

# LAB 7: VISUALISING GEOSPATIAL DATA



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## Learning Outcome

At the end of this session, learners will be able to:

- Create map views in Tableau
- Fill map with pie chart
- Create bar charts in tooltips
- Put data on Singapore map

## Data Preparation for Task 1 & 2

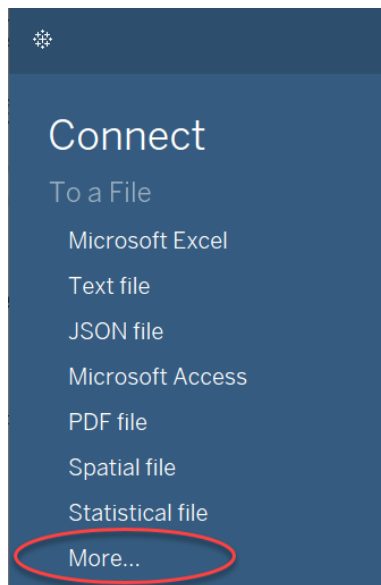
Create a Tableau work book that connect to the **Sample - Superstore Subset (Excel)** data source.

We are going to use this data source for all the first two tasks of this lab.

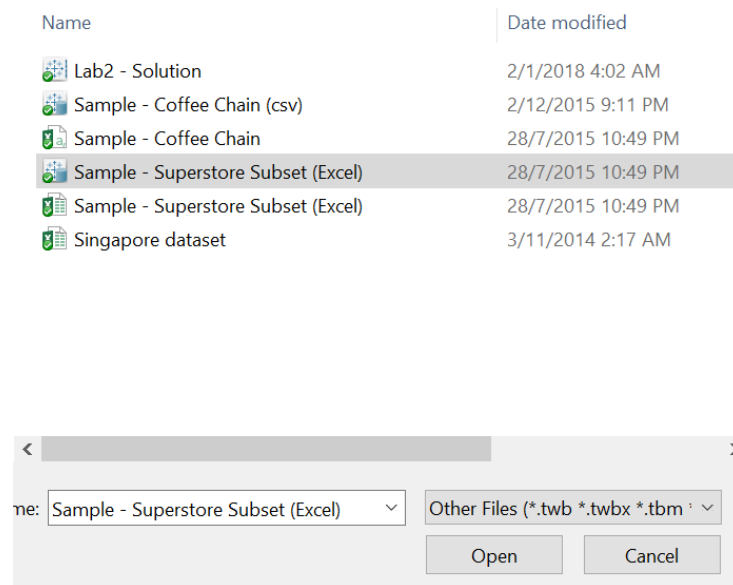
Step 1. Launch Tableau. Under Connect To a File, select **More...**

Step 2. From the file open window, select the **Sample - Superstore Subset (Excel)** Tableau Datasource file.

### Step 1



### Step 2

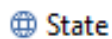


## Task 1: Mapping Basics

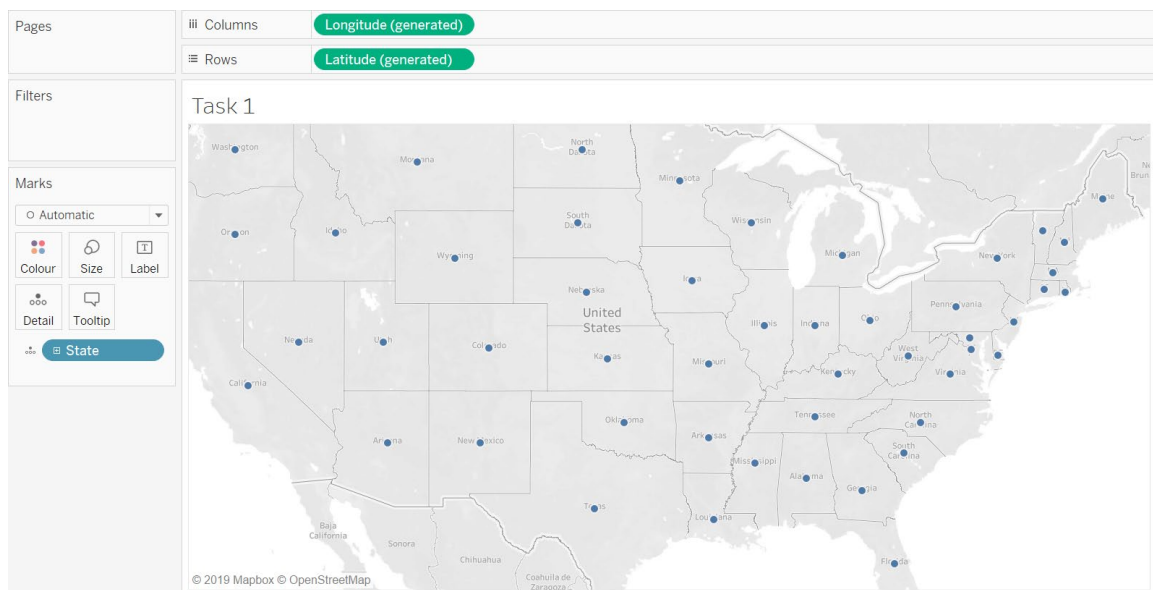
Creating map views in Tableau is quick and easy. This document will walk through setting up a basic map using the Superstore Sales example included with Tableau Desktop.

You can assign Geographic Roles to fields that contain geographic data such as country/region names, state names, zip codes, and so on. Fields with a Geographic Role will automatically generate longitude and latitude coordinates for display on a map view. Tableau automatically assigns Geographic Roles to fields with common location names such as State, County, etc. Geographic Roles can also be manually assigned to fields that are not automatically recognized.

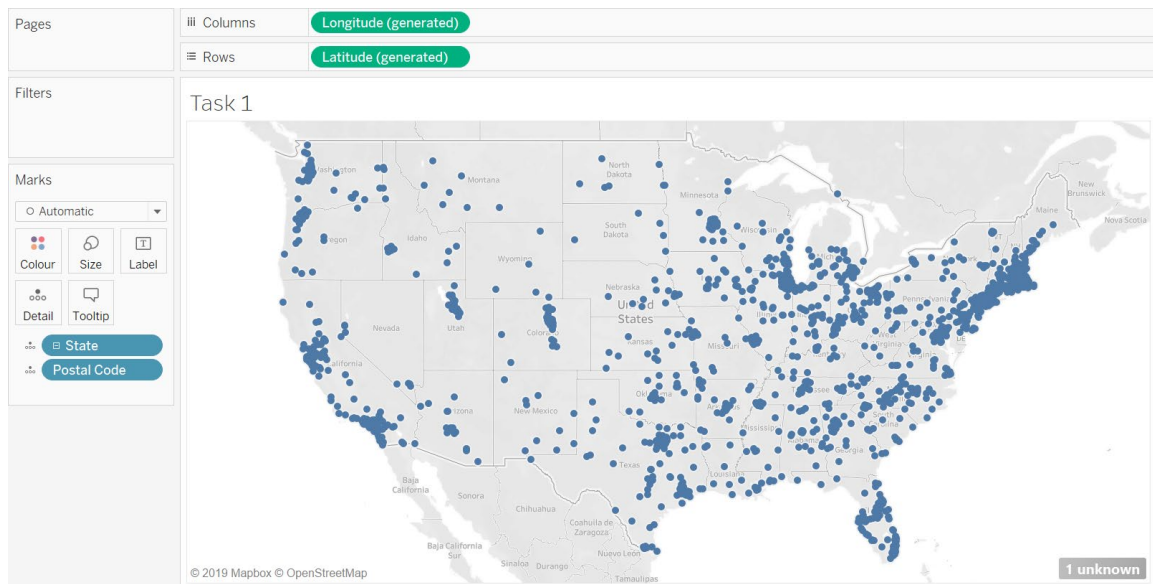
1. Click **Sheet1** tab at the left bottom corner to open the chart designer. Rename it as **Task 1**.
2. State and Zip Code are automatically recognized as having a Geographic Role, which is denoted in the Data window with a globe icon.



3. Double-click the State field in the Dimensions area of the Data window.
  - Tableau automatically adds Longitude (generated) and Latitude (generated) to the Columns and Rows shelves.
  - Customer State is automatically placed on the Level of Detail shelf. The Detail is used to determine how Tableau generates coordinates on Rows and Columns are displayed.



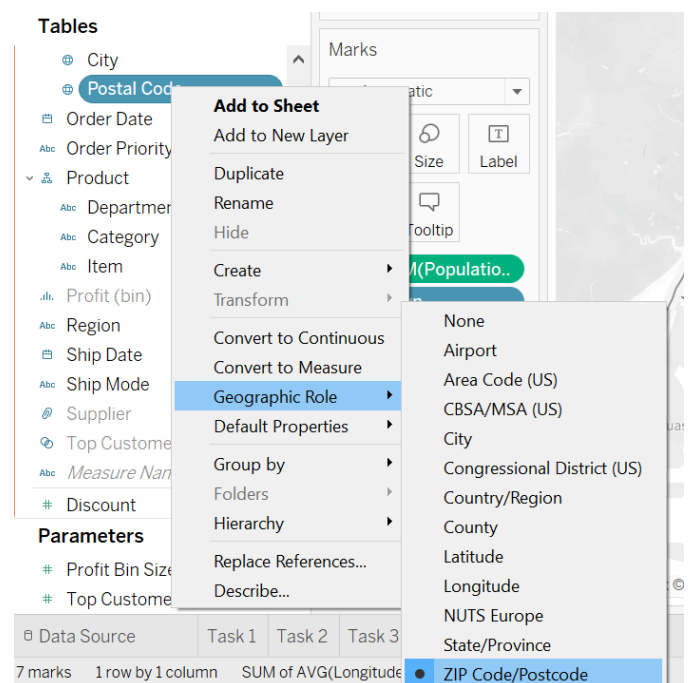
4. Drag the **Postal Code** field from the **Dimensions** pane to the **Detail** shelf to specify more detail. The built-in Geographic Roles are arranged in a hierarchy, the field with the lowest level of detail is what is shown on the map.



## Manually specify a geographic role

If a Geographic Role is not automatically recognized, you can manually specify. In this example Postal Code is used as the field name for zip code values.

1. Right-click the **Postal Code** field in the **Dimensions** pane.
2. Select **Geographic Role** → **Zip Code/Postcode**.



## Built-in geographic roles

Tableau contains several built-in Geographic Roles with predefined longitude and latitude coordinates. Many of the roles extend internationally but **some are limited to the U.S.** only. The built-in Geographic Roles are listed below. Refer to the Map Data page for map data providers and status.

### For Tableau Desktop 7.0 and later:

Role Name	Description
Area Code	U.S. telephone area codes; numbers only.
CBSA/MSA	U.S. Core Based Statistical Areas, which includes Metropolitan Statistical Areas, as defined by the U.S. Office of Management and Budget.
City	Worldwide cities with population of 15,000 or more. Names are in English, French, and German.
Congressional District	U.S. congressional districts.
Country/Region	Worldwide countries, regions, and territories. Names are in English, French, and German. Tableau also recognizes, FIPS 10, ISO 3166-1 alpha 2, and ISO 3166-1 alpha 3. Names are included in various forms, including long, short, and various abbreviations.
County	U.S. counties and county-equivalents by name. Independent cities are included with their names followed by city.
Latitude	Latitude in decimal degrees. Only available for numeric fields.
Longitude	Longitude in decimal degrees. Only available for numeric fields.
State/Province	<p>Worldwide state, province, and other first-level administrative divisions. Names are in English, French, and German.</p> <p>Official abbreviations available for the following countries: Australia, Brazil, Canada, Germany, Poland, Switzerland, U.K., and U.S.</p> <p><b>Note:</b> Some names may be available only in their local form.</p>

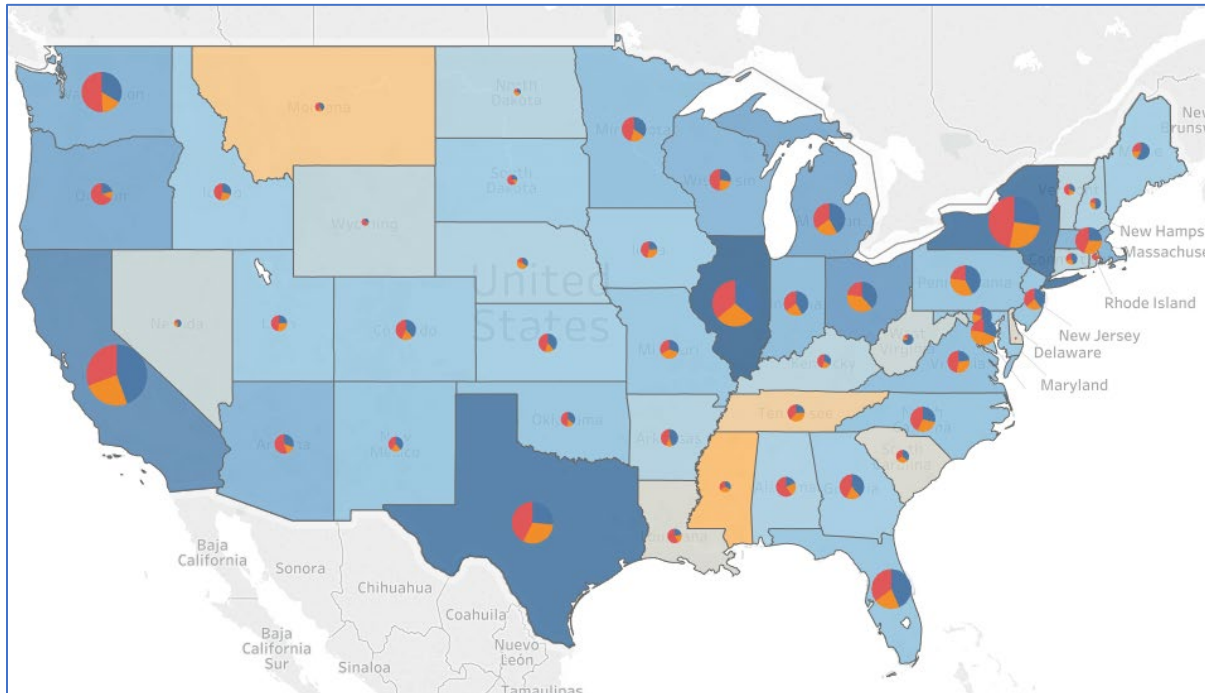
Role Name	Description
ZIP Code/Postcode	<p>U.S. five digit zip codes. Australian four digit postcodes.</p> <p>Canada Forward Sortation Area; first three characters of the six character Canadian postal code.</p> <p>French five digit postcodes. German five digit postcodes.</p> <p>New Zealand four digit postcodes.</p> <p>U.K. Outcodes; first segment of the five to seven character U.K.</p>

Adapted from <http://kb.tableausoftware.com/articles/knowledgebase/mapping-basics>  
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## Task 2: Filled Maps with Pie Chart

The pie mark type can be useful in showing simple proportions to the relative whole. For example, pie marks are effective when you want to show the percentage of profit for a product by geographic location.

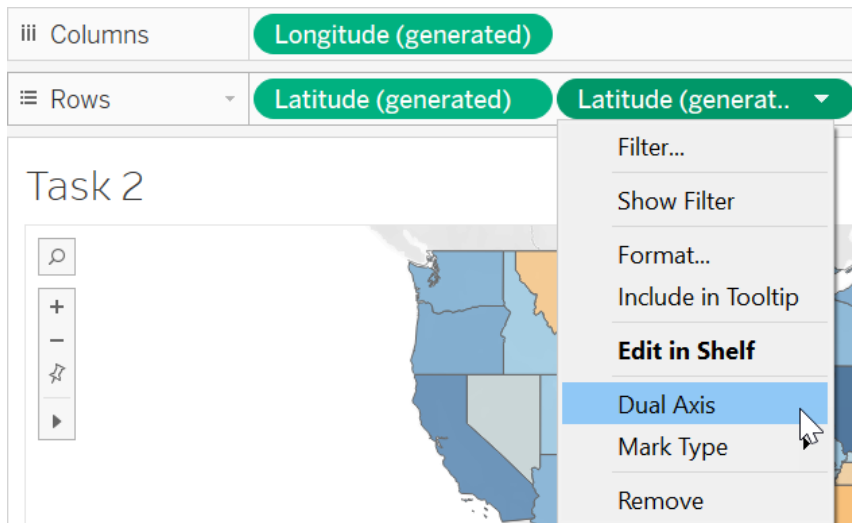
The example described here uses the pie mark type in conjunction with the filled maps mark type to show the percentage of profit for office supplies, relative to the total profits by state. The data source is the Superstore sample.



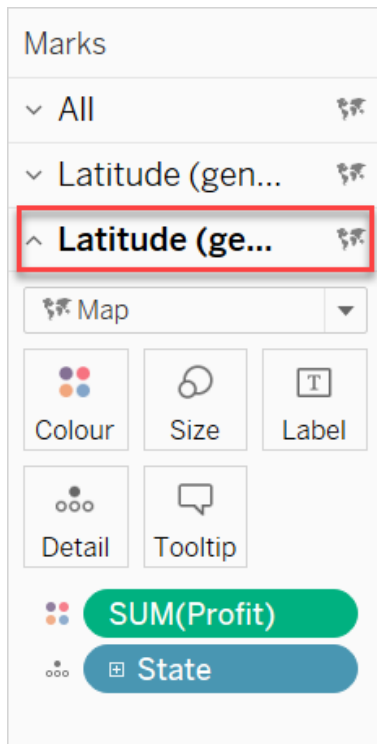
1. Open a new worksheet and rename it as **Task 2**.
2. Make sure the **Sample - Superstore Subset (Excel)** data source is connected.
3. Click the **State** field, and then in the **Show Me** panel, select the **Filled Map** view type.
4. From the **Measures** pane, drag **Profit** to **Color** on the Marks card.
5. Drag another instance of the **Latitude** field to the **Rows** shelf.



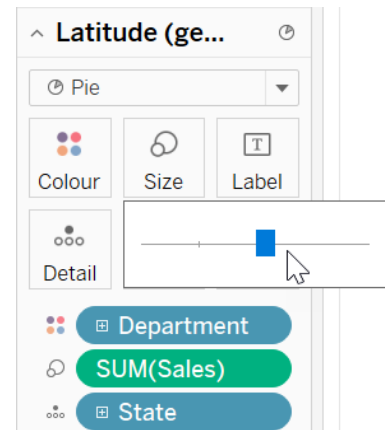
- Right-click the second **Latitude** field on the **Rows** shelf and select **Dual Axis**.



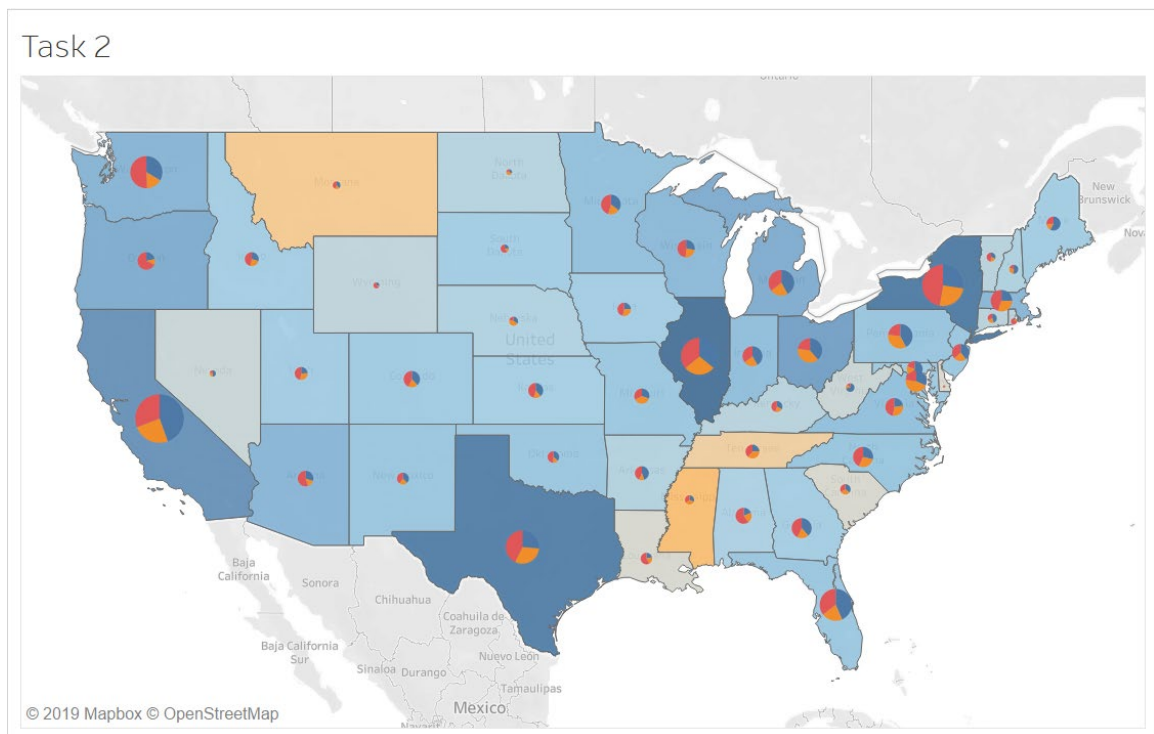
- On the Marks card, select the second **Latitude** field.



8. In the drop-down list of view types, select **Pie**.
9. From the **Measures** pane, drag **Sales** to **Size**.
10. From the **Dimensions** pane, drag **Department** to **Color**.
11. If necessary, use the **Size** slider to enlarge the pie charts.




12. Your map will look similar to the image below.



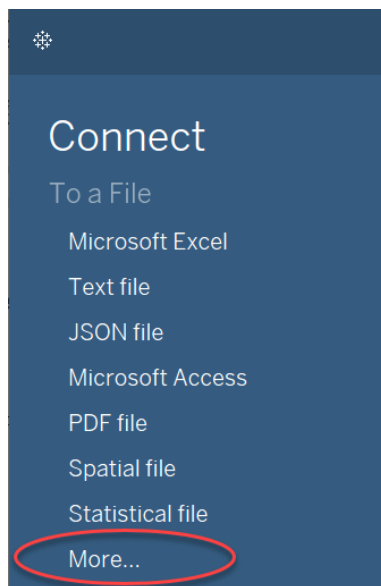
## Data Preparation for Task 3

Create a Tableau work book that connect to the **Sample – Coffee Chain data source**.

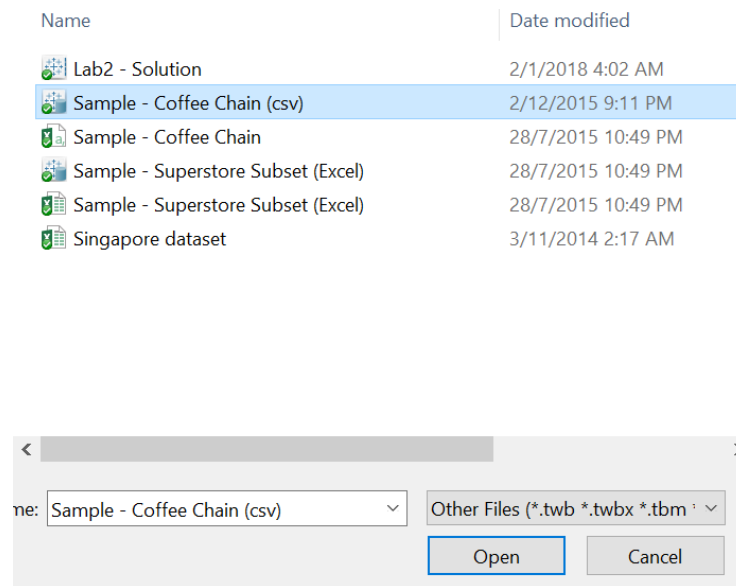
Step 1: Click on  icon to go to **Data Source** page. Under Connect To a File, select **Microsoft Excel**.

Step 2: From the file open window, select the **Sample – Coffee Chain (csv)** Tableau Datasource file.

### Step 1



### Step 2



## Task 3: Bar Charts in Tooltips

Displaying distribution or composition can be difficult on certain views such as maps or scatter plots, when the axis is dedicated to latitude and longitude or other measures. Using pie marks is an option, but often users have trouble discerning the size differences among slices in this mark type. This article covers a method to incorporate distribution or composition information as a bar chart within tooltips.

## Cohort calculations

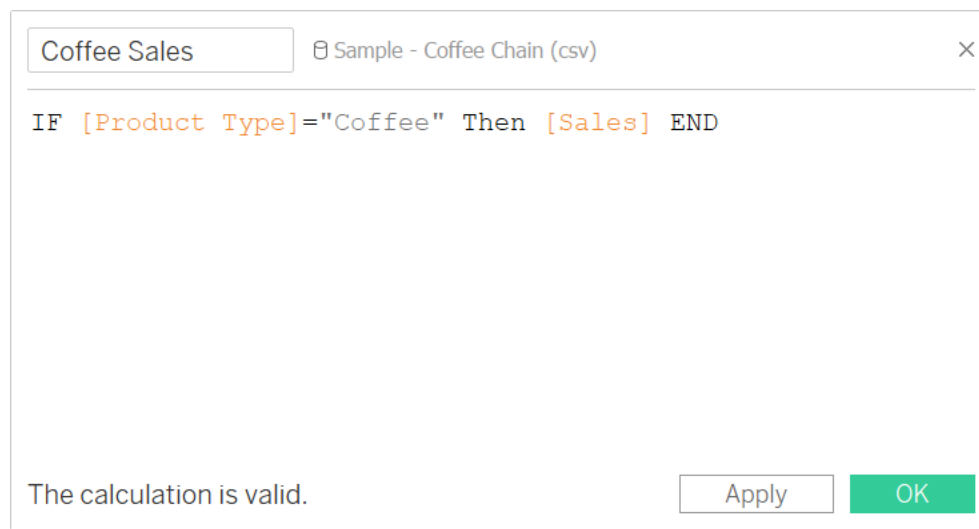
Using the method described in this article, creating a cohort calculation involves using one measure and one dimension.

1. Create a calculated field that separates the measure so that it is specific to each member of the dimension. The calculated field should have a formula that fits using the following syntax:

```
IF [Dimension]="member 1" Then [Measure] END
```

2. Go to **Analysis → Create Calculate Field**. Create a calculated named **"Coffee Sales"** using formula below.

```
IF [Product Type]="Coffee" Then [Sales] END
```



3. Repeat Step 2 for each member in Product Type. Do so for **Espresso**, **Herbal Tea** and **Tea** and create Calculated Field for each.

### Espresso Sales:

```
IF [Product Type]="Espresso" Then [Sales] END
```

### Herbal Tea Sales

```
IF [Product Type]="Herbal Tea" Then [Sales] END
```

### Tea Sales

```
IF [Product Type]="Tea" Then [Sales] END
```

You should have a separate cohort calculated field that describes the [Measure] for each member.

### Measures

> Budget

- # Coffee Sales
- # Espresso Sales
- # Herbal Tea Sales
- # Tea Sales

⊕ Latitude (generated)

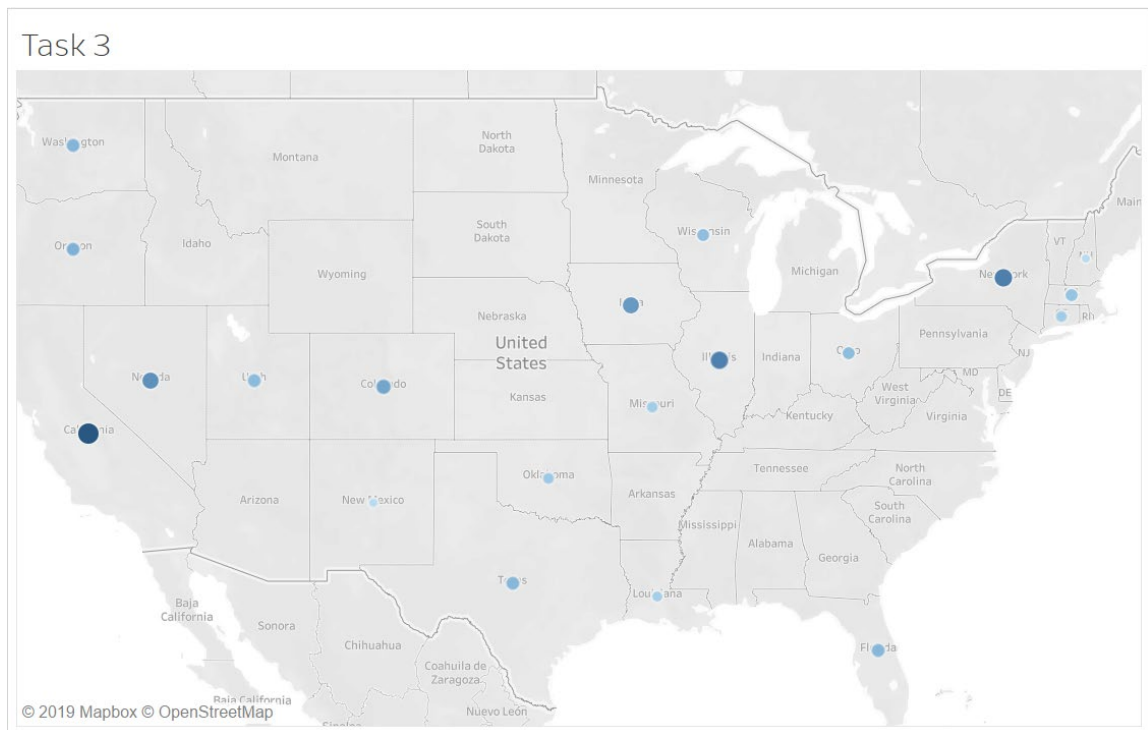
⊕ Longitude (generated)

### Parameters

- # Profit Bin Size
- # Top Customers

## Creating the map

1. Double-click the **State** field in the Dimensions pane.
2. Complete the view:
  - a. From the Measures pane, drag **Actuals** → **Sales** to **Size**.
  - b. From the Measures pane, drag **Actuals** → **Profit** to **Color**.



## Creating calculated bar field

The purpose of using bars within a tooltip is to have a calculated string field that represents the appropriate length of each bar.

1. From menu **Analysis** → select **Create Calculated Field**. This calculation represents the bar length for one of the dimension members.
2. In the **Formula** textbox, determine which of the following designs you wish to use, and then use one of the following formulas:

If you want hashed bars, use:

```
LEFT("|||||",ROUND((SUM([Your cohort calculation])/SUM([Measure]))*100,0))
```

**For example:**

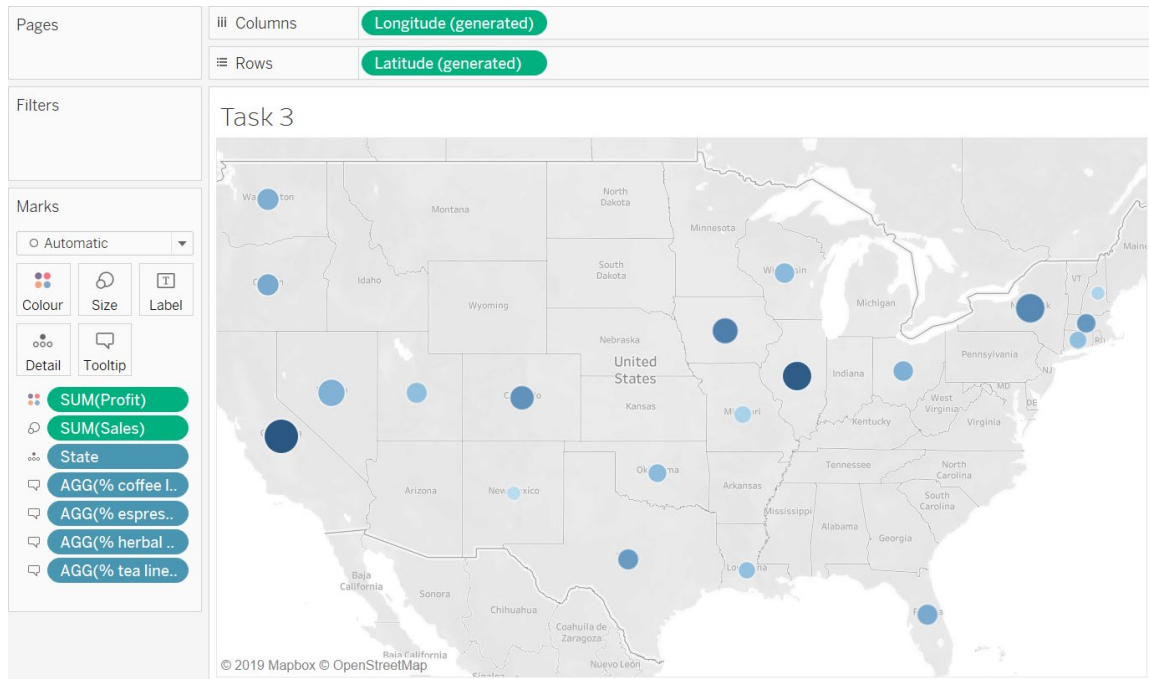
```
LEFT("|||||",ROUND((SUM([Coffee Sales])/SUM([Sales]))*100,0))
```



3. Do the same for
  - % espresso lines
  - % herbal tea lines
  - % tea lines

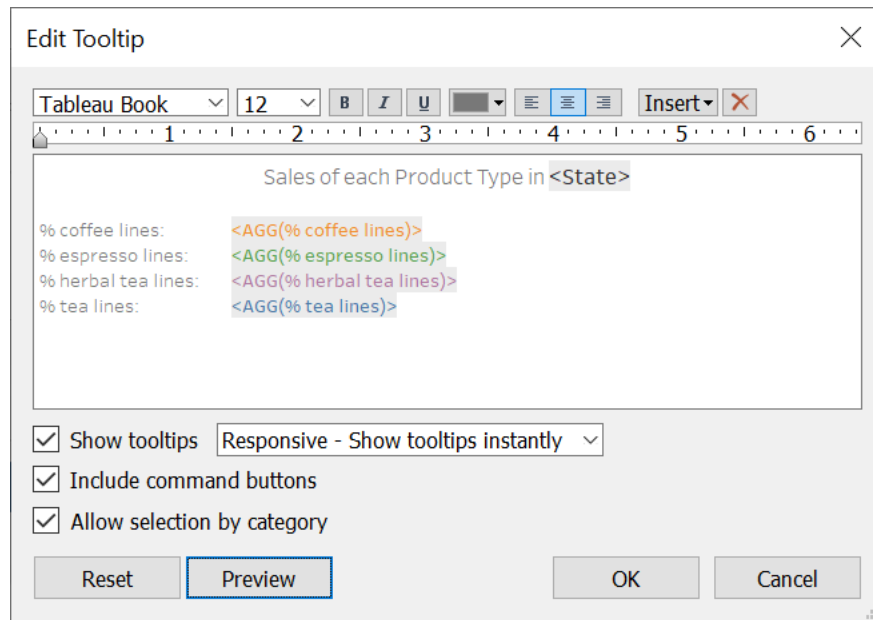
4. Drag the following fields to Tooltip under Marks:

- % coffee lines
- % espresso lines
- % herbal tea lines
- % tea lines

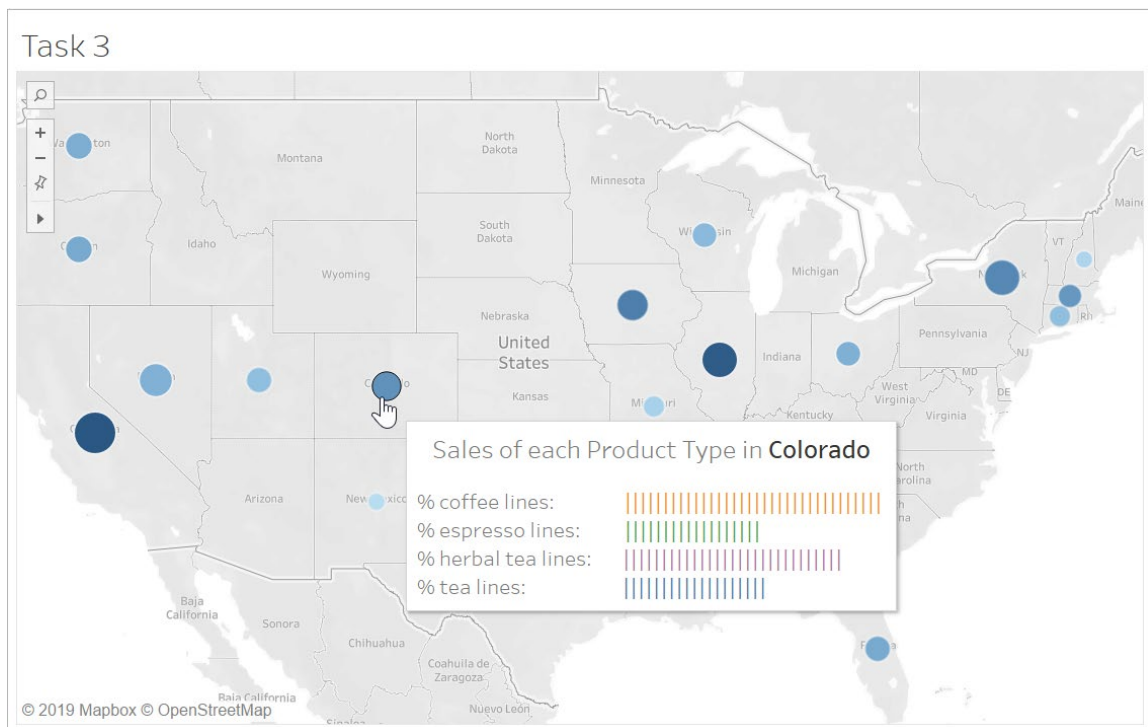


5. Select **Worksheet** → **Tooltip**.

6. In the Edit Text dialog box, position the cursor where you want to insert the new field and do the following tasks:
- Type and format a label for the field according to the screen shown.
  - Click **Insert**.
  - In the **Insert** list, locate the field you added to the **Level of Detail** shelf, and select it.
  - When finished, click **OK**.




7. Mouse over to view the updated tooltip.





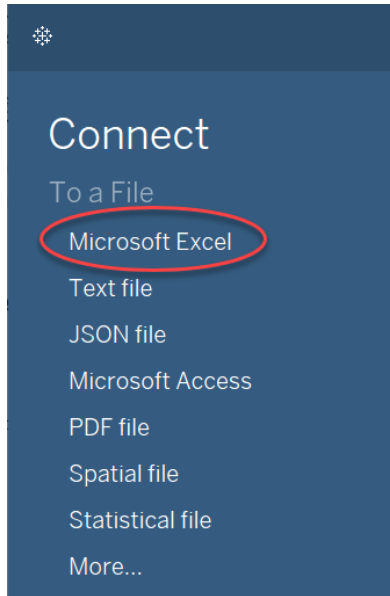
## Data Preparation for Task 4

Create a Tableau work book that connect to the **Singapore dataset**.

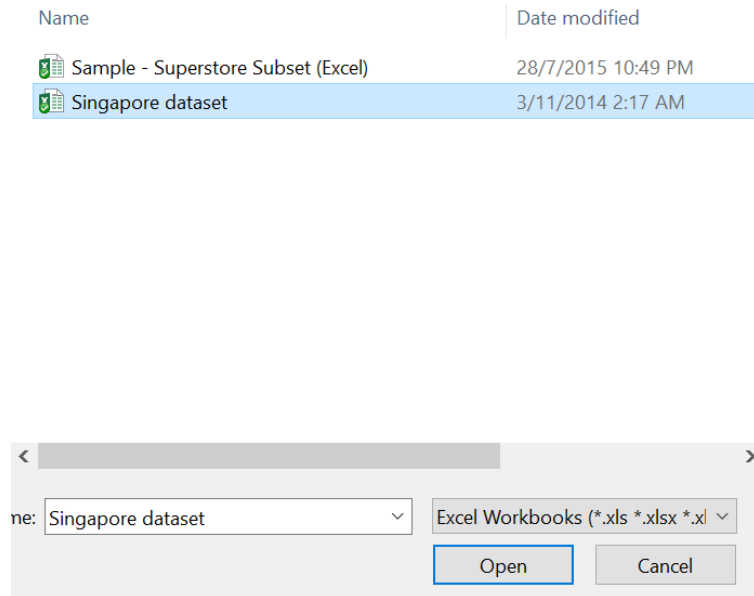
Step 1: Click on  icon to go to **Data Source** page. Under Connect To a File, select **Microsoft Excel**.

Step 2: From the file open window, select the **Singapore dataset**.

### Step 1



### Step 2

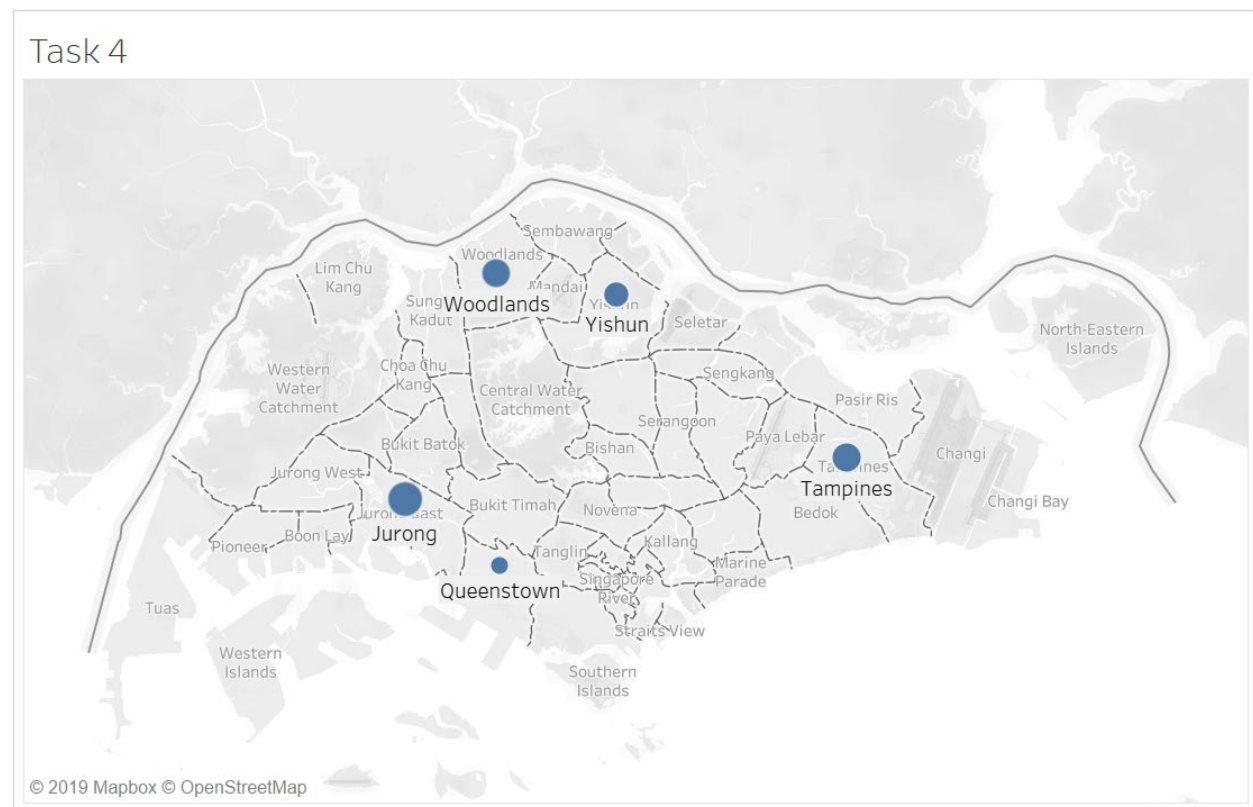


## Task 4: Creating Singapore Map

You may have noticed by now that Tableau doesn't recognize Singapore Town. Basically, you cannot connect to an Excel file with the various town names and expect Tableau to resolve the longitude and latitude before plotting them on the map.

As such, there is a need to extract the longitude and latitude of the places of interest from site like Google Map <https://maps.google.com.sg/>. If you are not sure how to get the information, please follow this [guide](#).

The downloaded Singapore dataset.xlsx has extracted some towns' information for you. Use this dataset to create the following map.



### Some tips:

- You cannot “double clicked” the town to get Tableau to resolve the location so drag longitude to Columns and latitude to Rows
- Drag Population to Size to see the differences of the 5 towns

**To do:**

- Add on more towns in the Singapore dataset excel. You can update the data by right-click on the data source → Refresh.

Town	Population	longitude	latitude
Bishan	219999	103.8352	1.3526
Sengkang	143555	103.8914	1.3868

- Enhance the display of tooltips.

