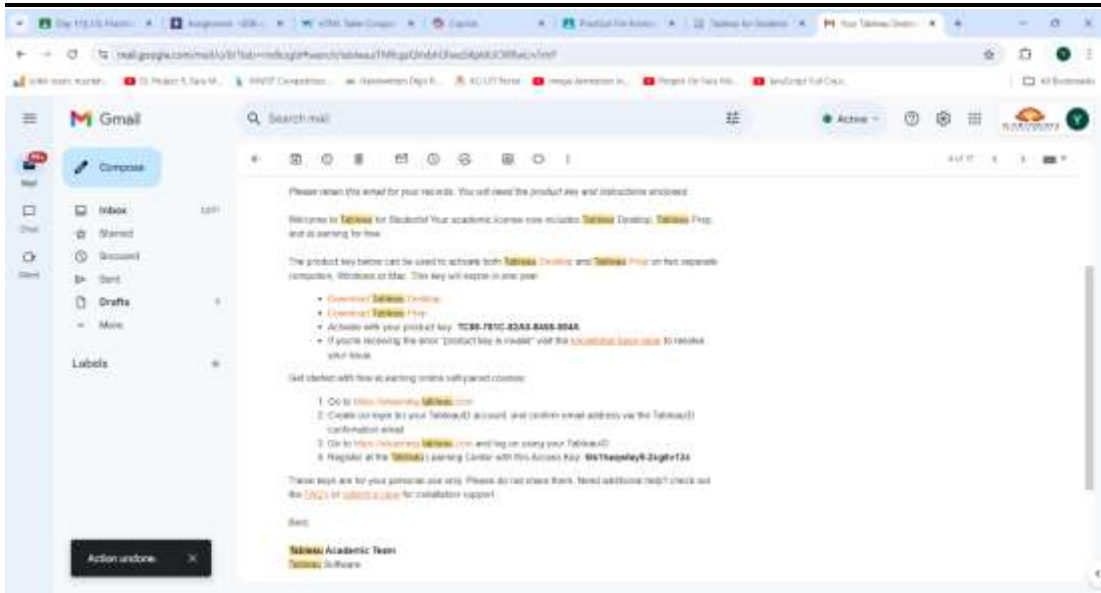
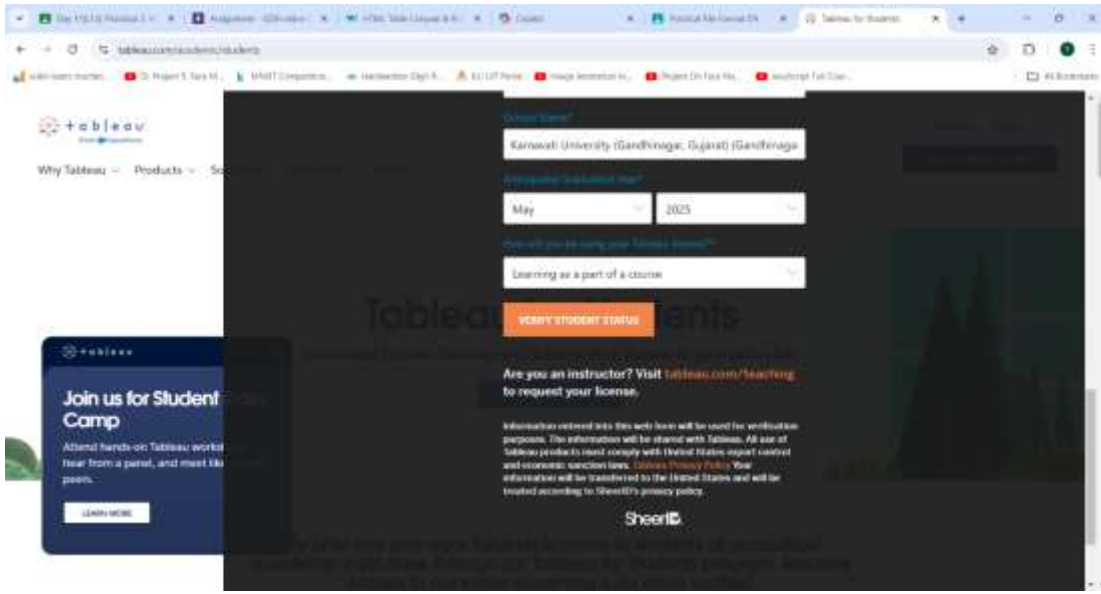
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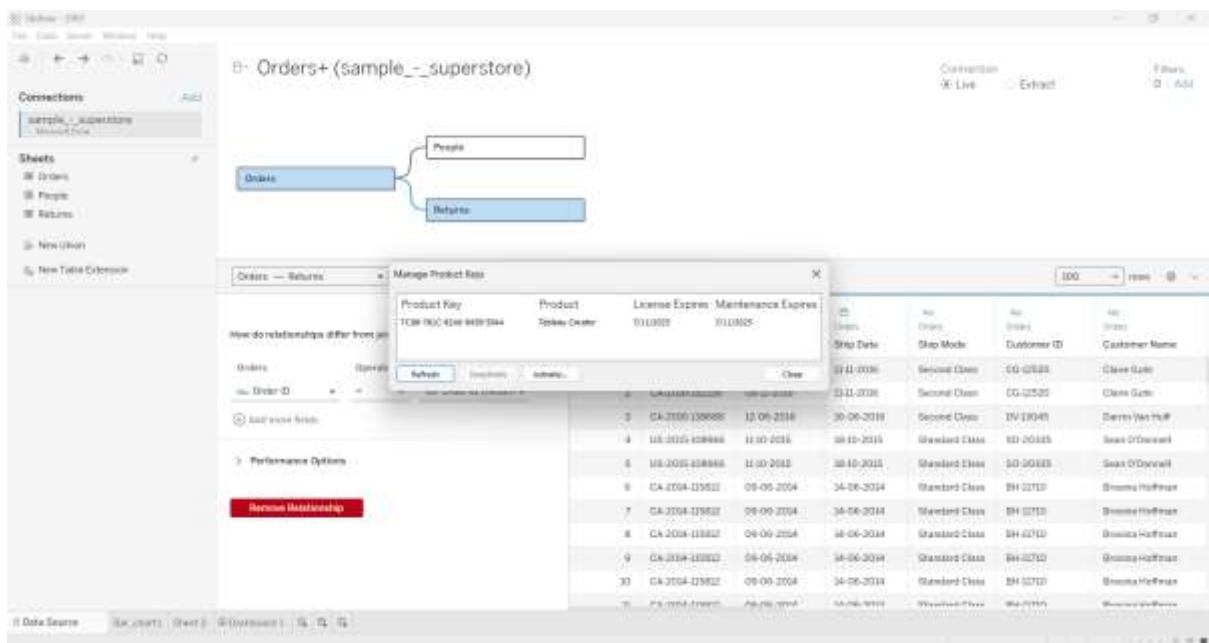
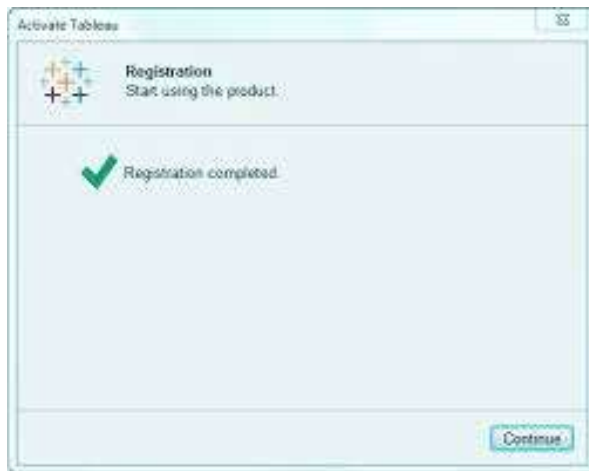
1. To study about various products of Tableau, Create your account, Installing and setting up Tableau.

### Solution:



20220701001





2. To study about Data Connection and Connecting to different data sources in Tableau like try to Import Dataset from 1. Excel 2. PDF 3. Text File etc.

### Solution:

The top screenshot shows the Tableau Desktop 'Connect' pane. It lists various data sources under 'To a File' (Microsoft Excel, Text File, JSON File, Microsoft Access, PDF File, Sybase File, Microsoft File, More...) and 'To a Server' (Microsoft SQL Server, MySQL, Oracle, Amazon Redshift, More...). The 'Quick Start' section offers 'Accelerators' (Salesforce Data Cloud, Budget Dashboard, Ad Spend) and 'Sample Workbooks' (Explore what Tableau can do).

The bottom screenshot shows the 'Orders+ (sample\_-\_superstore)' data source connected. The 'Connections' pane on the left shows 'sample\_-\_superstore' as the selected data source. The 'Tables' pane shows 'Orders' as the selected table. The main view displays a table with the following data:

Name	Category	Sub-Category	Product Name	Sales	Quantity	Discount
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0
Flourish	Flourish	Flourish	Flourish	261,888	2	0

### 3. Import Dataset into Tableau and create relationship between tables.

Tableau - 2022

File Data Server Window Help

Connections: sample\_superstore Microsoft Excel

Sheets: Orders, People, Returns, New Union, New Table Extension

Orders+ (sample\_superstore)

Relationship: Orders — People

How do relationships differ from joins? Learn more

Orders Operator People

all Region all Region (People)

Add more fields

Performance Options

Remove Relationship

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name
1	CA-2016-152256	08-16-2016	11-11-2016	Second Class	CG-12525	Clara Galt
2	CA-2016-152256	08-16-2016	11-11-2016	Second Class	CG-12525	Clara Galt
3	CA-2016-139088	12-06-2016	30-06-2016	Second Class	IV-19041	Terri Van Hout
4	US-2015-128866	11-30-2015	08-10-2015	Standard Class	SD-20165	Sean O'Donnell
5	US-2015-128866	11-30-2015	08-10-2015	Standard Class	SD-20165	Sean O'Donnell
6	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman
7	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman
8	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman
9	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman
10	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman
11	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman

Tableau - 2022

File Data Server Window Help

Connections: sample\_superstore Microsoft Excel

Sheets: Orders, People, Returns, New Union, New Table Extension

Orders+ (sample\_superstore)

Relationship: Orders — Returns

How do relationships differ from joins? Learn more

Orders Operator Returns

all Order ID all Order ID (Returns)

Add more fields

Performance Options

Remove Relationship

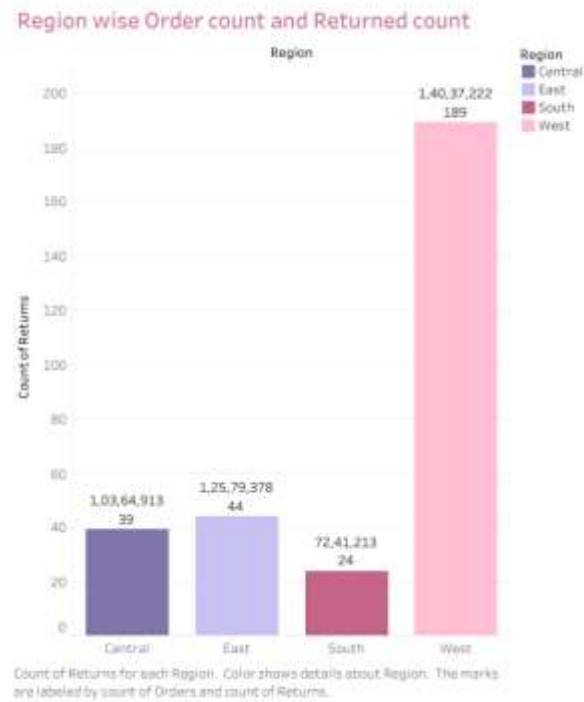
Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name
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11	CA-2014-119512	09-06-2014	24-06-2014	Standard Class	BH-12710	Bonnie Hoffman



#### 4. Creating a basic bar chart to visualize sales data.

Steps:

1. Select Region and Order(count) field.
2. Select Returned(count) field.
3. Select bar graph to represent.

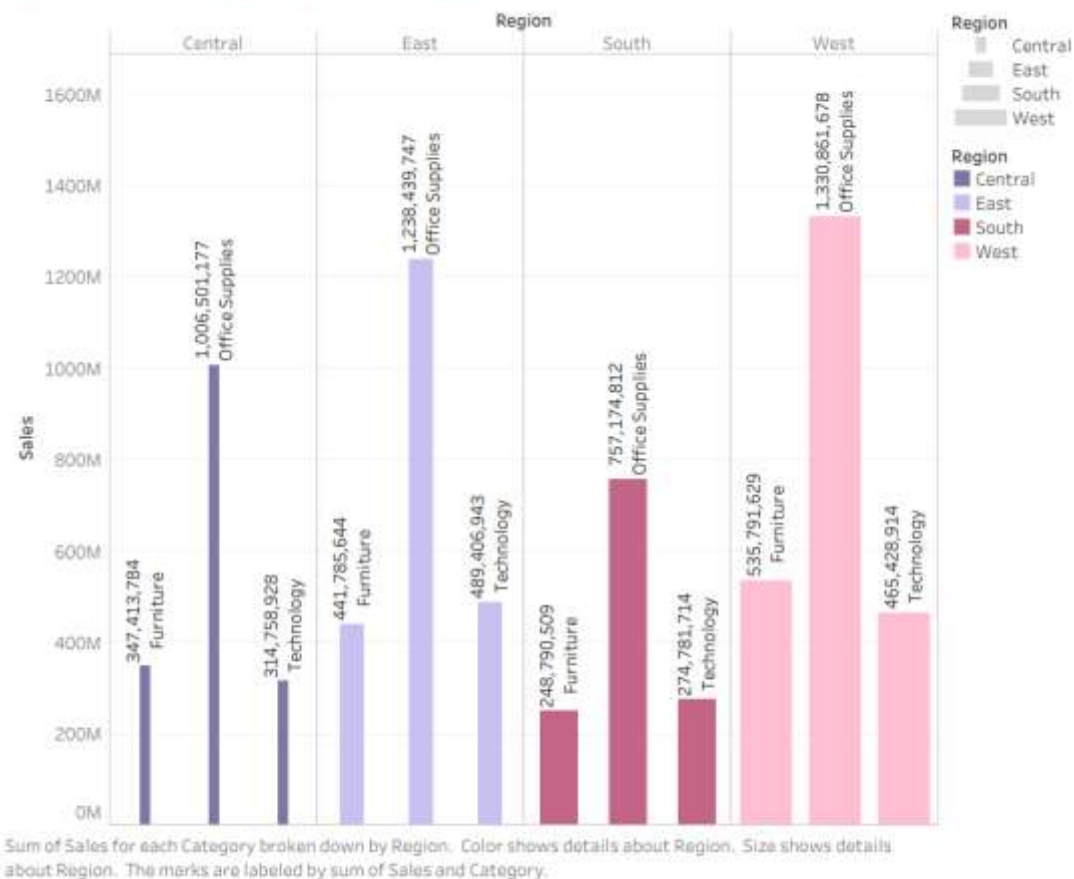


## 5. Customizing the bar chart by adding labels and tooltips.

Steps:

1. Select Region and Category columns.
2. Select Sales.
3. Select a bar graph for showing sales according to category wise region.
4. And add region and category to label field.

### Region wise Category with its Sales

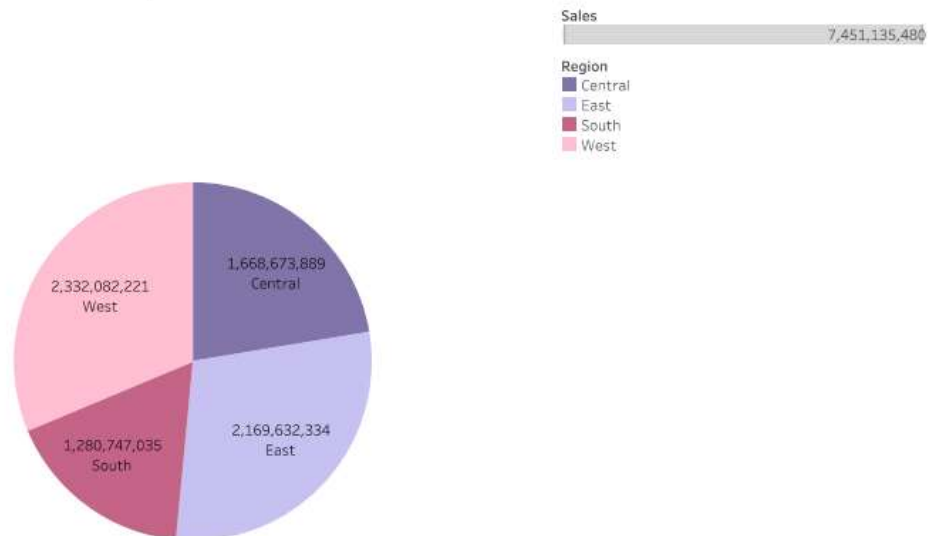


## 6. Create a Pie Chart for Sales Data and customize it using color scheme, Label, size.

Steps:

1. Select Region and Sales Fields.
2. Select a pie chart to represent it.
3. Also add Sales and Region to label field.

Regional Sales Comparison



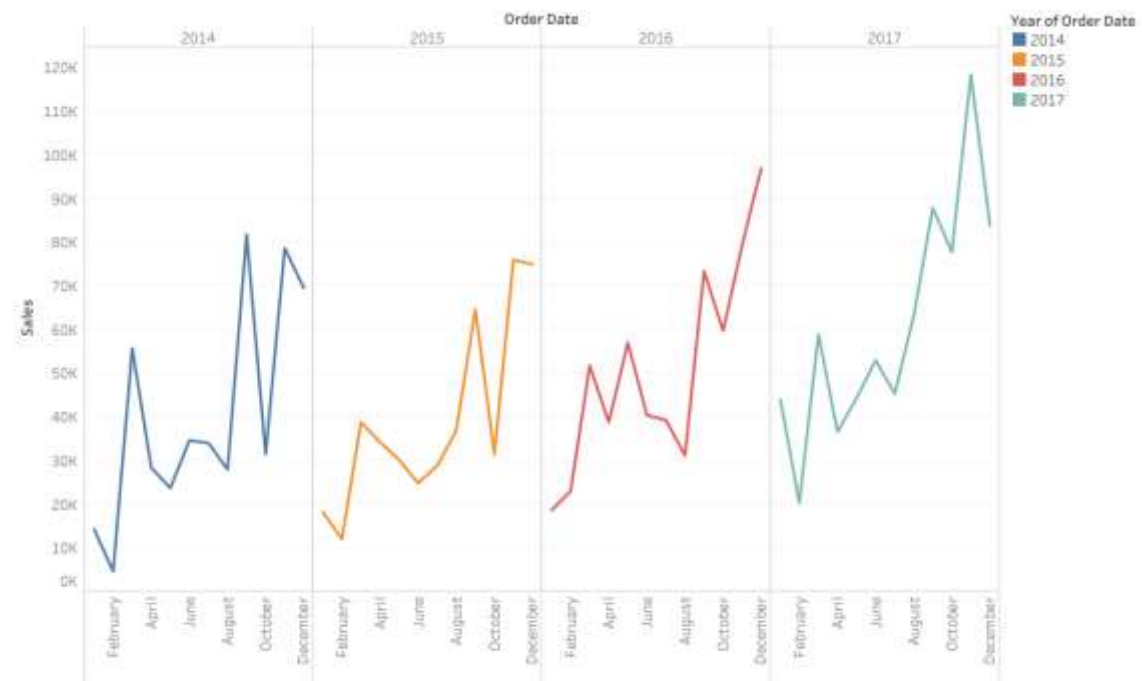
Sum of Sales and Region. Color shows details about Region. Size shows sum of Sales. The marks are labeled by sum of Sales and Region.

## 7. Creating a line chart to analyse sales trends over time.

Steps:

1. Select Year field.
2. Select Sales field and monthly data.
3. Select line chart to represent it.

Sales trend over Time

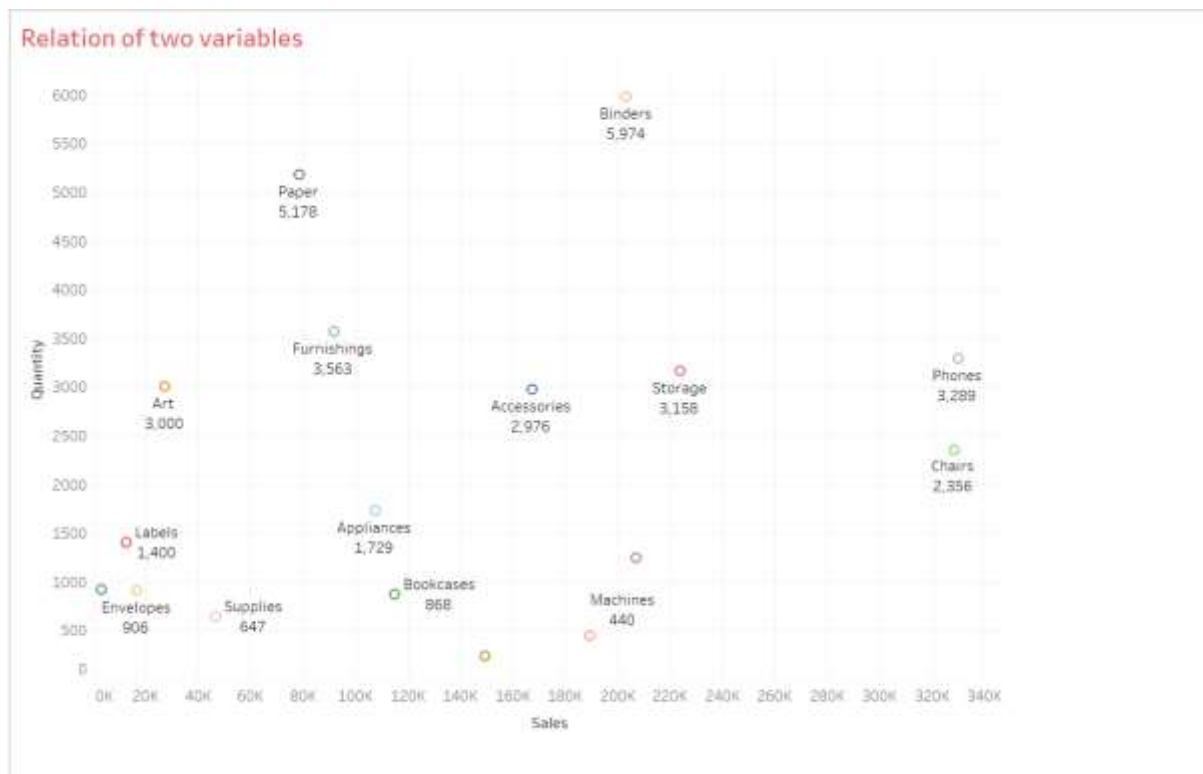


The trend of sum of Sales for Order Date Month broken down by Order Date Year. Color shows details about Order Date Year.

## 8. Building a scatter plot to explore the relationship between two variables.

Steps:

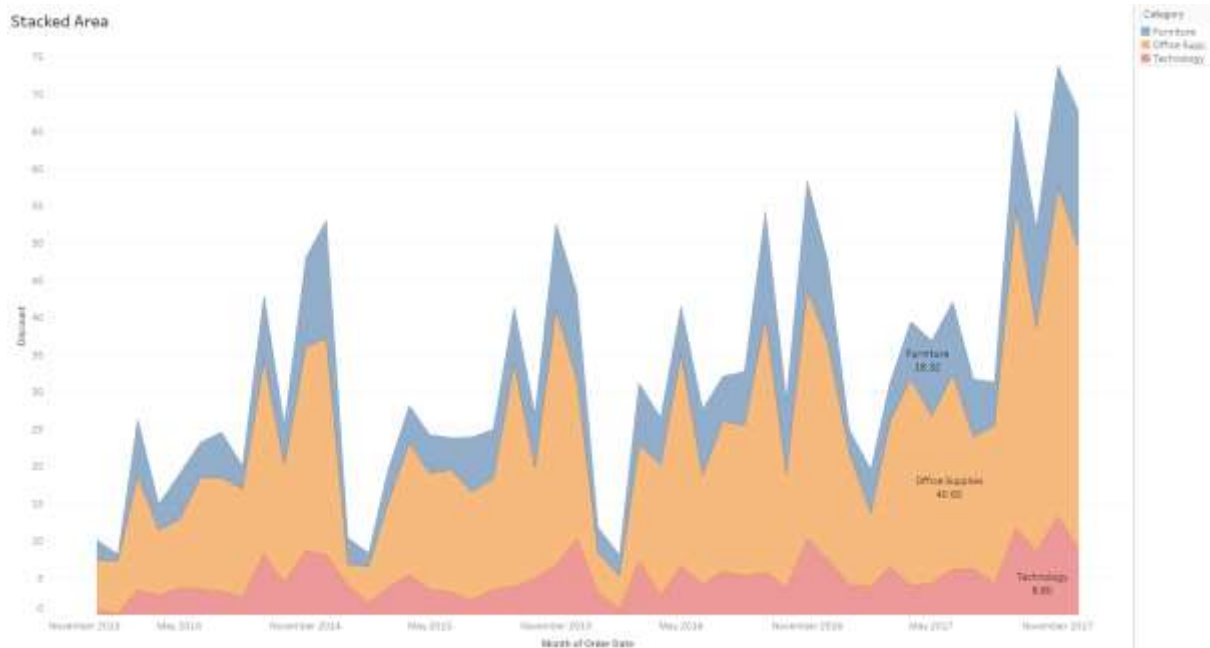
1. Select Sub category.
2. Select Sales and Quantity.
3. Select Sales and Sub category for labelling.



## 9. Creating a stacked area chart to analyze Sales Data.

Steps:

1. Select Category field.
2. Select data of month and discount field.
3. Select Stacked area chart and label with category and discount.

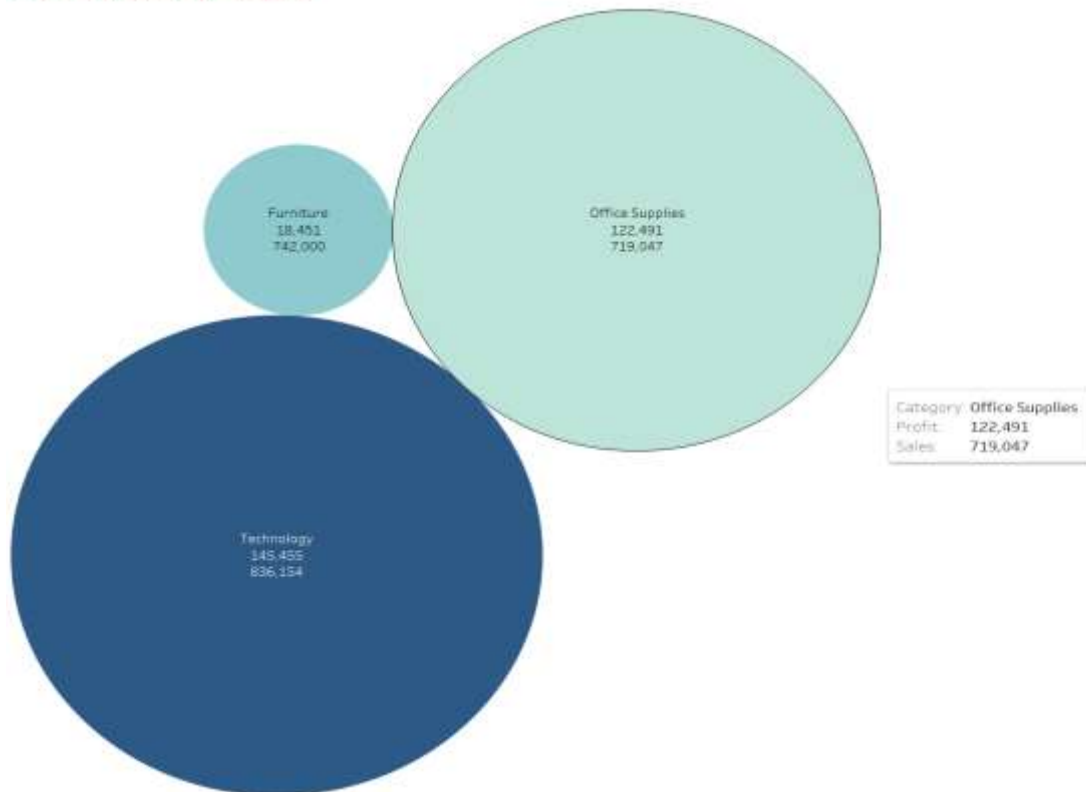


## 10. Visualizing categorical data using a bubble chart.

Steps:

1. Select category field.
2. Select Profit and Sales fields.
3. Select Profit, Sales and category for label.

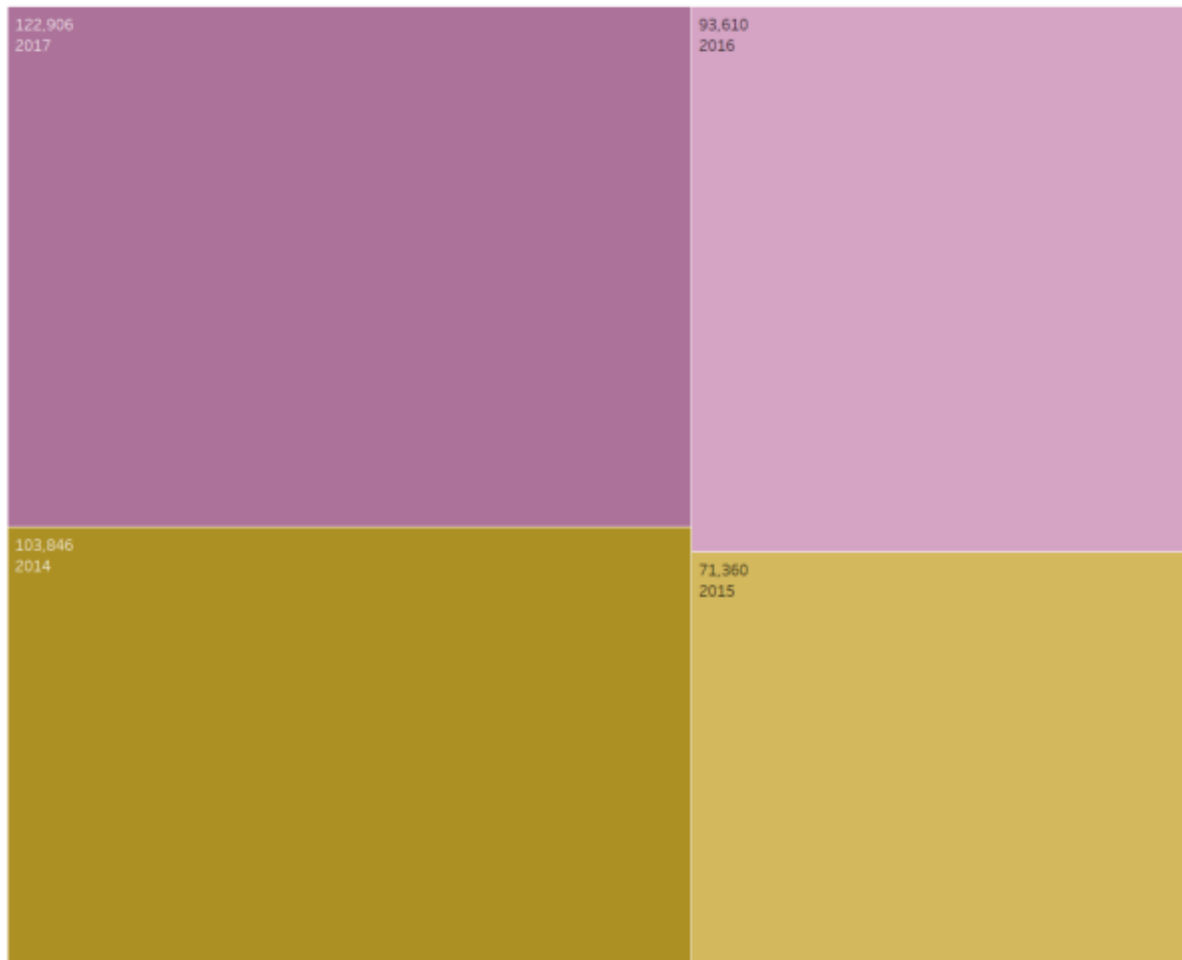
Profit and Sales By Category



11. Creating a Tree map using Tableau and working with data, filter, sorting.  
Steps:

1. Select Year field and Sales field.
2. Sorted it according to highest sales values.
3. Label it with Year and Sales field.

Treemap of Sales By Year

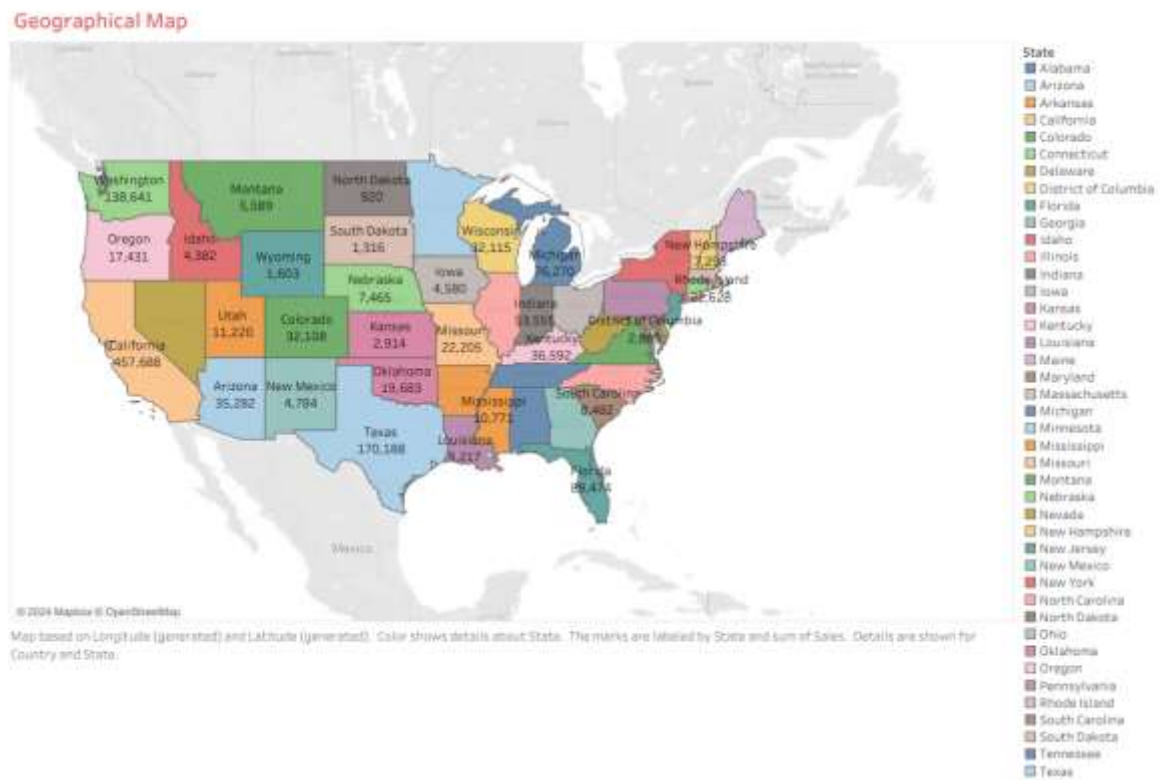




## 12. Create a geographic Map using Tableau and highlights all relevant states/Cities with label.

Steps:

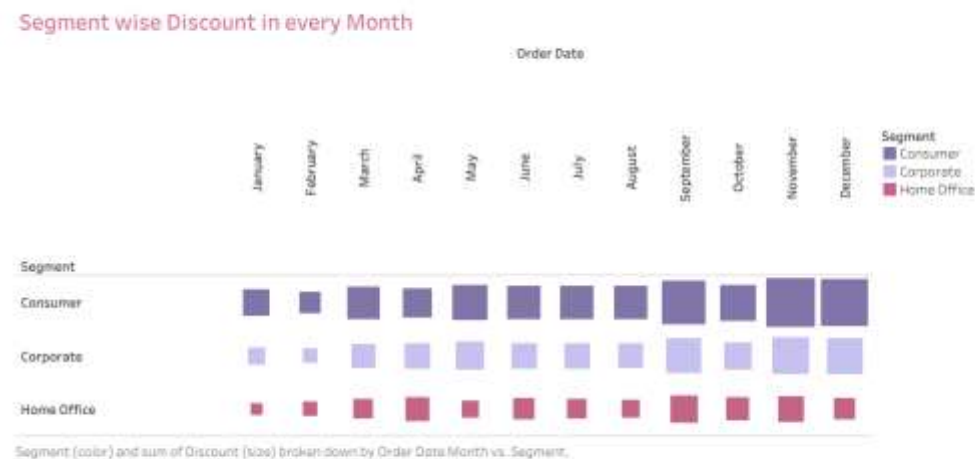
1. Select Country field and State field.
2. Select State field for label and colour.
3. Select Discount field for label.



### 13. Creating a heat map to identify patterns or correlations in data.

Steps:

1. Select Segment field.
2. Select Discount field and Date field for month wise data.
3. Select Segment For color.

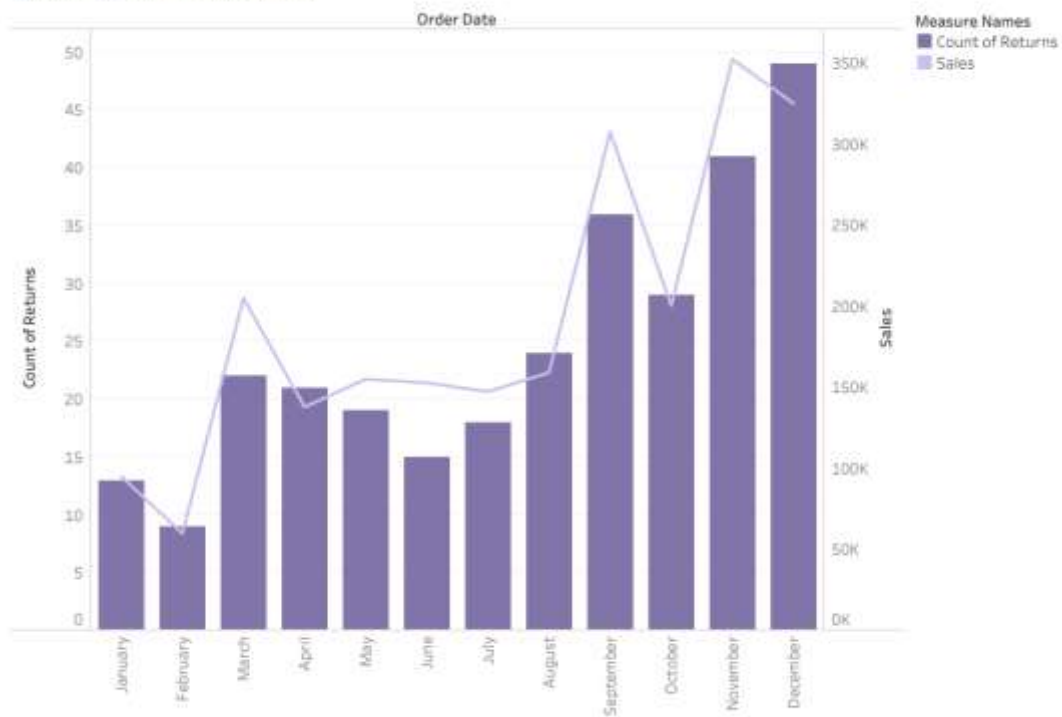


### 14. Implementing dual-axis charts to compare two metrics with different scales

Steps:

1. Select Count of returns and sum of sales.
2. Select date for month.
3. Create dual-axis chart for this .

### Monthly Sales vs Returns



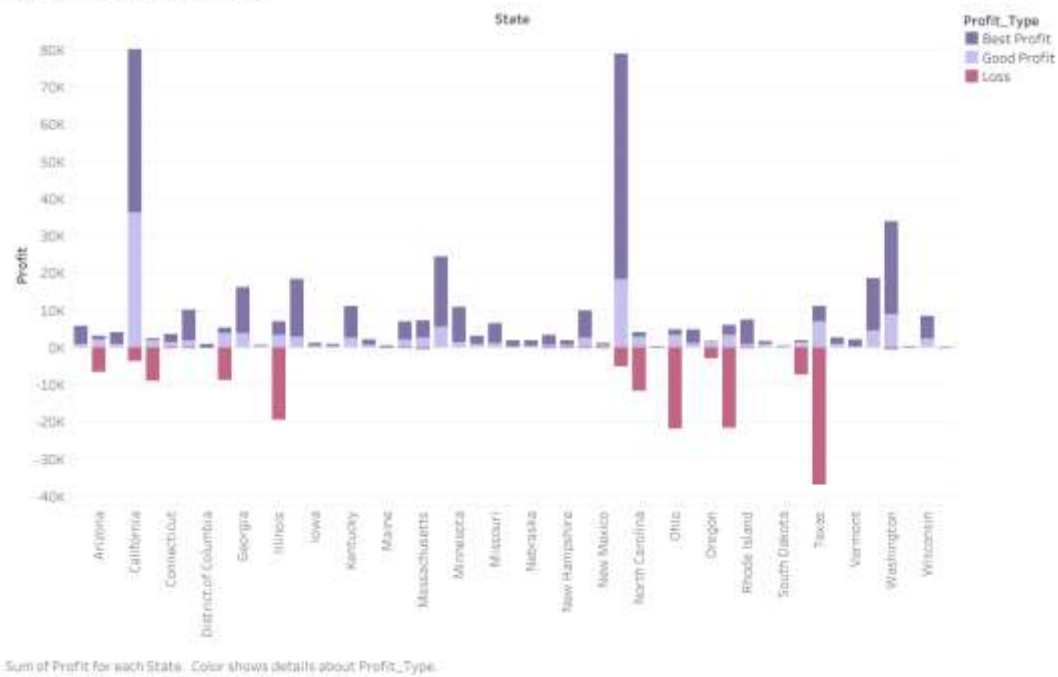
The trends of count of Returns and Sales for Order Date Month. Color shows details about count of Returns and Sales.

## 15. Applying advanced calculations and functions for customized metrics.

### Steps:

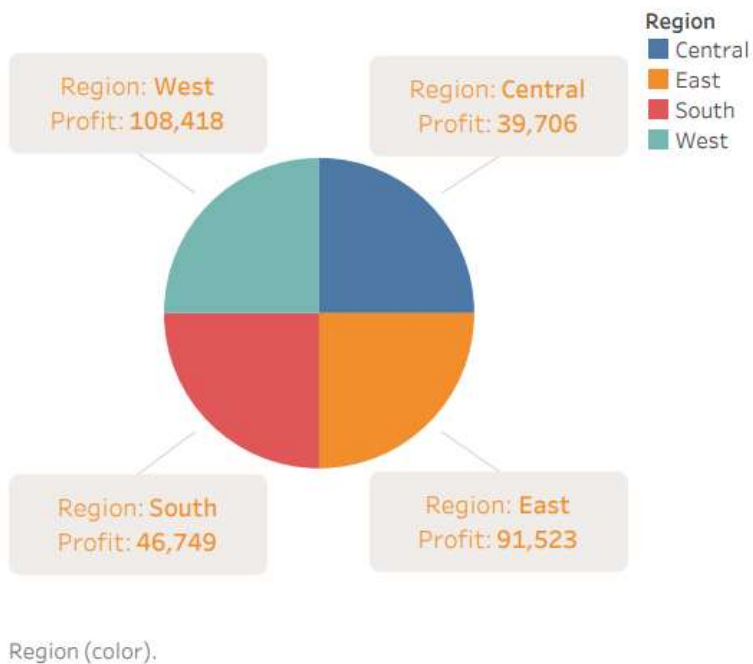
1. Create a calculated field of profit type (Loss, Good Profit and Best Profit).
2. Now select this field and states to visualize the profit type state-wise.
3. Rotate label for more good visualization.

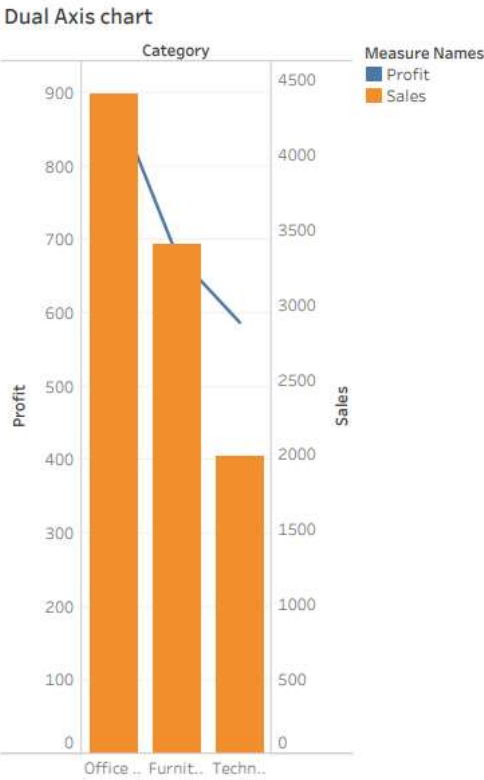
State wise Profit Status



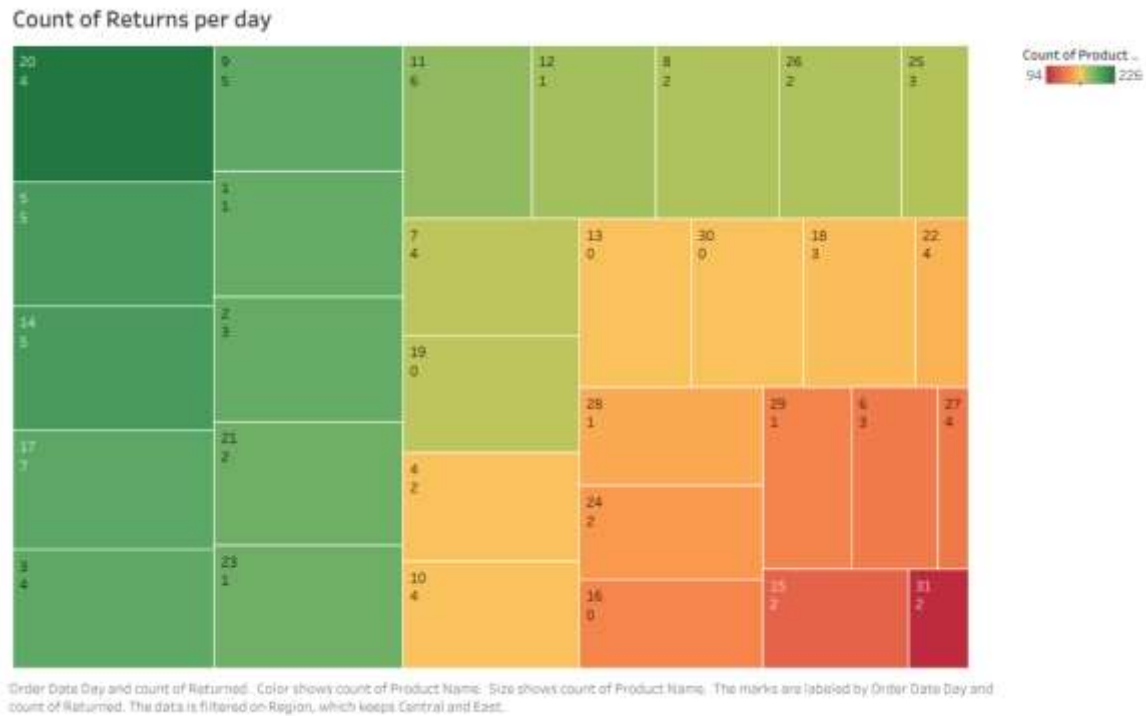
16. Create minimum six worksheets for data visualization in Tableau using Sales Dataset.

Region wise Quantity

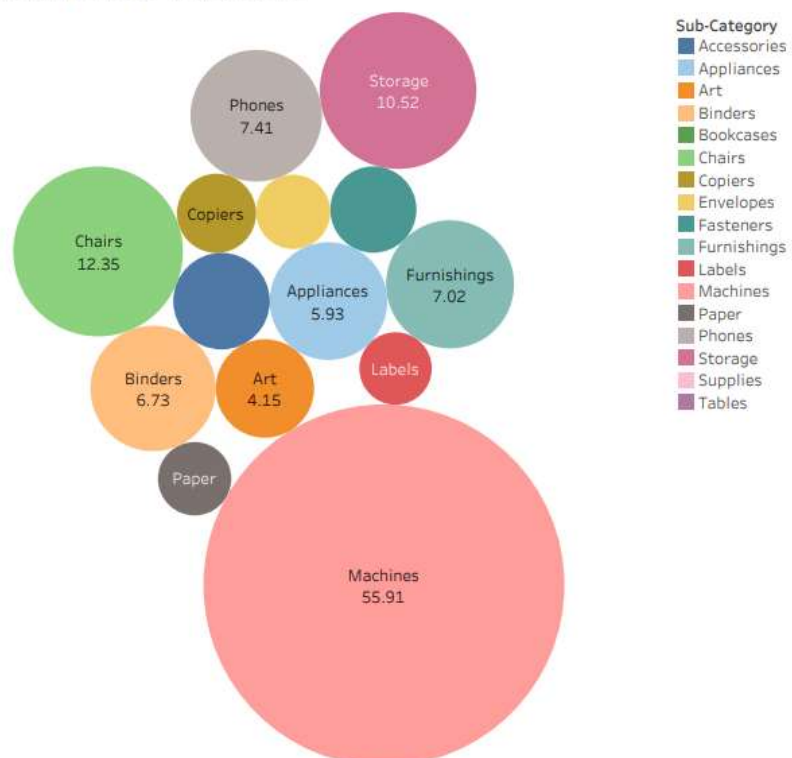




The trends of Profit and Sales for Category. Color shows details about Profit and Sales. The data is filtered on State, which keeps South Carolina and South Dakota.

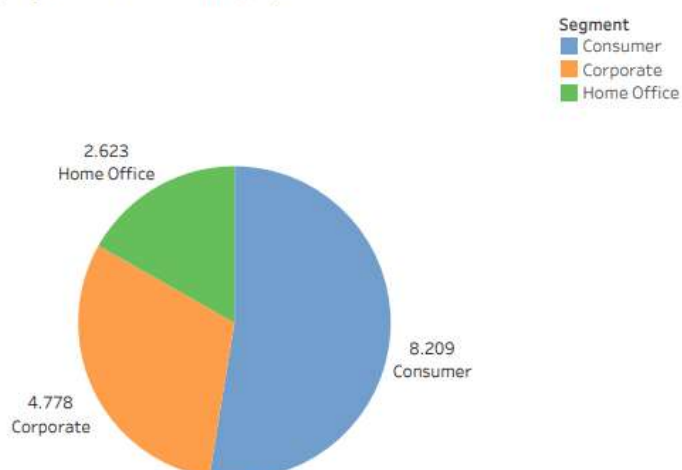


### Sub-category wise Profit\_ratio

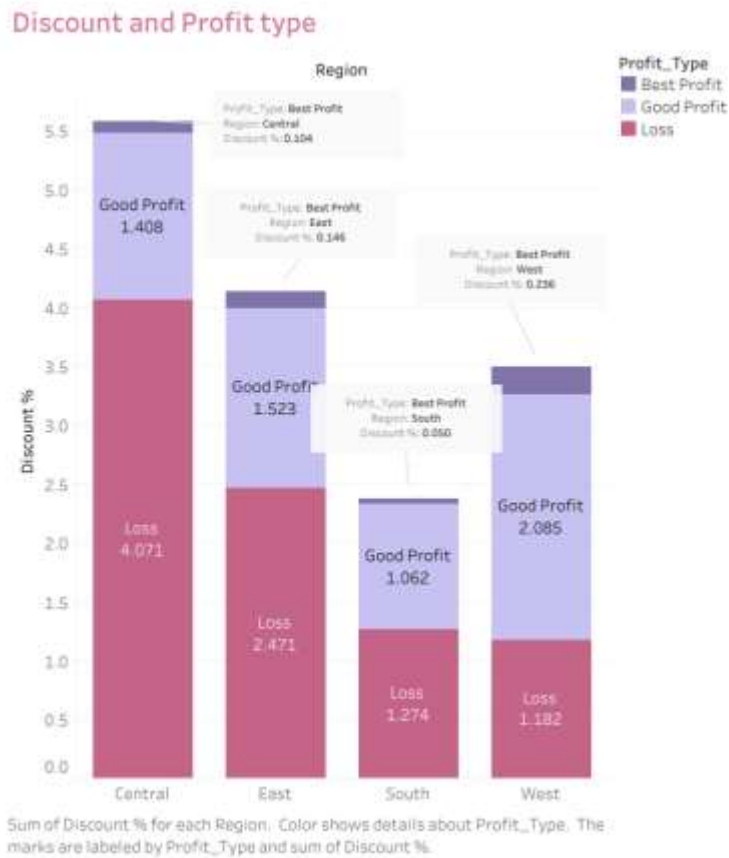


Sub-Category and Profit\_ratio. Color shows details about Sub-Category. Size shows Profit\_ratio. The marks are labeled by Sub-Category and Profit\_ratio.

### Category wise Discount(%)

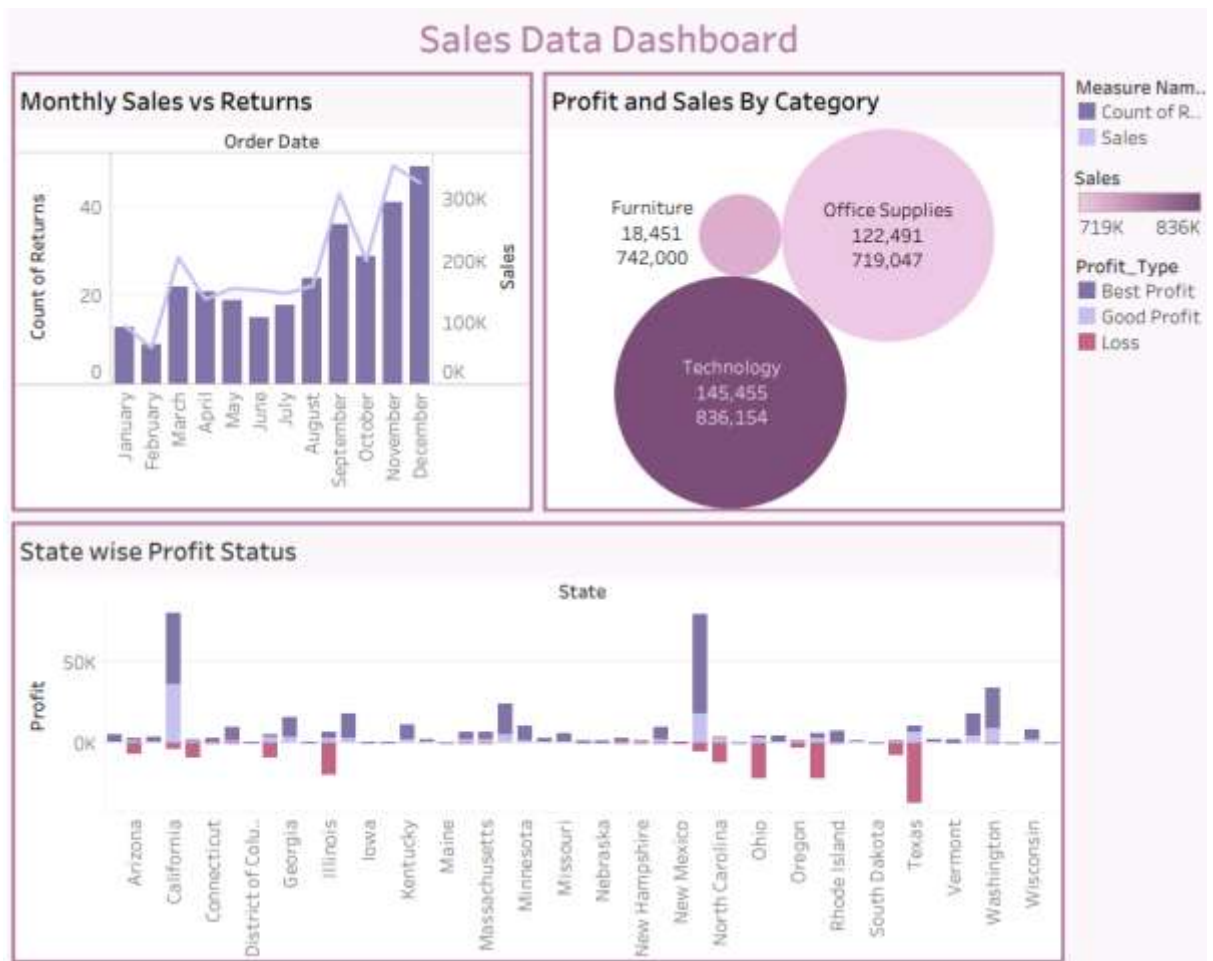


Sum of Discount % and Segment. Color shows details about Segment. The marks are labeled by sum of Discount % and Segment.



## 17.Designing a comprehensive dashboard with multiple visualizations for Sale Dataset.

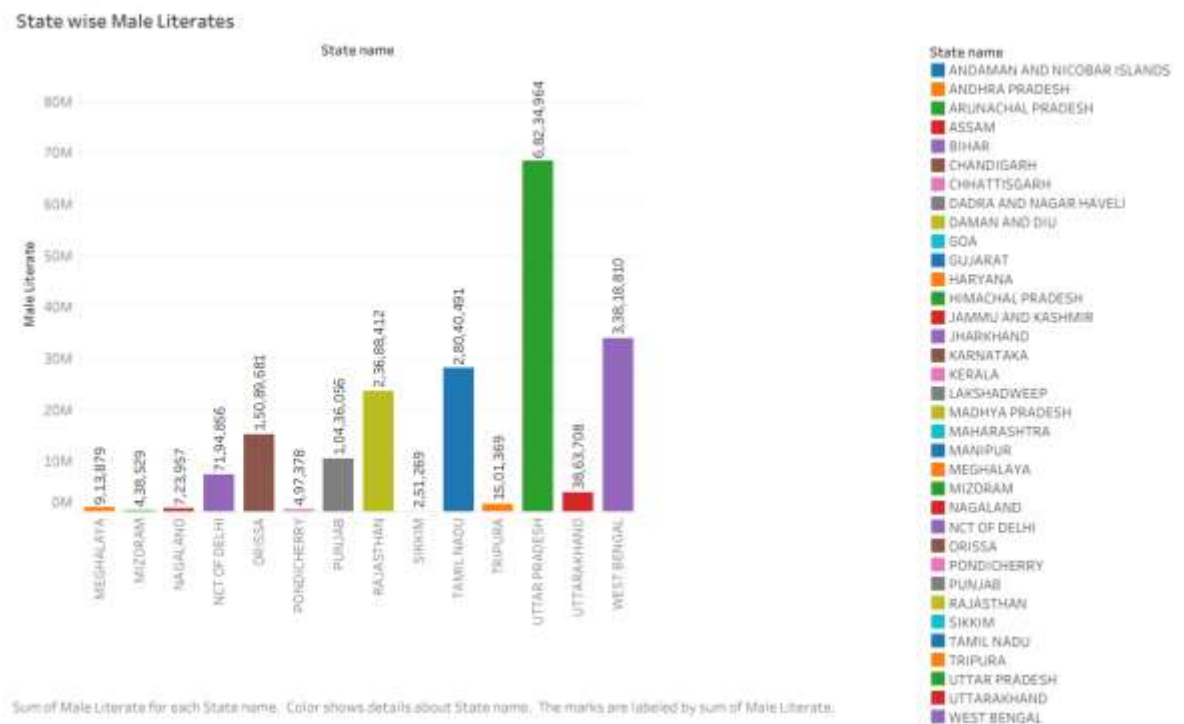
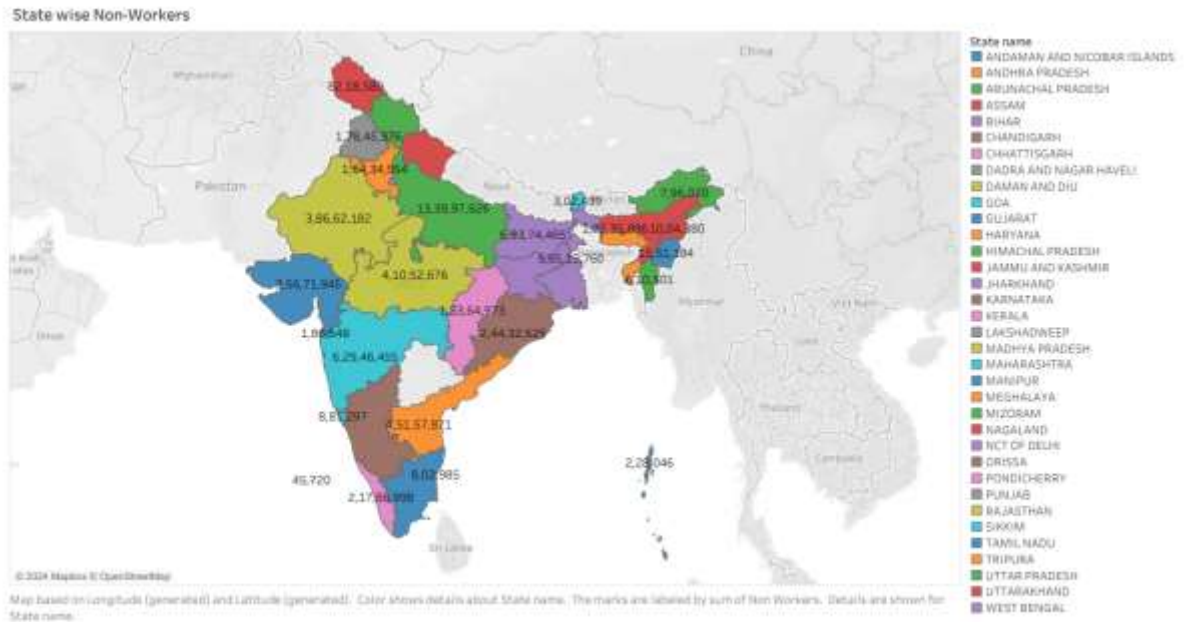
- 1.On the bottom right you have a option of dashboard creation.
- 2.Create this and drag sheets there
- 3.Create and edit the dashboard according to your needs.



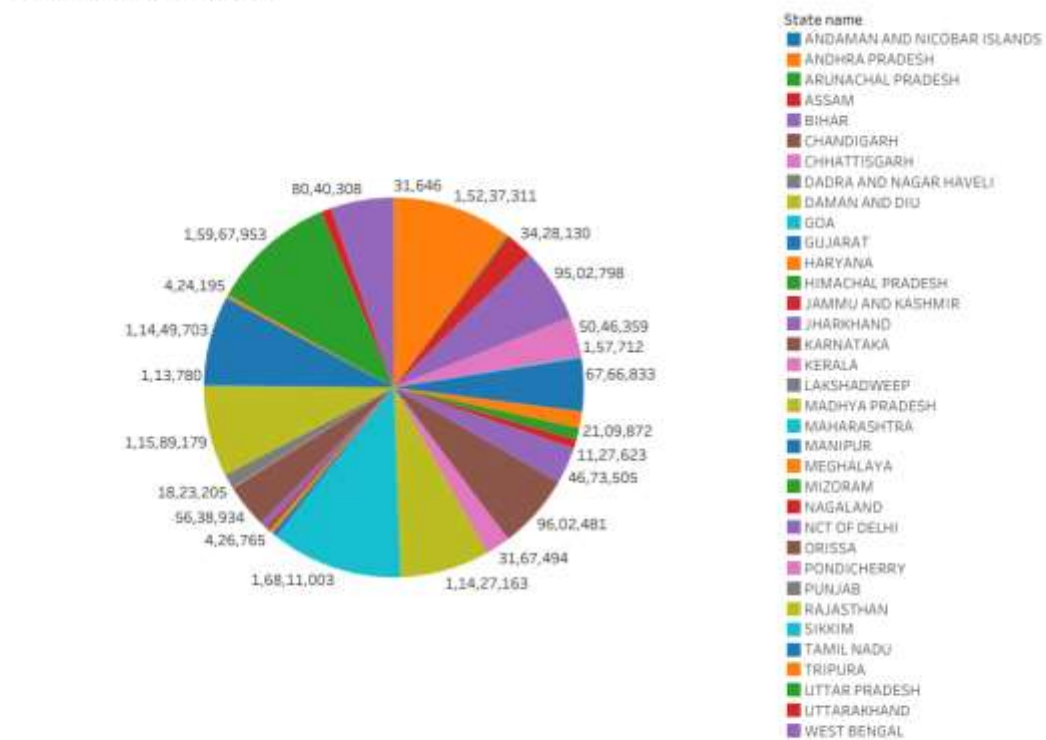


18. Prepare a census dataset (data must be actual as per Gov portal), generate maps geographical, Bar Chart, Pie Chart, Bubble Chart visualization using Tableau and Create a Complete Dashboard.

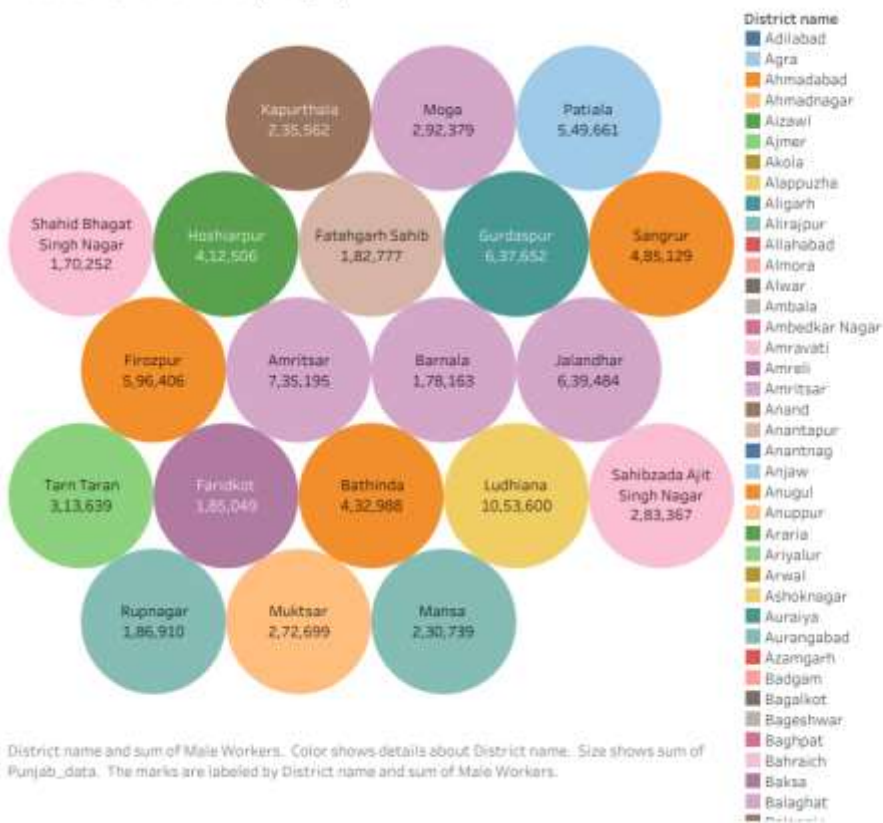
Same as above charts, use the steps and different fields for different visualization.



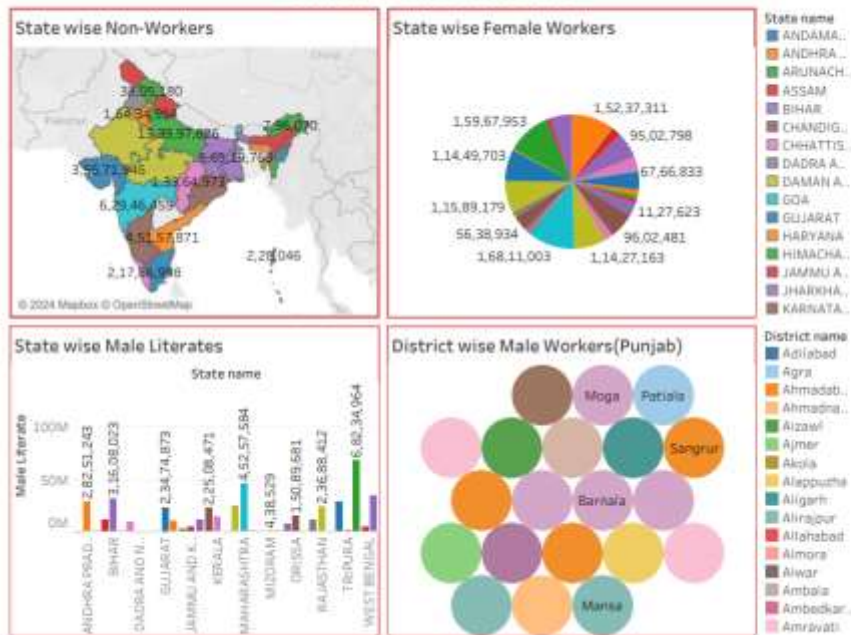
State wise Female Workers



District wise Male Workers(Punjab)



### Census Data Dashboard



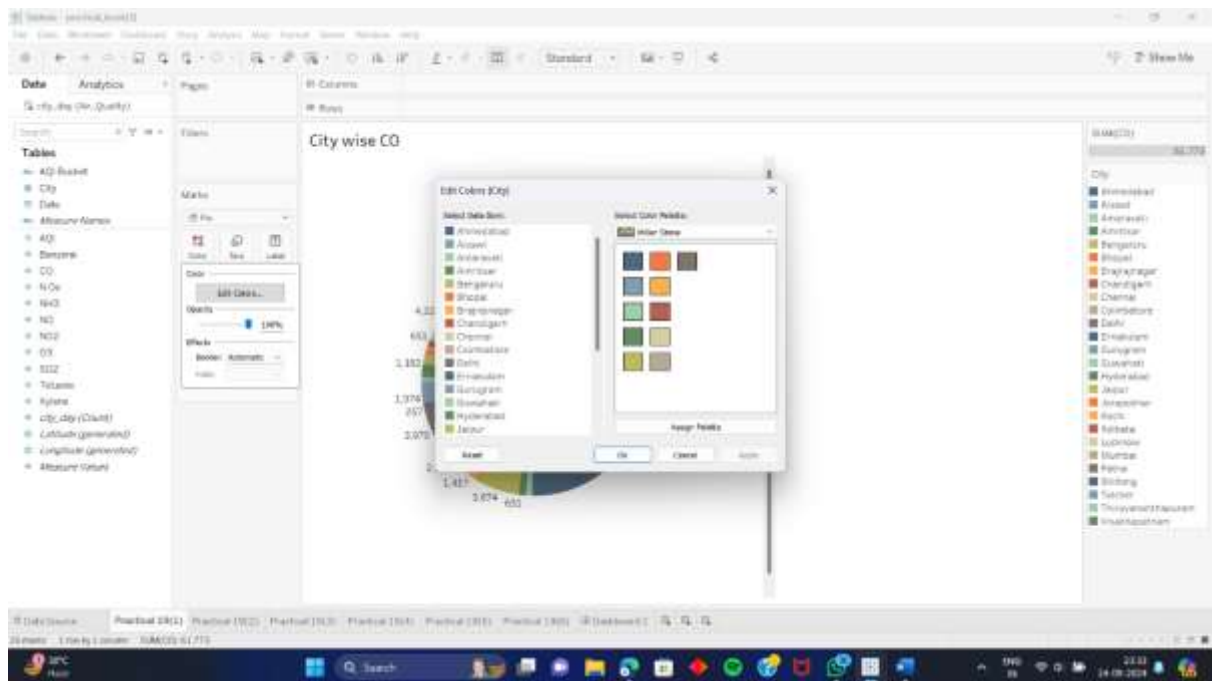
19.Prepare a City wise Air Quality Index dataset and generate visualization using Tableau. Try to use maximum functions available in Tableau

## 1. Color

## Open a new worksheet

Create a pie chart for the city wise CO percentage

And put the 'City' field in the color category

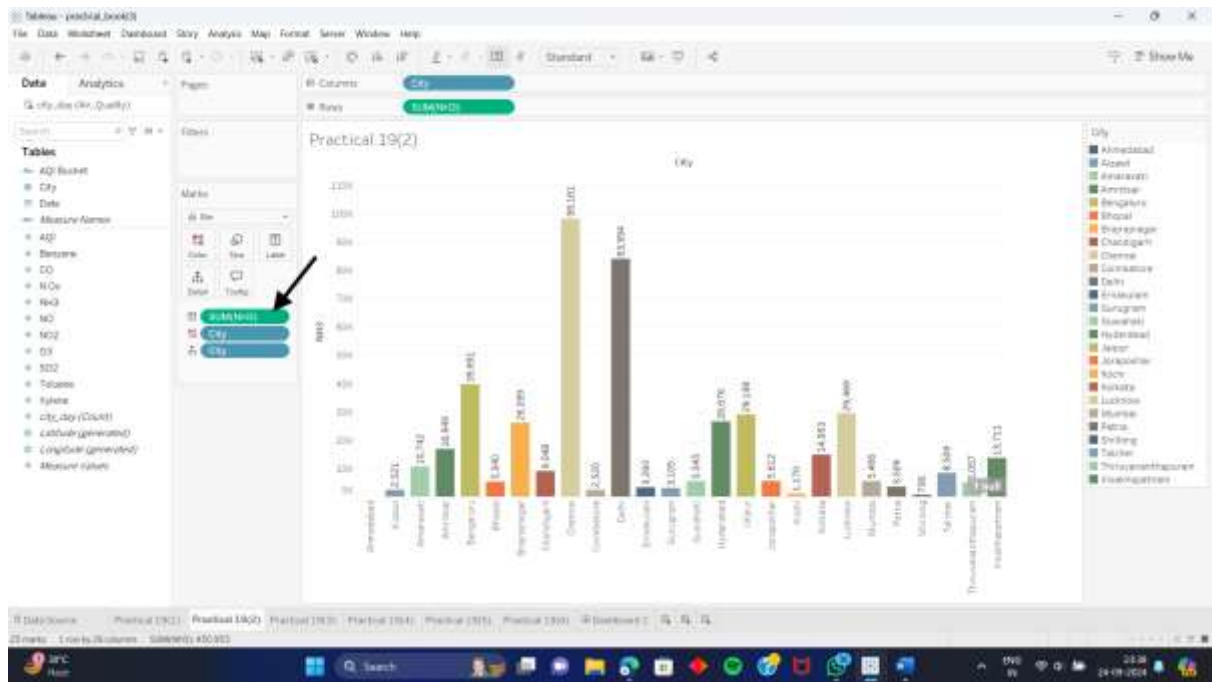


## 2. Label

Open a new worksheet.

Create a bar chart for the city wise NH3 percentage.

And put the 'NH3 field in the label category.

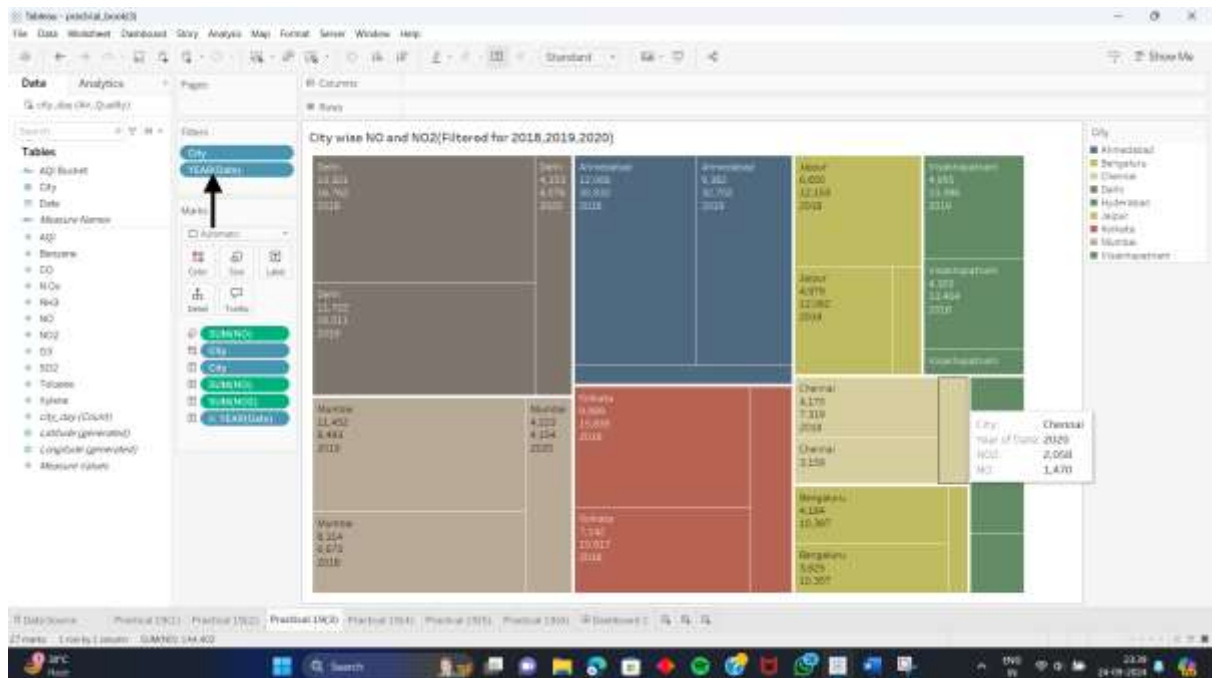


### 3. Filter

Open a new worksheet.

Create a bar chart for the city wise NH3 percentage.

And put the 'NH3' field in the label category.

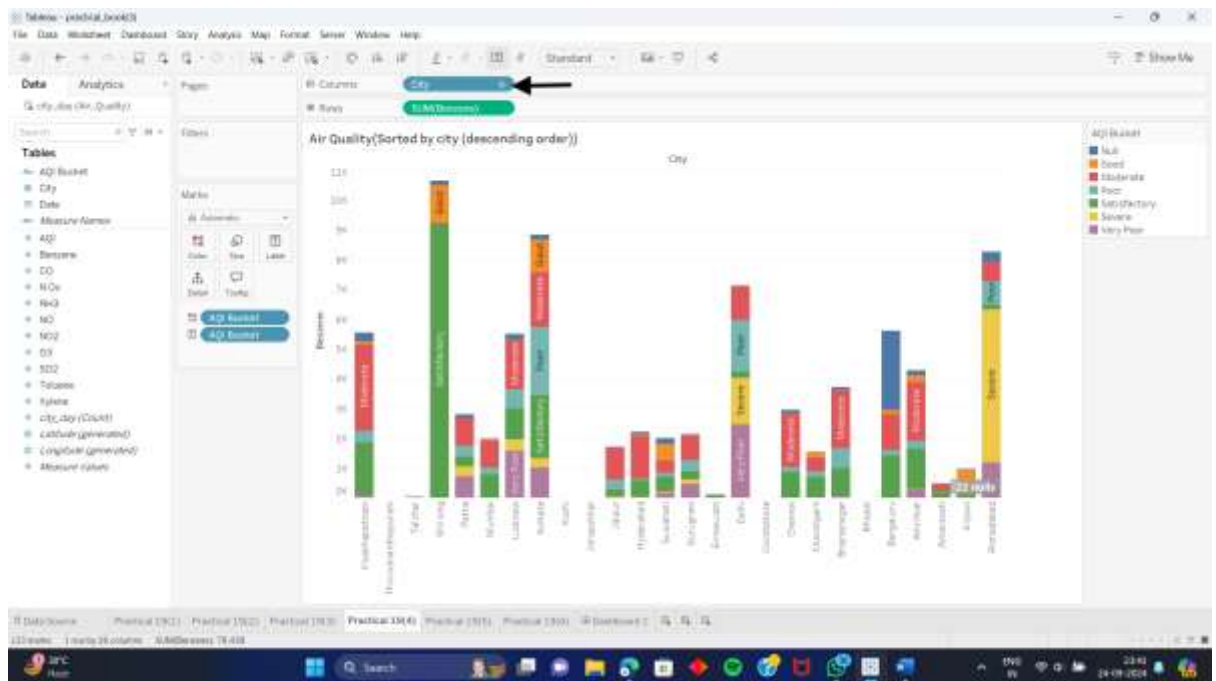


### 4. Sorting

Open a new worksheet.

Create a bar chart for the city wise benzene percentage and AQI Bucket.

And sort the 'city' field in descending order .

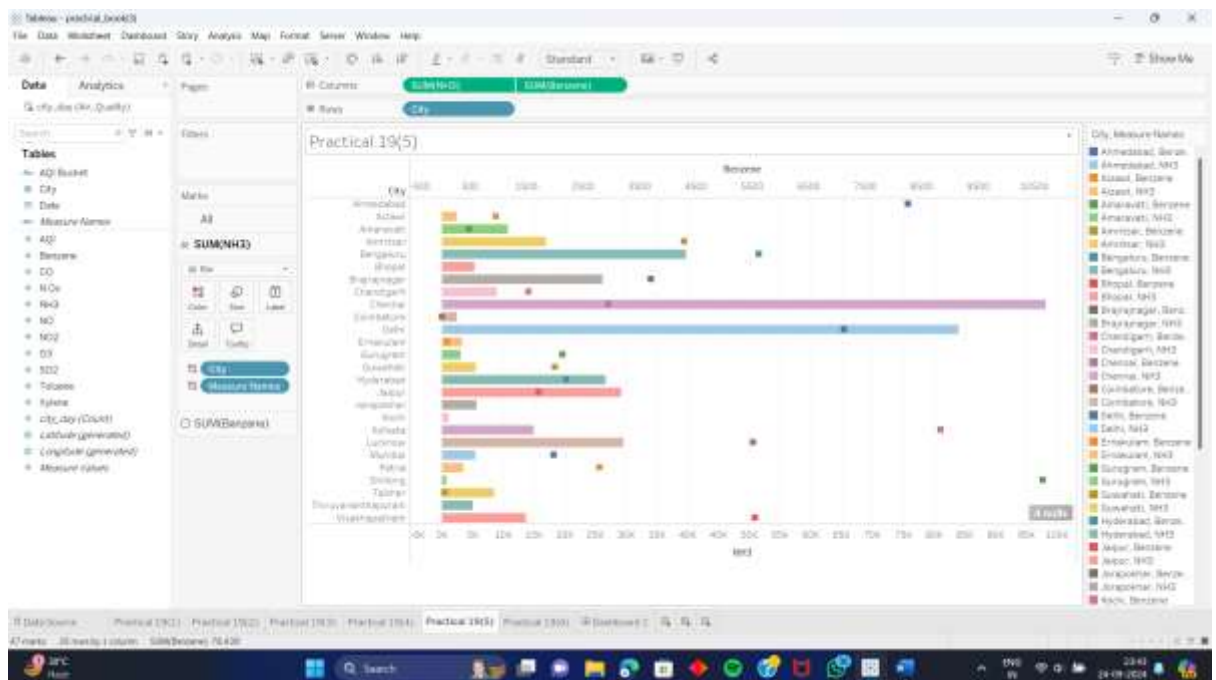
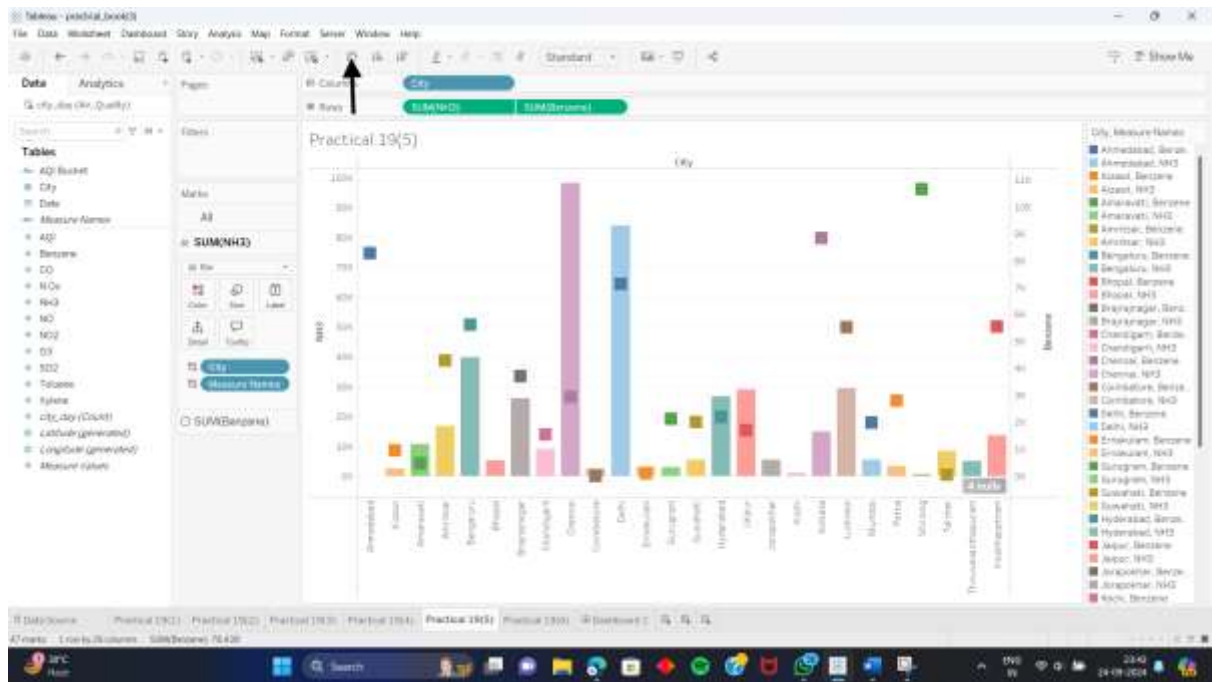


## 5. Swap Row Cloumn

Open a new Worksheet

Add fields to Columns and Rows and then click the button as shown in the picture as follows for swapping the row and column.





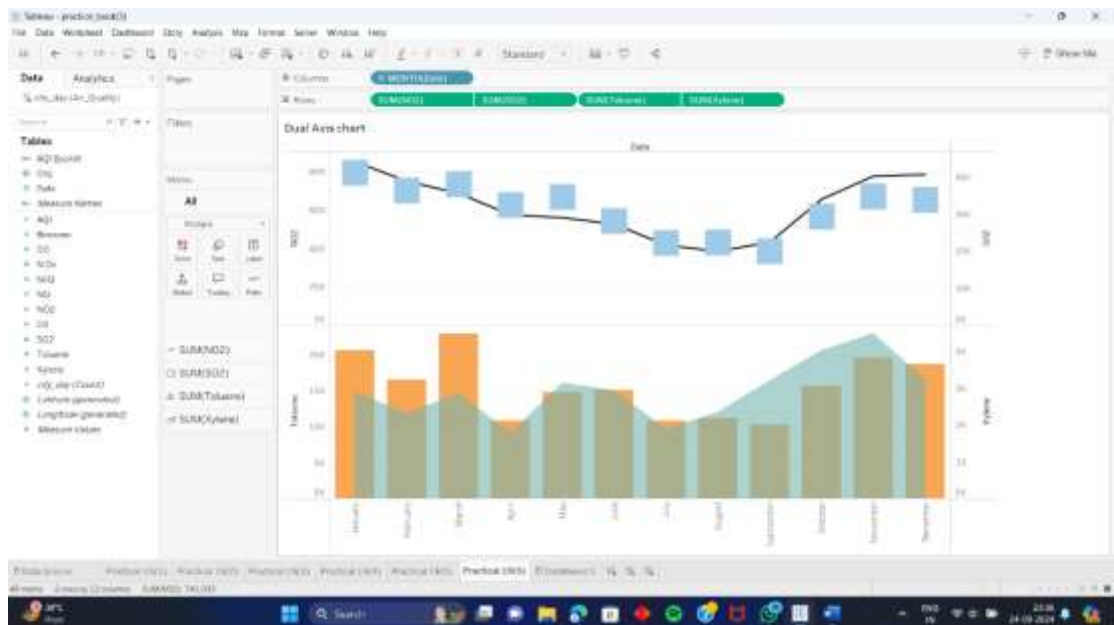
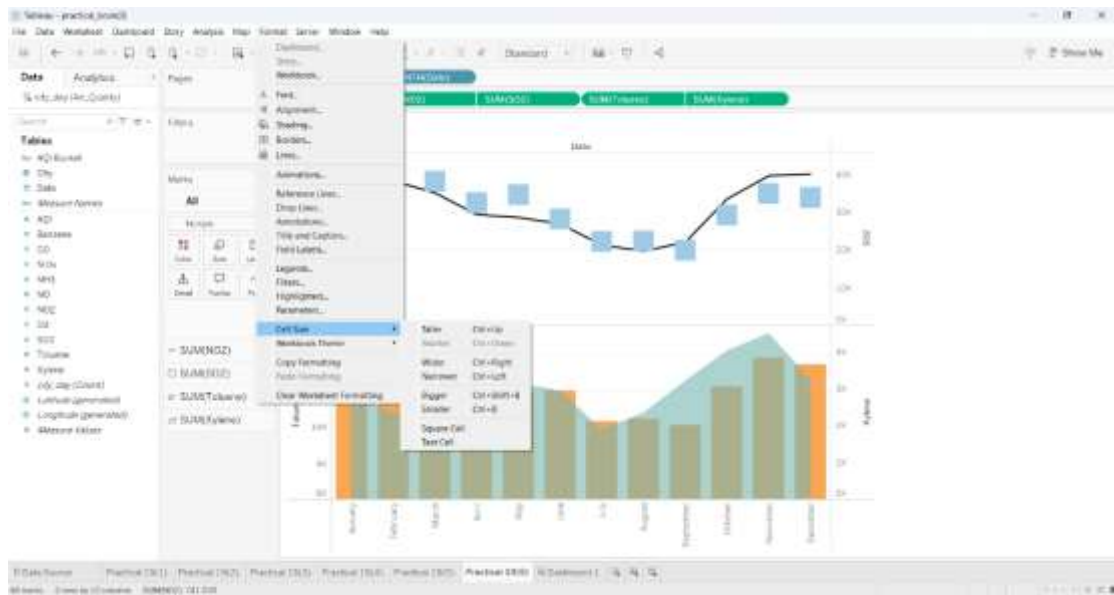
## 6. Size of objects.

Open a new Worksheet.

Add Fields and create a chart.

Now go to format and click on cell size.

For changing the different sizes of the chart.





## 20. Create a Dashboard for AQI Visualizations.

1. On the bottom right you have a option of dashboard creation.
2. Create this and drag sheets there
3. Create and edit the dashboard according to your needs.



## 21. Apply BG Color, Float, Add filter, Add links/Image, Add Download button, Add navigations, on your AQI Dashboard.

### Enhancing an AQI Dashboard with Additional Features

Open your AQI dashboard in Tableau.

Apply a background color:

Click on the dashboard area and select the "Format" pane.

Choose "Shading" to pick a background color.

Add floating elements:

Go to the "Objects" panel and select "Floating".

Drag elements like text boxes, images, or web objects onto the dashboard.

Add filters:

Click on the chart that you want to filter.

Select "Filter" and choose the field for filtering.

Add a download button:

Go to the "Dashboard" menu and select "Actions".

Choose "Export" as the action type and configure the download options.

Include navigation links/images:

Use text objects with hyperlinks for navigation or add images with link properties.



## 22. Creating a data story on census dataset using Tableau's story features.

### Creating a Data Story on a Census Dataset Using Story Features

Prepare your worksheets:

- Ensure you have various visualizations of the census dataset ready.

Open Tableau's story feature:

- Click "New Story" from the Tableau workspace.

Add story points:

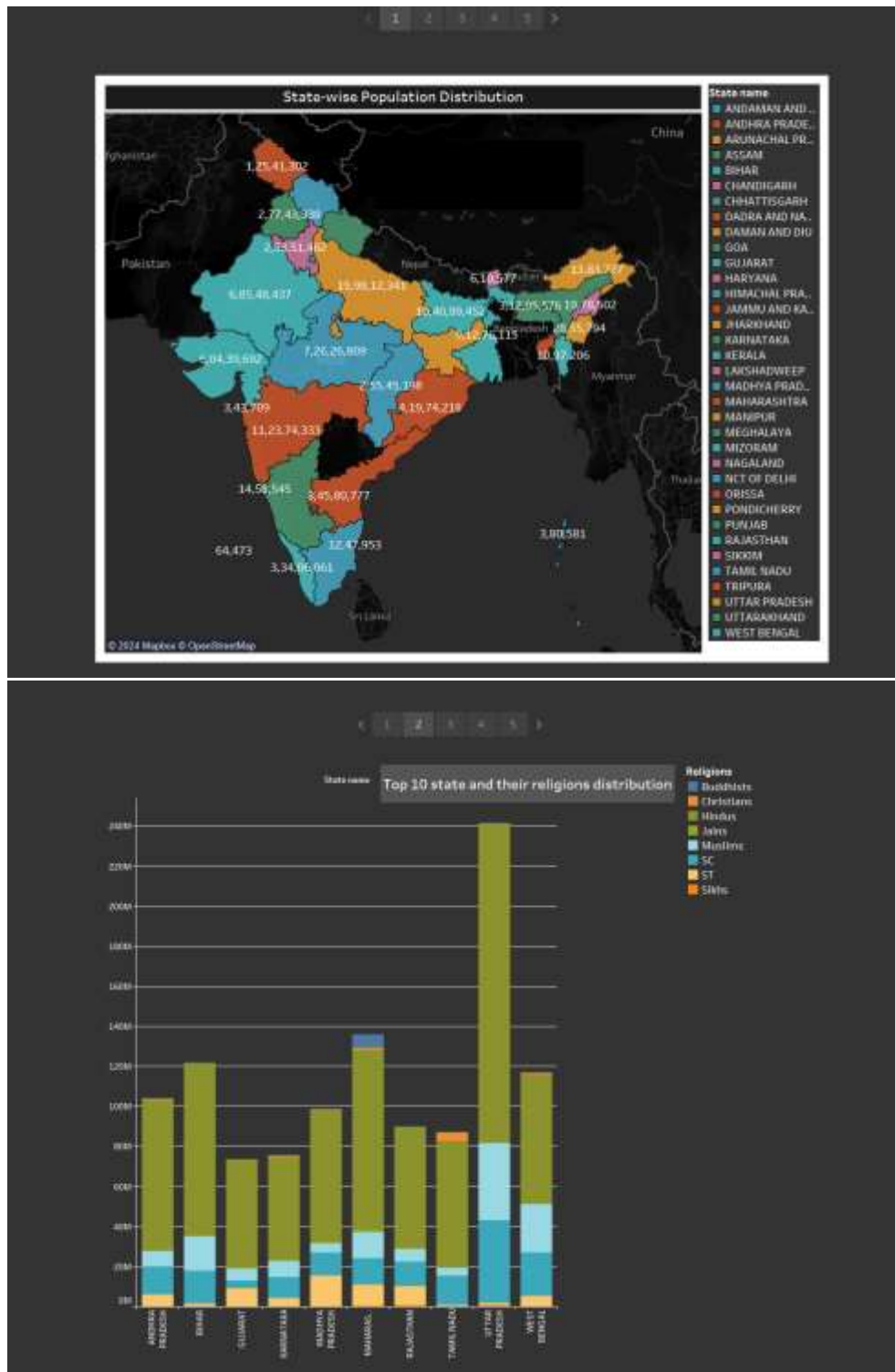
- Drag and drop your prepared worksheets into the story panel as story points.

Customize each story point:

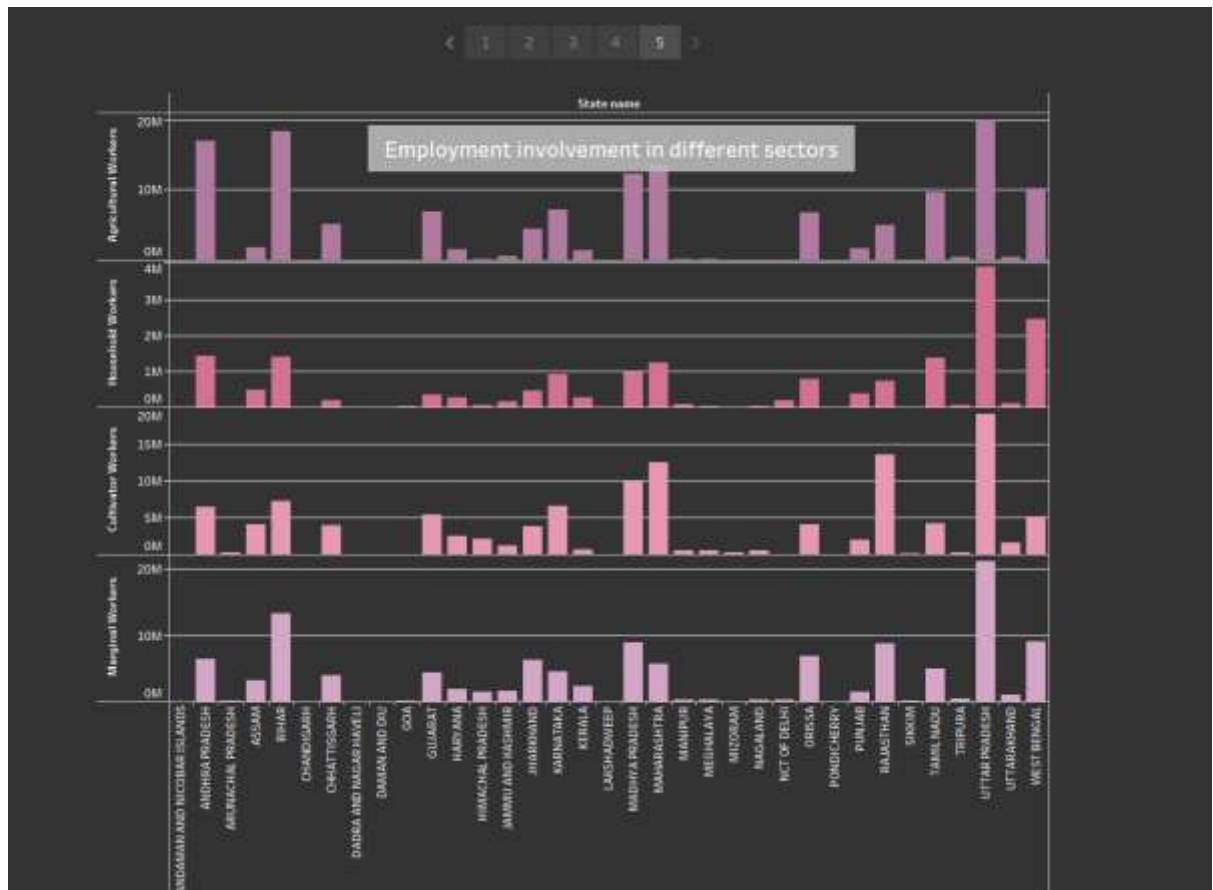
- Use the "Caption" section to add descriptive text and explanations.

Add transitions and sequencing:

- Adjust the order of story points to ensure a logical narrative flow.







## 23.Designing annotations and add captions to enhance your data story.

### Adding Annotations and Captions to Data Stories

Open your story in Tableau.

Select a story point where you want to add an annotation.

Right-click on the chart and choose "Annotate" > "Mark".

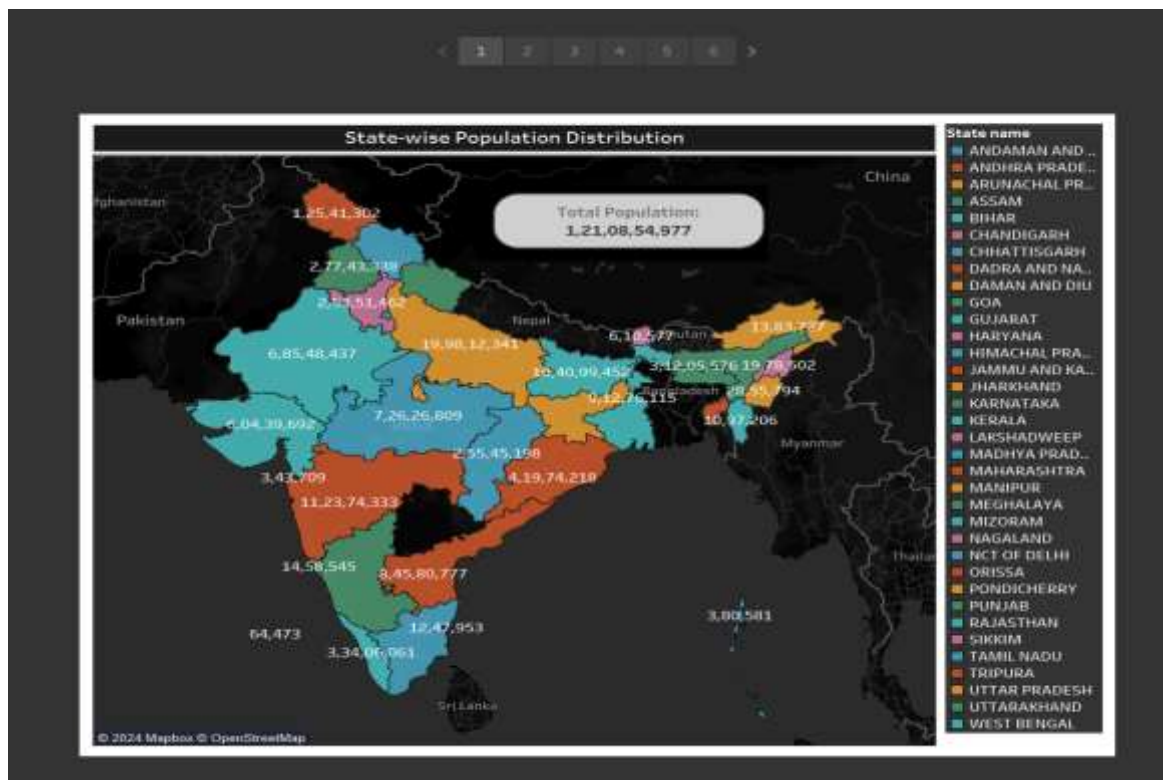
Type the annotation text to explain key data points.

Add captions:

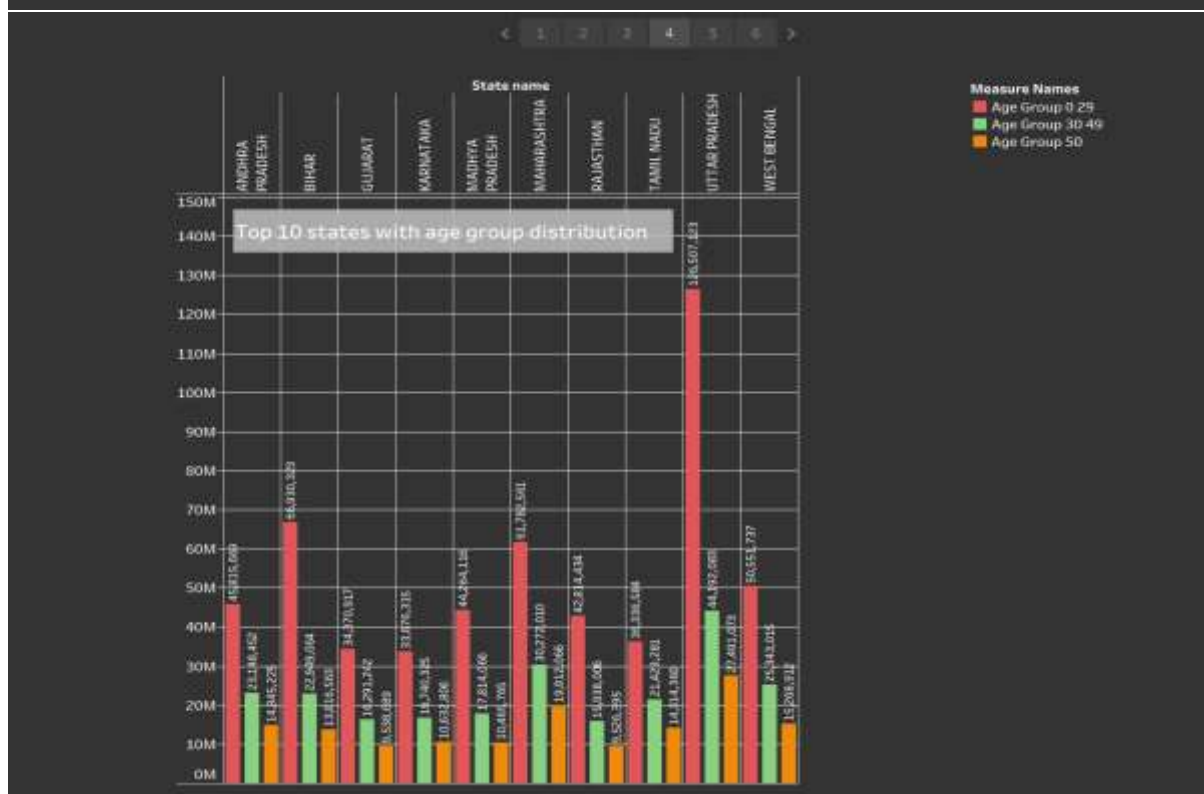
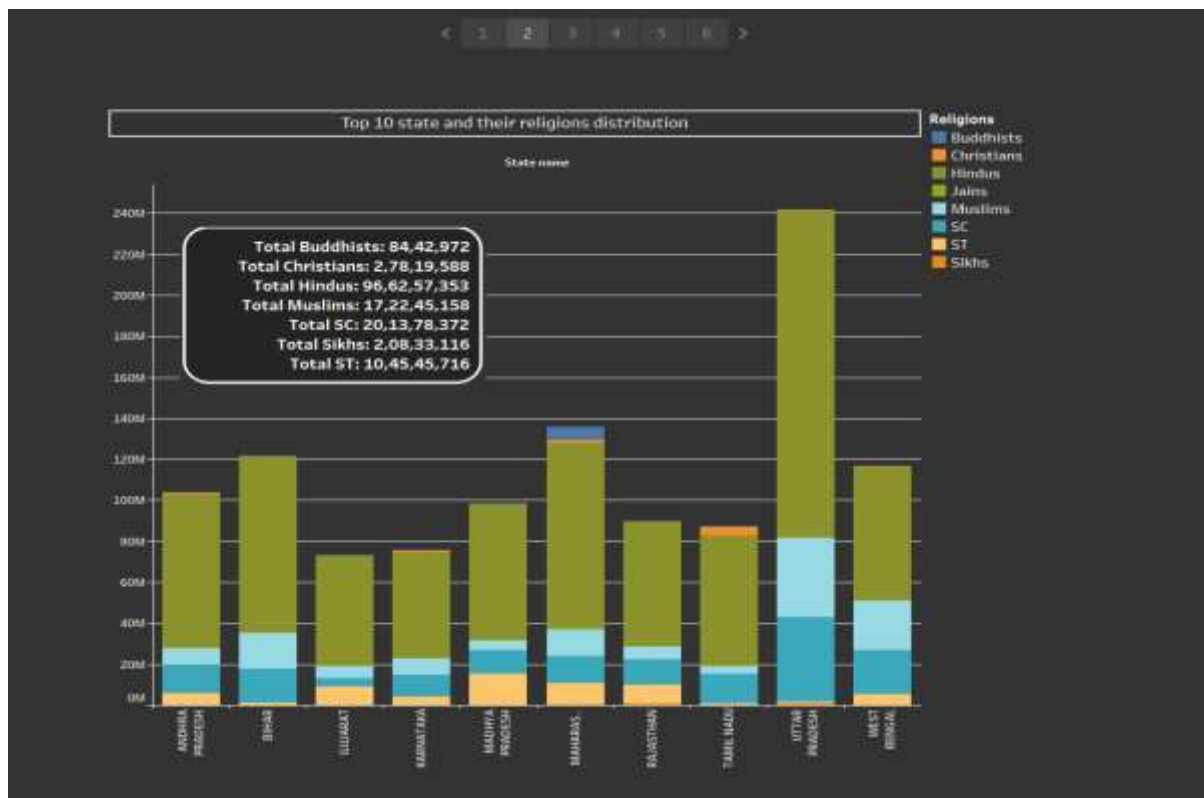
Use the "Caption" field at the bottom of each story point to provide context or additional insights.

Style the annotations:

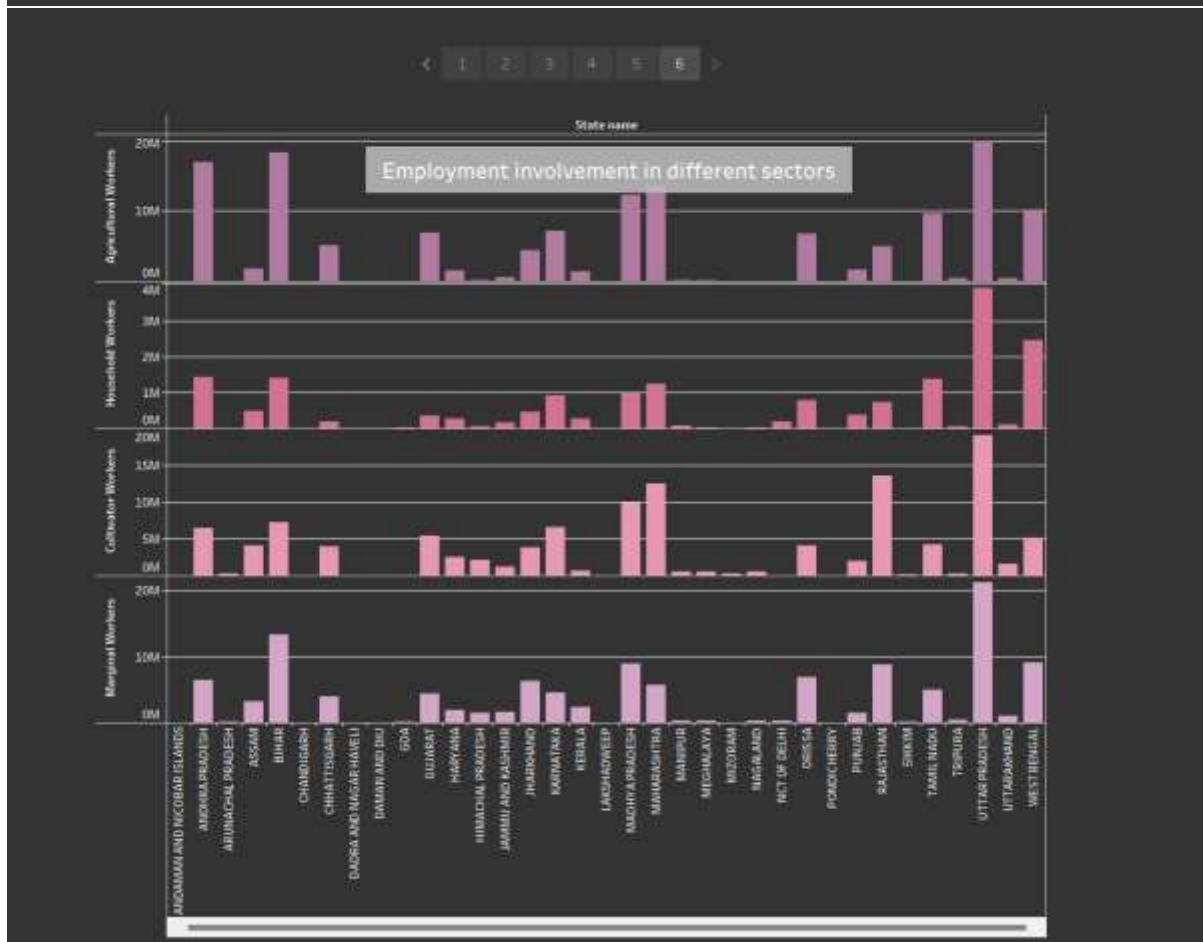
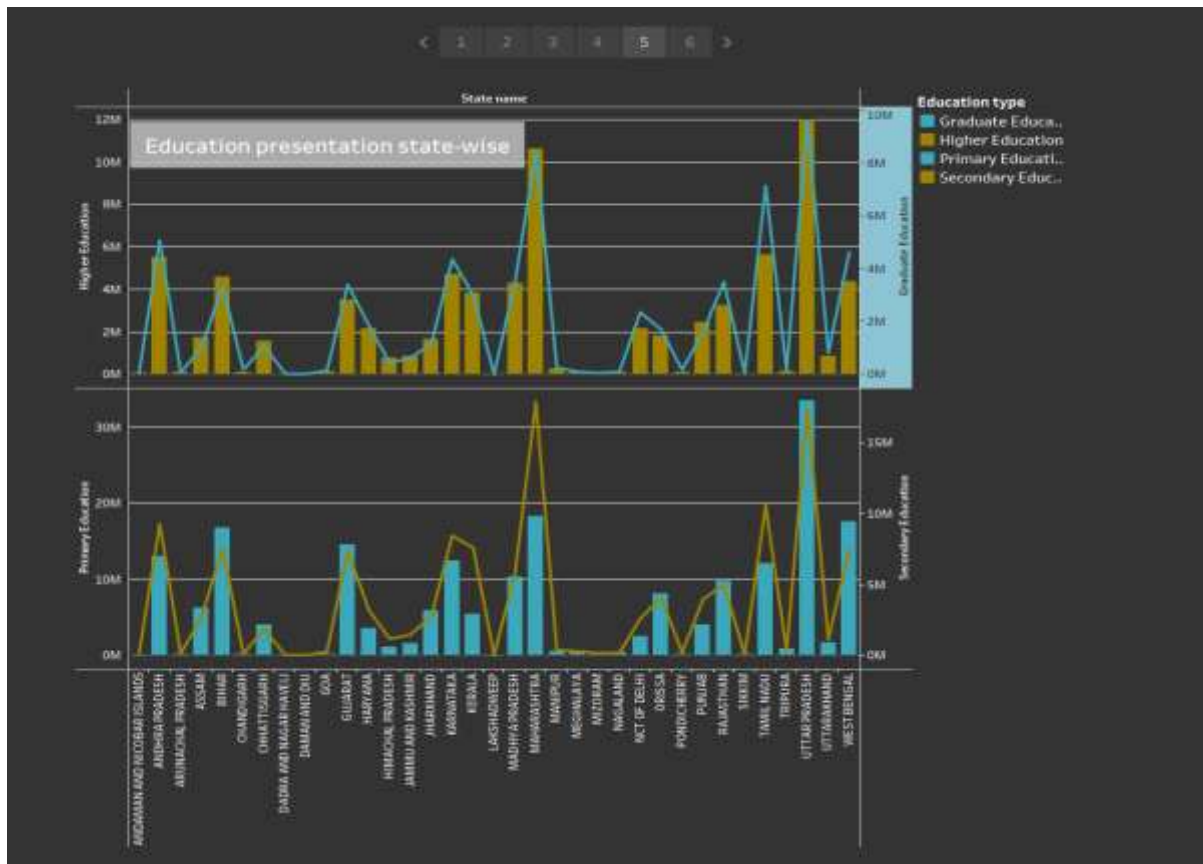
Customize the font, size, and color to match the theme of your story.











## 24. Create a Data Story for City wise Air Quality Index data.

Creating a Data Story for City-wise AQI Data

Collect AQI visualizations:

Ensure you have charts like bar charts, line charts, and maps related to city-wise AQI data.

Create a new story:

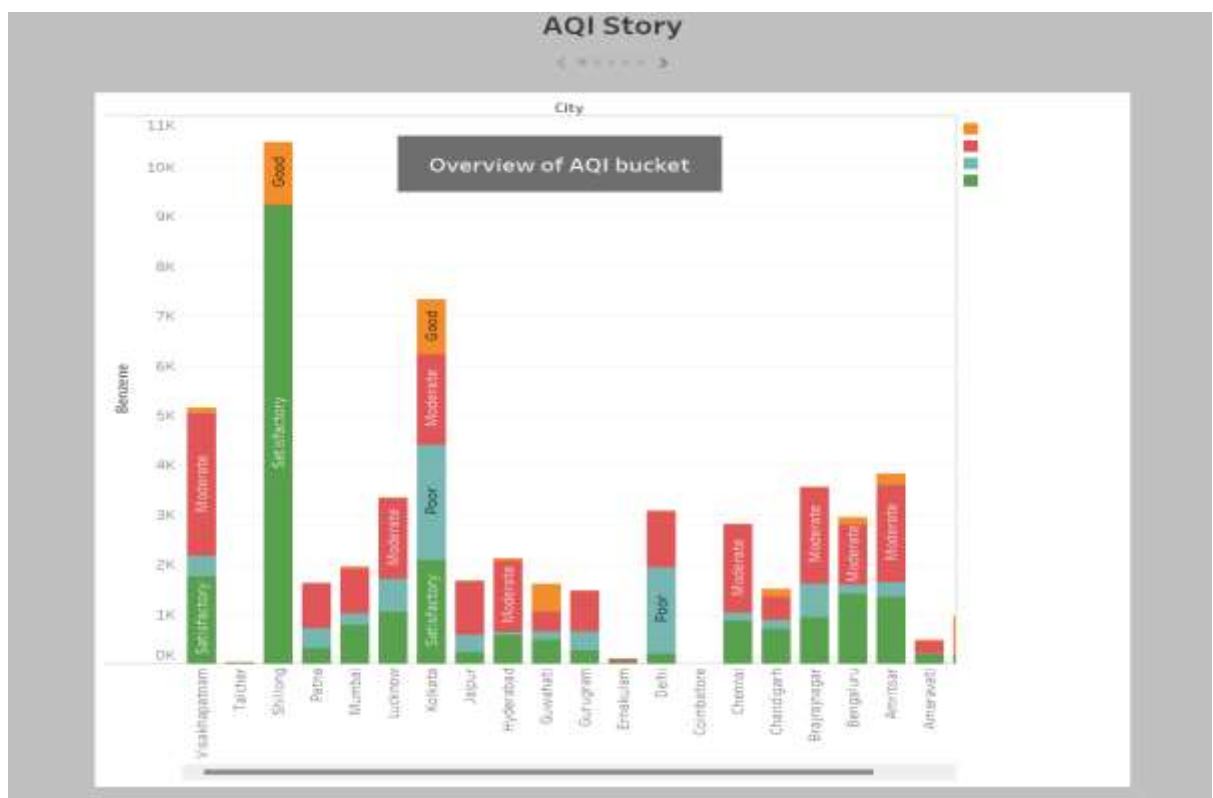
Click "New Story" in Tableau.

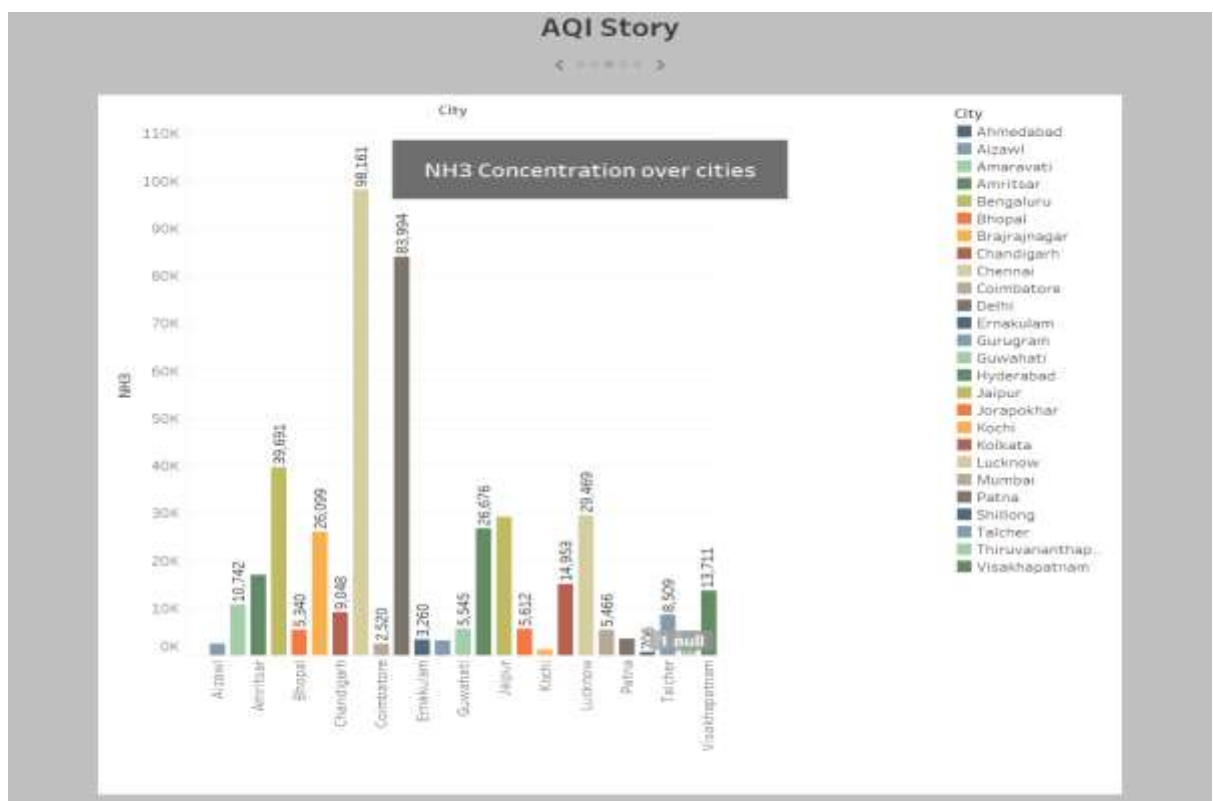
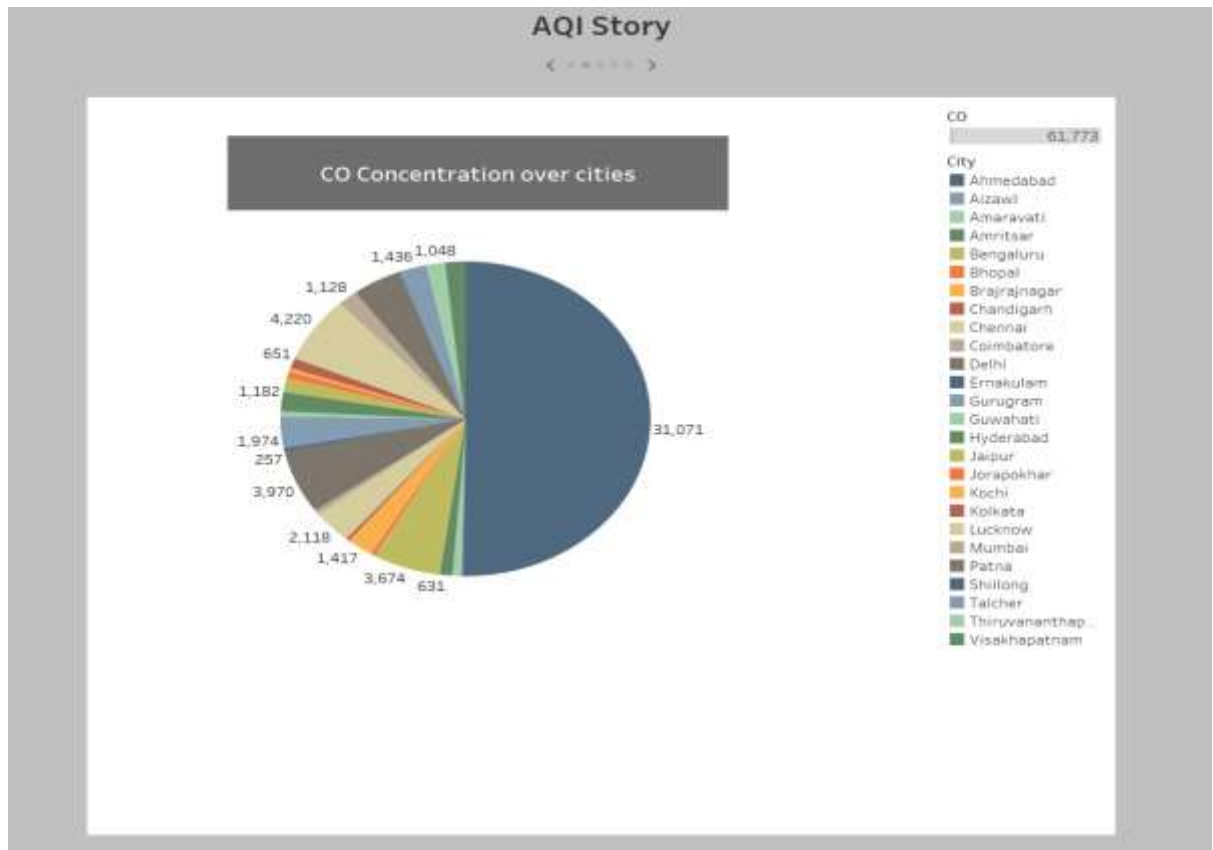
Add and arrange story points:

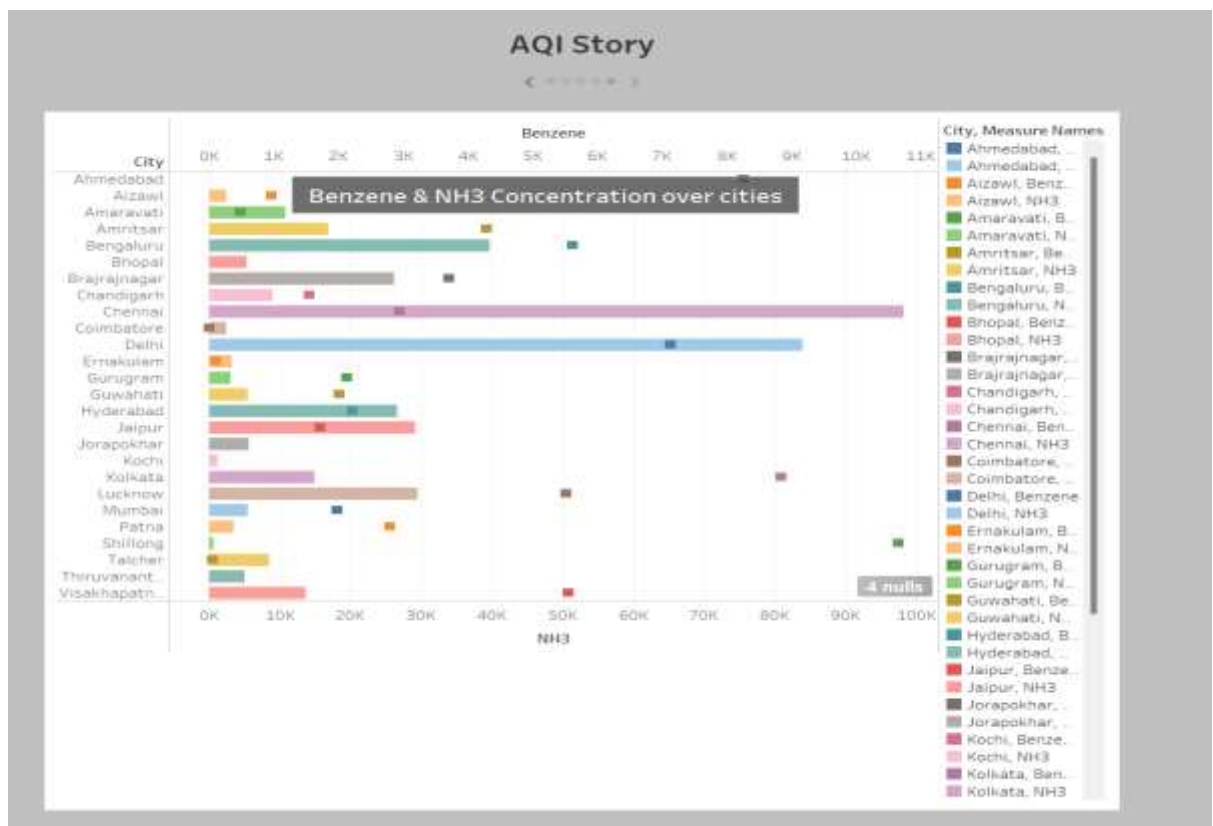
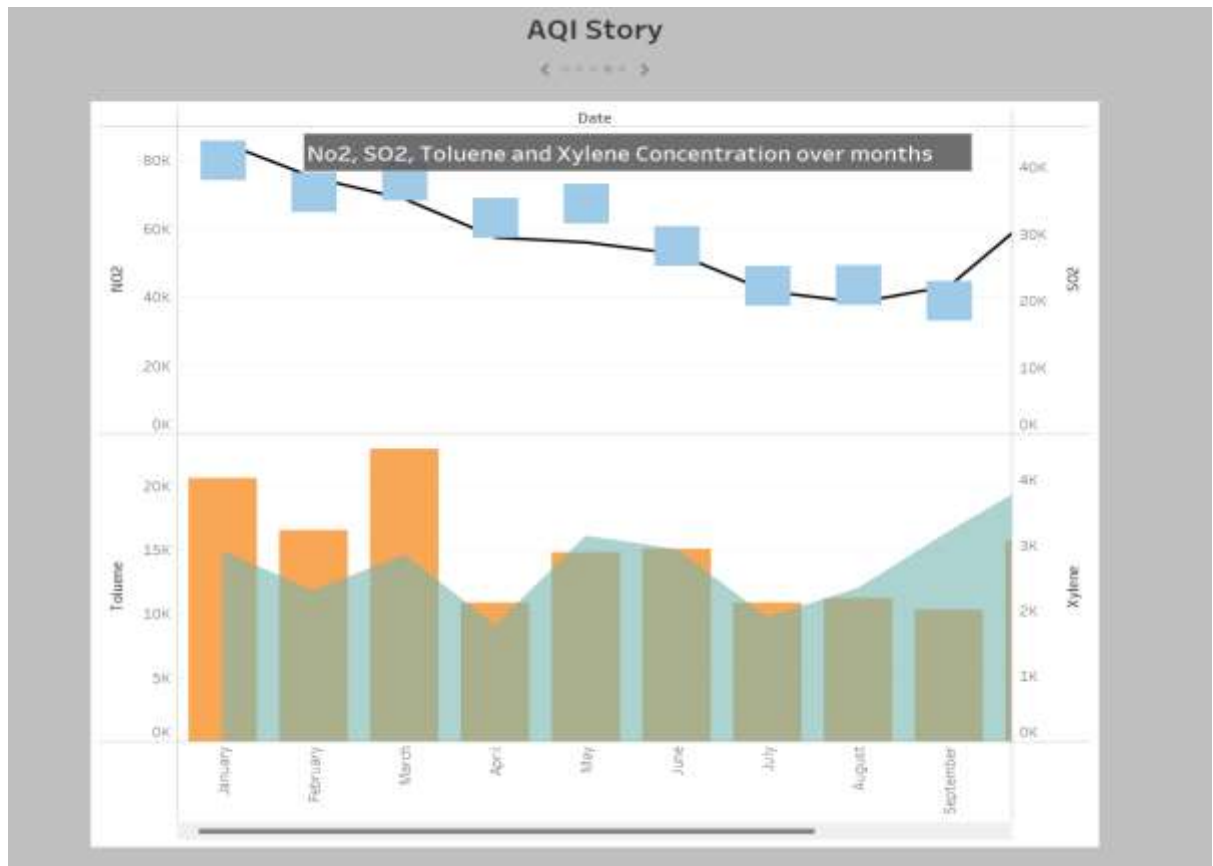
Drag AQI charts onto the story layout.

Label and explain:

Use the "Caption" and annotations to highlight trends and significant AQI levels.







## 25. Create a Data Story for Sale Data.

Creating a Data Story for Sales Data

Prepare sales-related worksheets:

Use bar charts, line charts, and scatter plots showing sales data.

Open the story feature:

Click "New Story" from the Tableau workspace.

Insert visualizations as story points:

Drag each sales chart into the story.

Add explanatory captions:

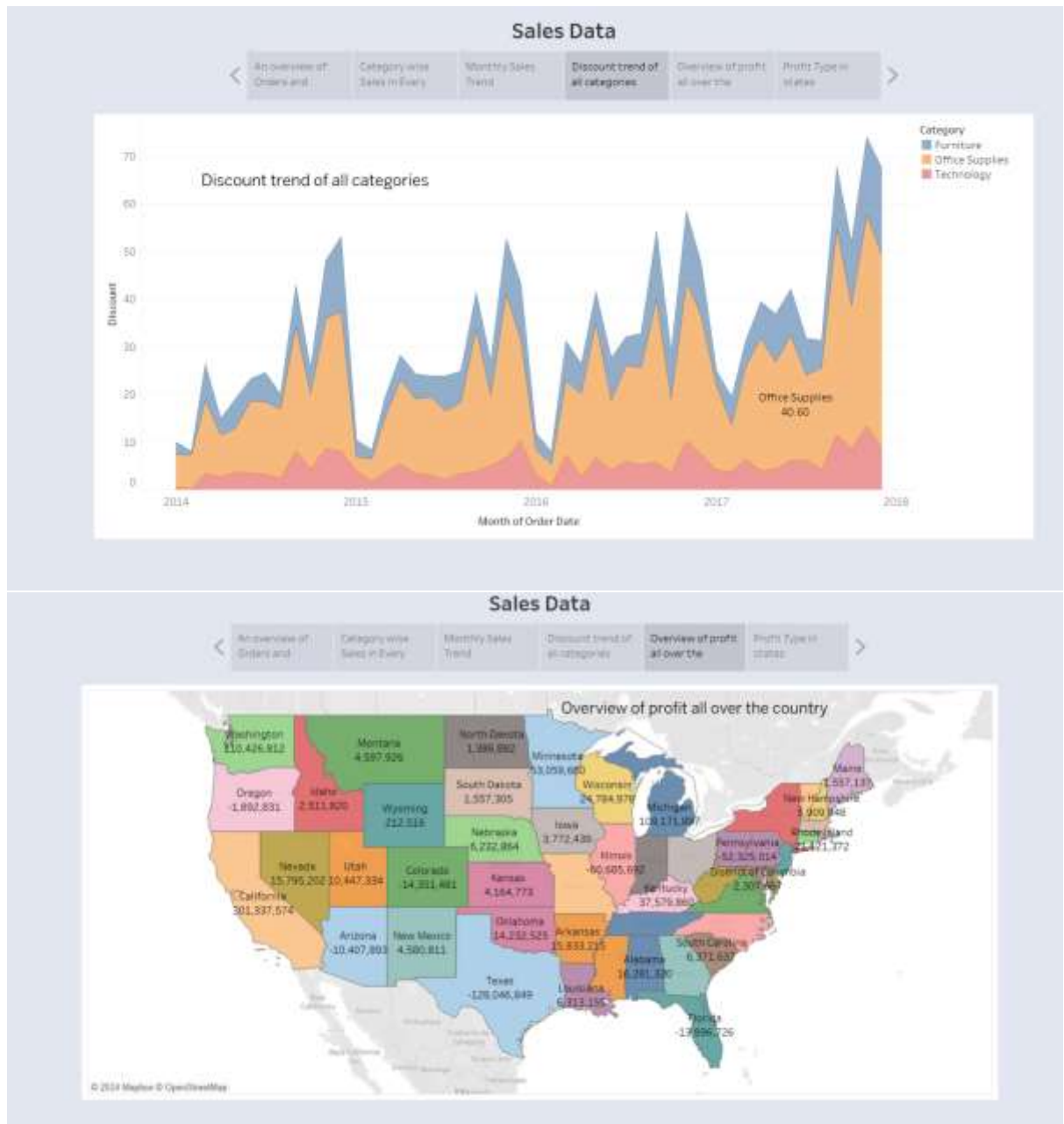
Include captions that outline key sales trends and data-driven insights.

Add navigation:

Include navigation links within text objects to allow smooth movement between story points.









## 26. Create a Complete Dashboard and Story for Customer Segmentation Dashboard.

### 1. Dashboard

Develop customer segmentation charts:

Create pie charts, bar graphs, and demographic visualizations.

Create a dashboard:

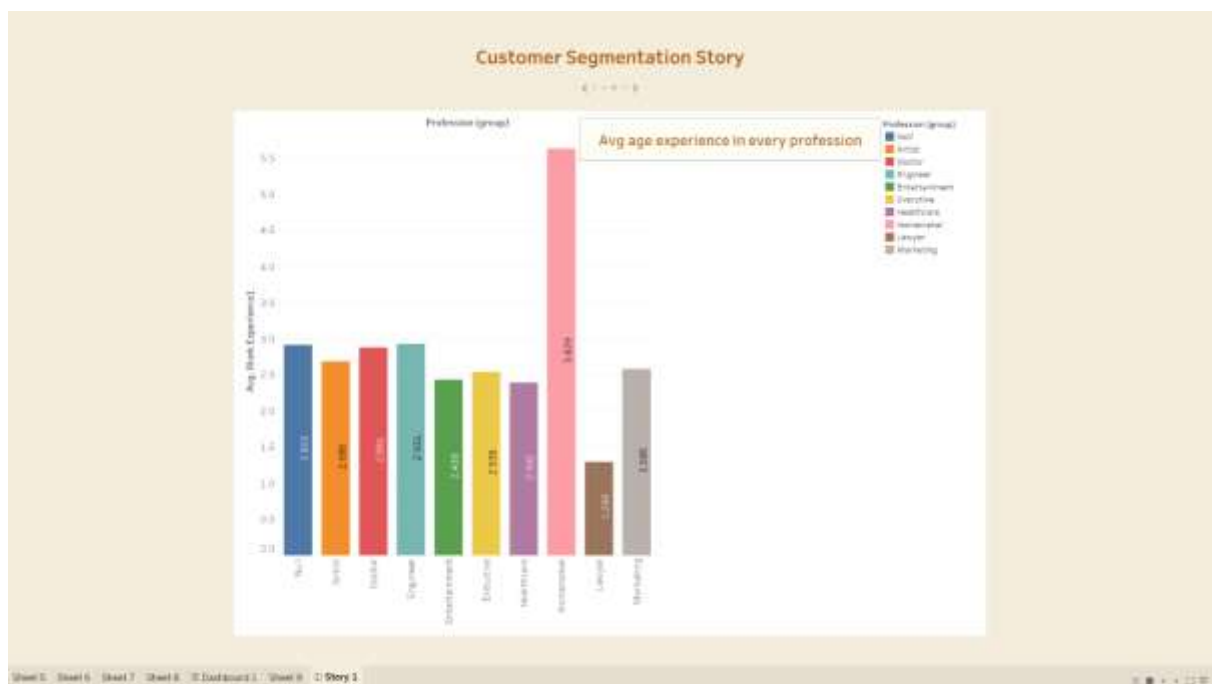
Drag the segmentation charts into a new dashboard and arrange them for a comprehensive view.

Add filters and interactions:

Include interactive filters to let users explore different customer segments.









## 27.To study about extensions in Tableau Dashboard and try to use any two extensions.

### Using Extensions in Tableau Dashboards

Open the dashboard where you want to use extensions.

Access the extensions gallery:

Click "Objects" and select "Extension".

Choose an extension:

Browse the Tableau Extension Gallery and select two extensions, such as "Export all" or "Filter Bookmarks capabilities".

Drag and drop the extensions into the dashboard.

Configure the extensions:

Follow the on-screen prompts to set up and integrate them with your data.

### Two extensions in dashboard



## 28. Apply Data Blending to combine data from multiple sources to create a unified visualization, such as integrating sales data with customer demographics.

### Applying Data Blending

Connect to multiple data sources in Tableau.

Select primary and secondary data sources:

Ensure that they share at least one common field (e.g., "Customer ID").

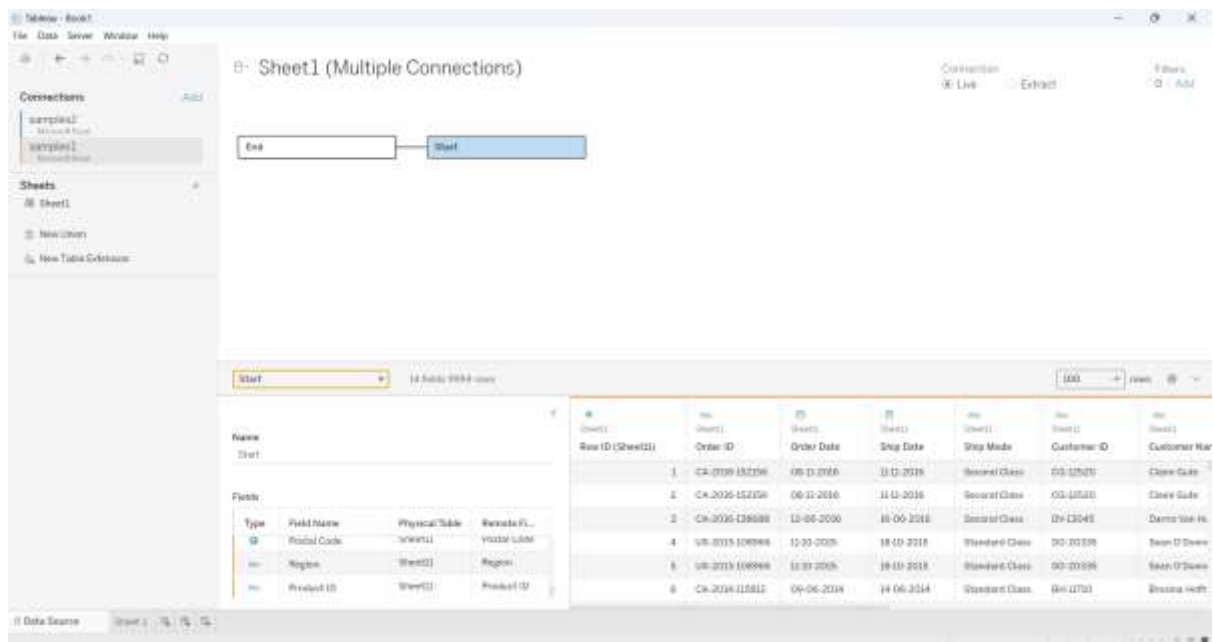
Blend the data:

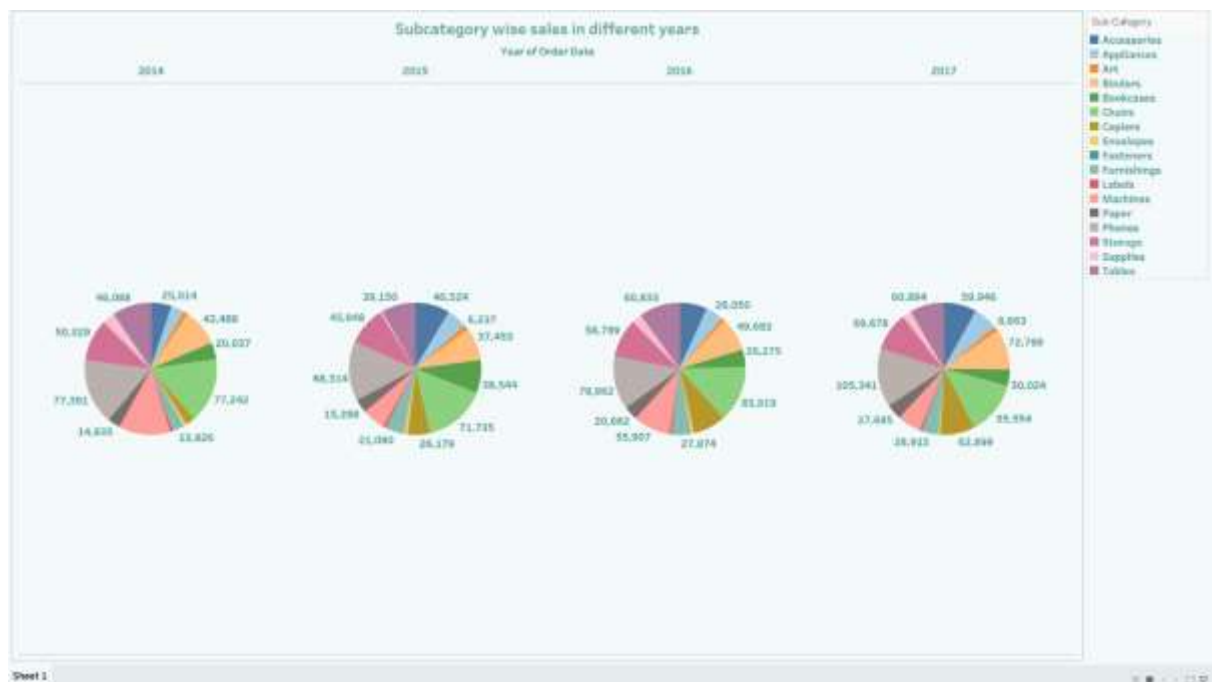
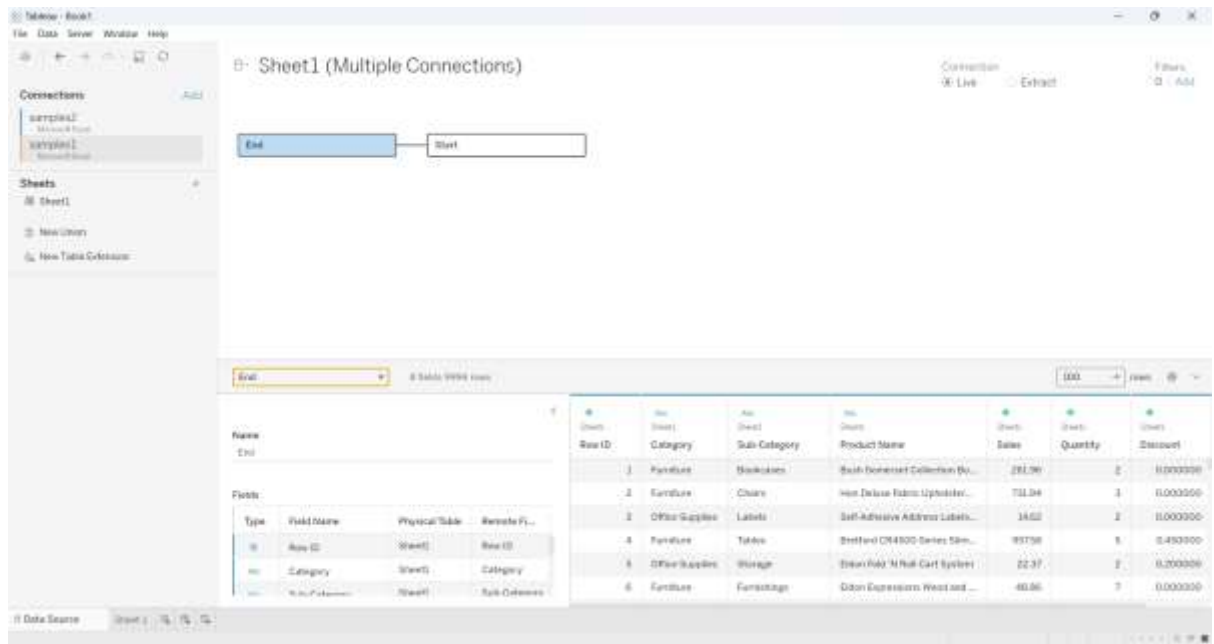
Drag the primary field into the worksheet.

Use a secondary field from the additional data source, marked by a small link icon.

Create unified visualizations:

Use blended fields to build combined charts or dashboards.





## 29. Create a comprehensive Dashboard and Story for Analysing Marketing Campaign Impact on Sales.

### 1. Dashboard

Prepare marketing data visualizations:

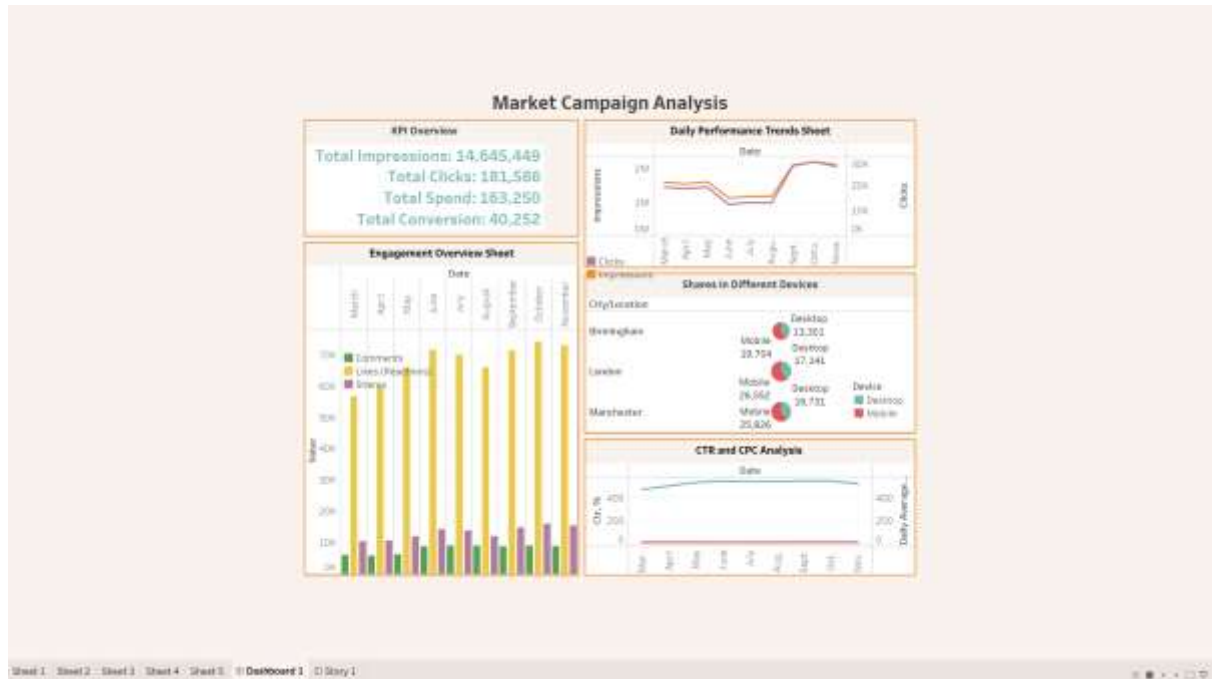
Create charts like line charts for campaign timelines and bar graphs for conversion rates.

Create a dashboard:

Drag the visualizations into a new dashboard and organize them logically.

Add interactive elements:

Use filters and highlighters to allow users to explore different campaigns.



## 2. Story

Create a story:

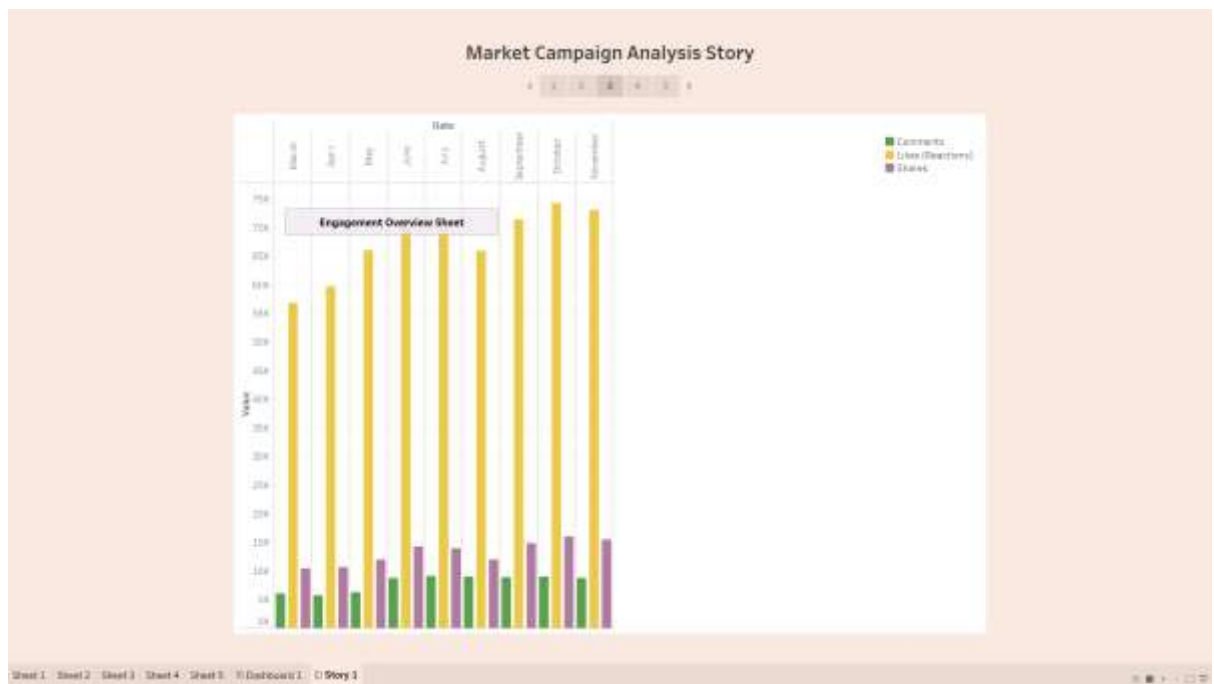
Add the marketing dashboard as a story point.

Explain findings:

Use captions and annotations to describe campaign impacts and CPC.









## 30. Create a comprehensive Dashboard and Story on Social Media Analytics.

### 1. Dashboard

Import social media data and create visualizations:

Include engagement rate charts, follower growth line charts, and sentiment-analysis bar charts.

Create a social media analytics dashboard:

Combine all visualizations in a dashboard, adding filters for different platforms or time periods.

Add interactive elements:

Include filters for platform type or date range.



### 2. Story

Create a story for presentation:

Drag the dashboard into the story layout and organize story points.

Add context and insights:

Use captions to highlight significant trends and metrics in social media performance

