Communicating with Data – Intro to Tableau

Dr. Ab Mosca (they/them)

Slides based off slides courtesy of Jordan Crouser (https://jcrouser.github.io/)

Plan for Today

- Introduction to Tableau
- Lab pt. 1 - Getting started:
  - Connecting to a data file
  - Creating views
  - Using "Show Me": a recommender system for views
- Lab pt. 2 - Exploring other datasets

- Discussion (time permitting)

Lab pt. 1 modeled on "Getting Started with Tableau Desktop" Version 8.2

Reminder

- hw01 is released today! (https://amosca01.github.io/SDS-CS109/ > Homework > hw01)
- Due next Thursday (09/19) at midnight
  - You have extensions if you need them, but you MUST tell me if you're taking one
  - Revise and resubmit also exists!
- Work alone or with a partner (you choose!)

**I won't always remind you there is a homework released/due, make sure you stay up to date with the course schedule! **

Introduction to Tableau

- A drag-and-drop tool for mapping data dimensions onto visual dimensions

- Today we will learn:
  - How to load data into Tableau
  - A little bit about how Tableau organizes data
  - How to tell Tableau which facets of the data to display, and how

What is  ?

- Visualization and business analytics software with a strong focus on **relational data**
- Idea originally developed at Stanford University
- Now owned by Salesforce

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What's relational data?

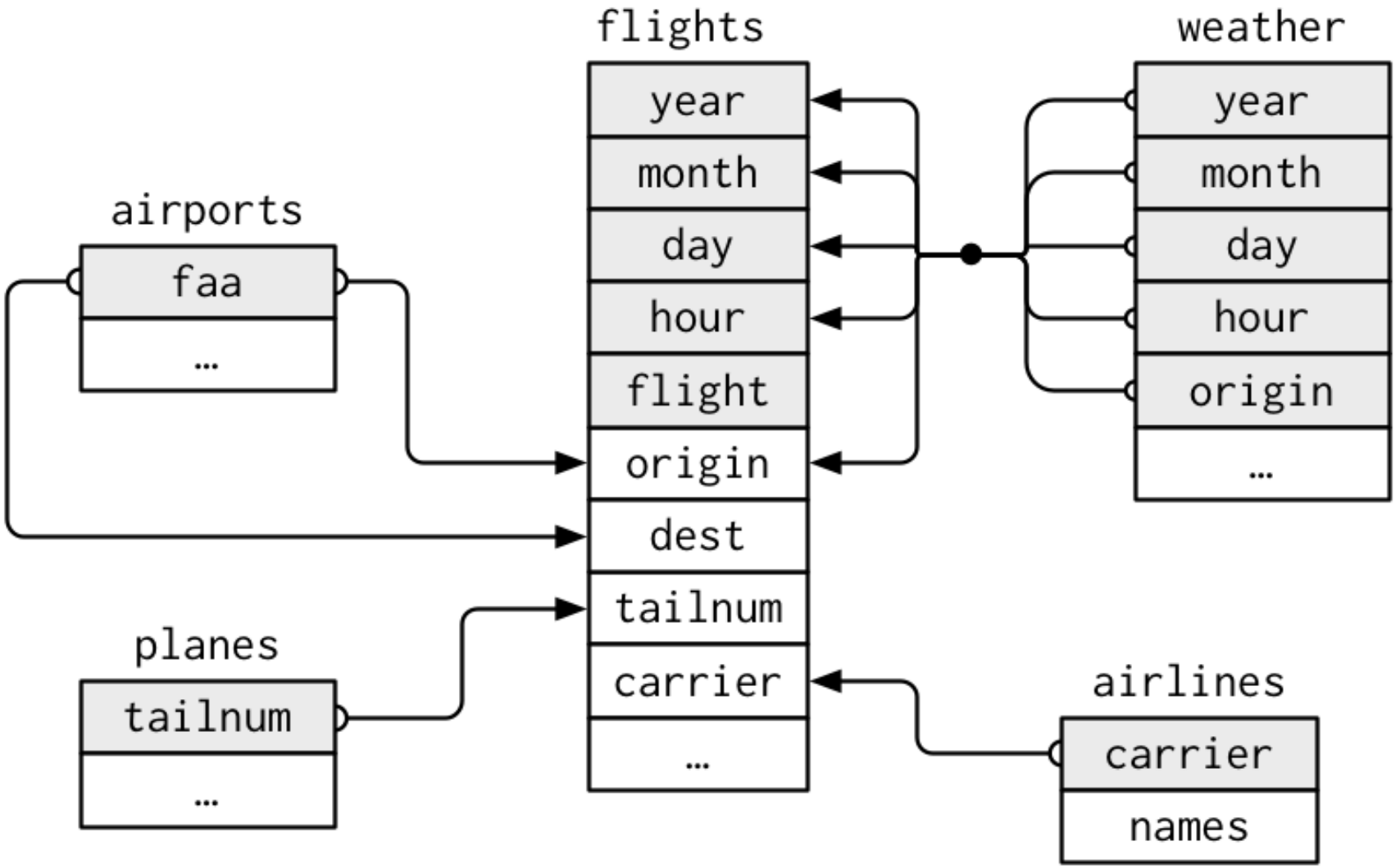
```
airlines
#> # A tibble: 16 × 2
#>   carrier name
#>   <chr>   <chr>
```

```
airports
#> # A tibble: 1,458 × 8
#>   faa   name                                lat   lon   alt    tz dst   tzone
#>   <chr> <chr>                             <dbl> <dbl> <dbl> <dbl> <chr> <chr>
```

```
planes
#> # A tibble: 3,322 × 9
#>   tailnum  year type                manufacturer model engines seats speed engine
#>   <chr>   <int> <chr>               <chr>        <chr>   <int> <int> <int> <chr>
```

```
weather
#> # A tibble: 26,115 × 15
#>   origin  year month   day  hour  temp  dewp humid wind_dir wind_speed wind_gust
#>   <chr>  <int> <int> <int> <int> <dbl> <dbl> <dbl>    <dbl>      <dbl>     <dbl>
#> 1 EWR     2013     1     1     1  39.0  26.1  59.4      270      10.4         NA
#> 2 EWR     2013     1     1     2  39.0  27.0  61.6      250       8.06        NA
#> 3 EWR     2013     1     1     3  39.0  28.0  64.4      240      11.5         NA
#> 4 EWR     2013     1     1     4  39.9  28.0  62.2      250      12.7         NA
#> 5 EWR     2013     1     1     5  39.0  28.0  64.4      260      12.7         NA
#> 6 EWR     2013     1     1     6  37.9  28.0  67.2      240      11.5         NA
#> # i 26,109 more rows
```

Relational Data



https://r4ds.had.co.nz/relational-data.html

Tableau basics

Main Window: New Workbook

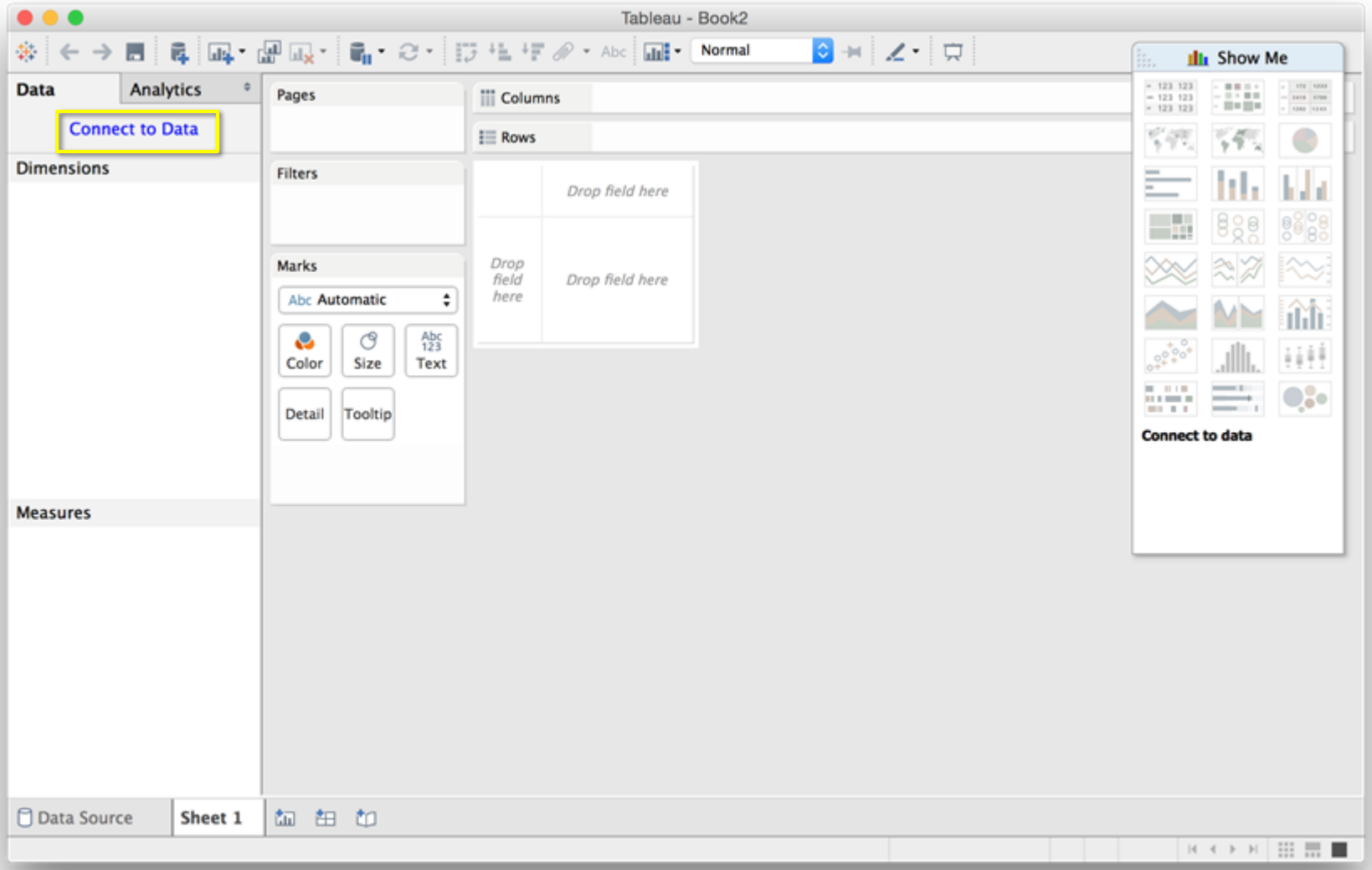


Tableau basics

Main Window: with Data and Views

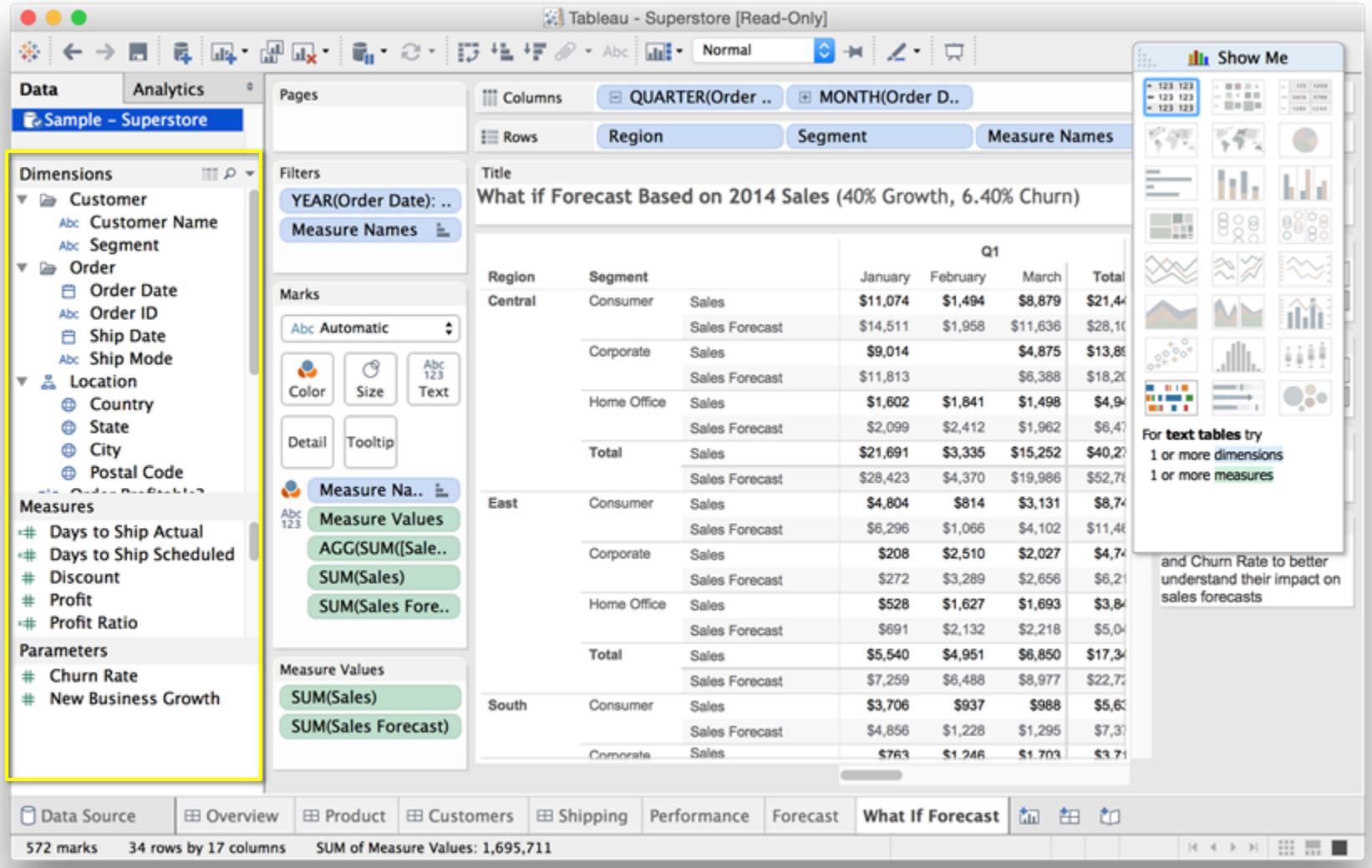


Tableau basics

Data Types

- All data fields are assigned one of the following types:

Icon	Description
Abc	Text values
	Date values
	Date & Time values
#	Numerical values
T/F	Boolean values (relational only)
	Geographic values (used with maps)

- Occasionally the auto-detected type is wrong; this can be manually overridden using the menu

Tableau basics

Main Window: with Data and Views

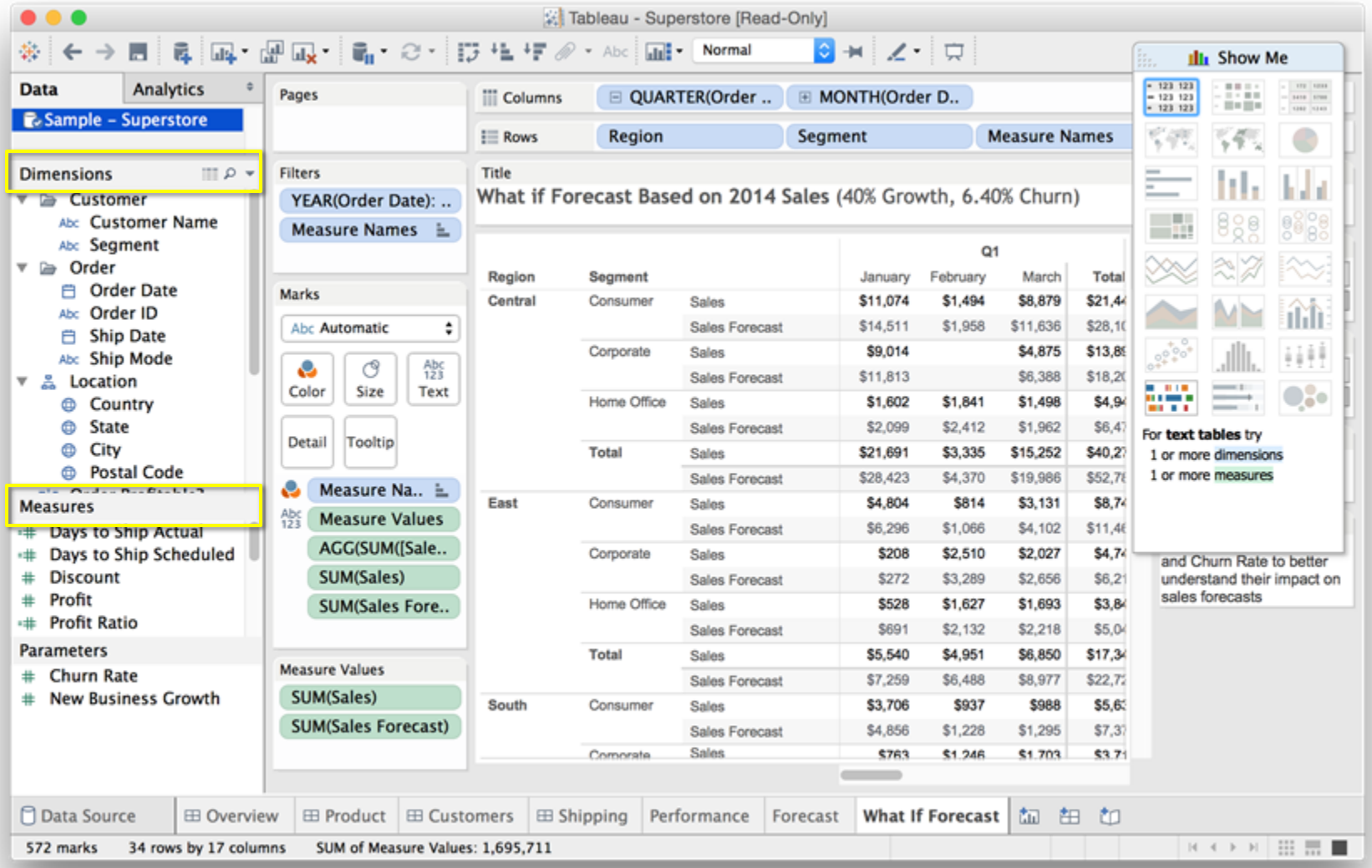


Tableau basics

Data Roles: Dimensions

- In general, any field containing qualitative or categorical information is treated as a dimension (e.g. text, dates)
- In relational data, dimensions are the independent variables
- Data can be aggregated using the values of a dimension
- When added as rows/columns, dimensions produce headers

Tableau basics

Data Roles: Measures

- In general, any field containing quantitative information is treated as a measure (e.g. numerical data, etc.)
- In relational data, measures are the dependent variables
- The values of a measure are a function of one or more dimensions
- When added as rows/columns, measures produce axes

Tableau basics

Data Roles: Dimensions vs. Measures

measure Which is which? dimension

total number of students in each **house**

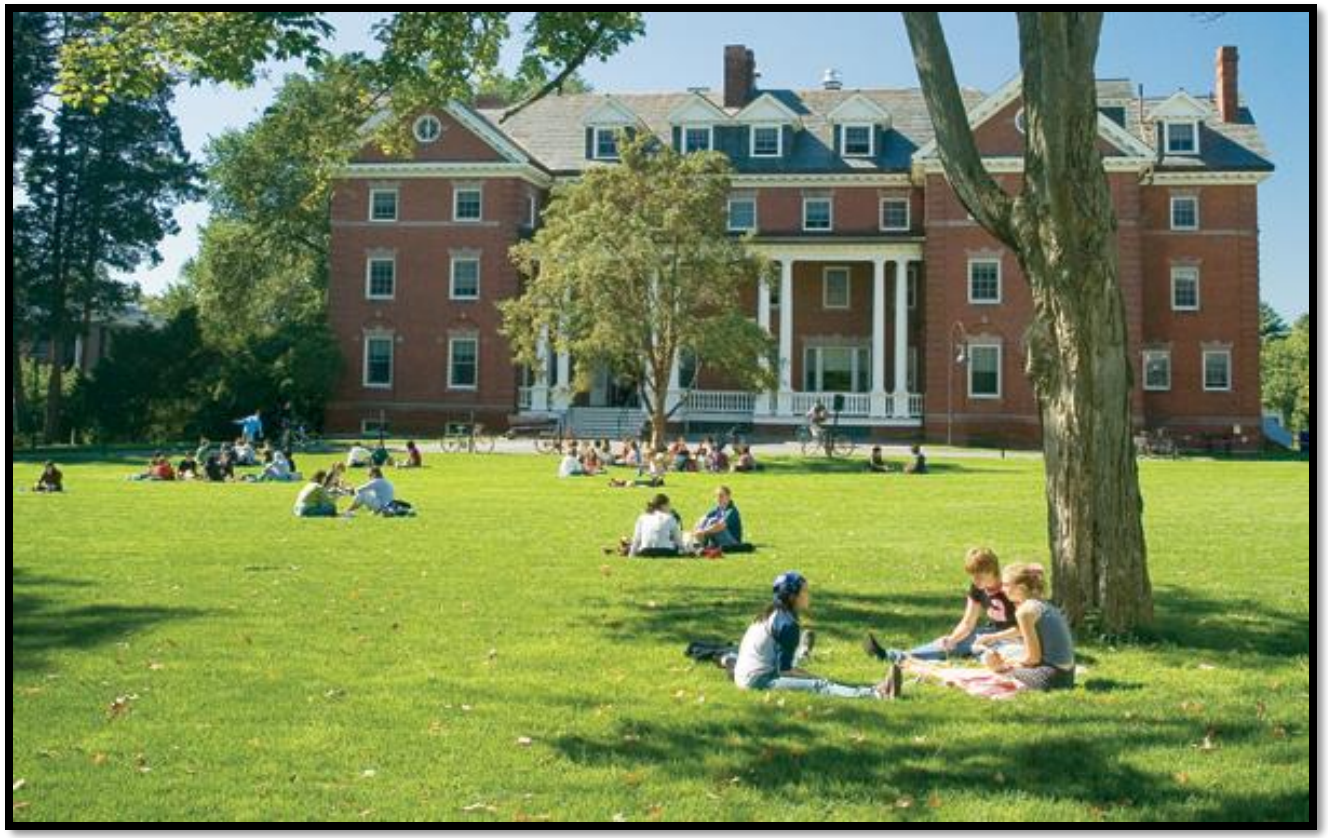


Tableau basics

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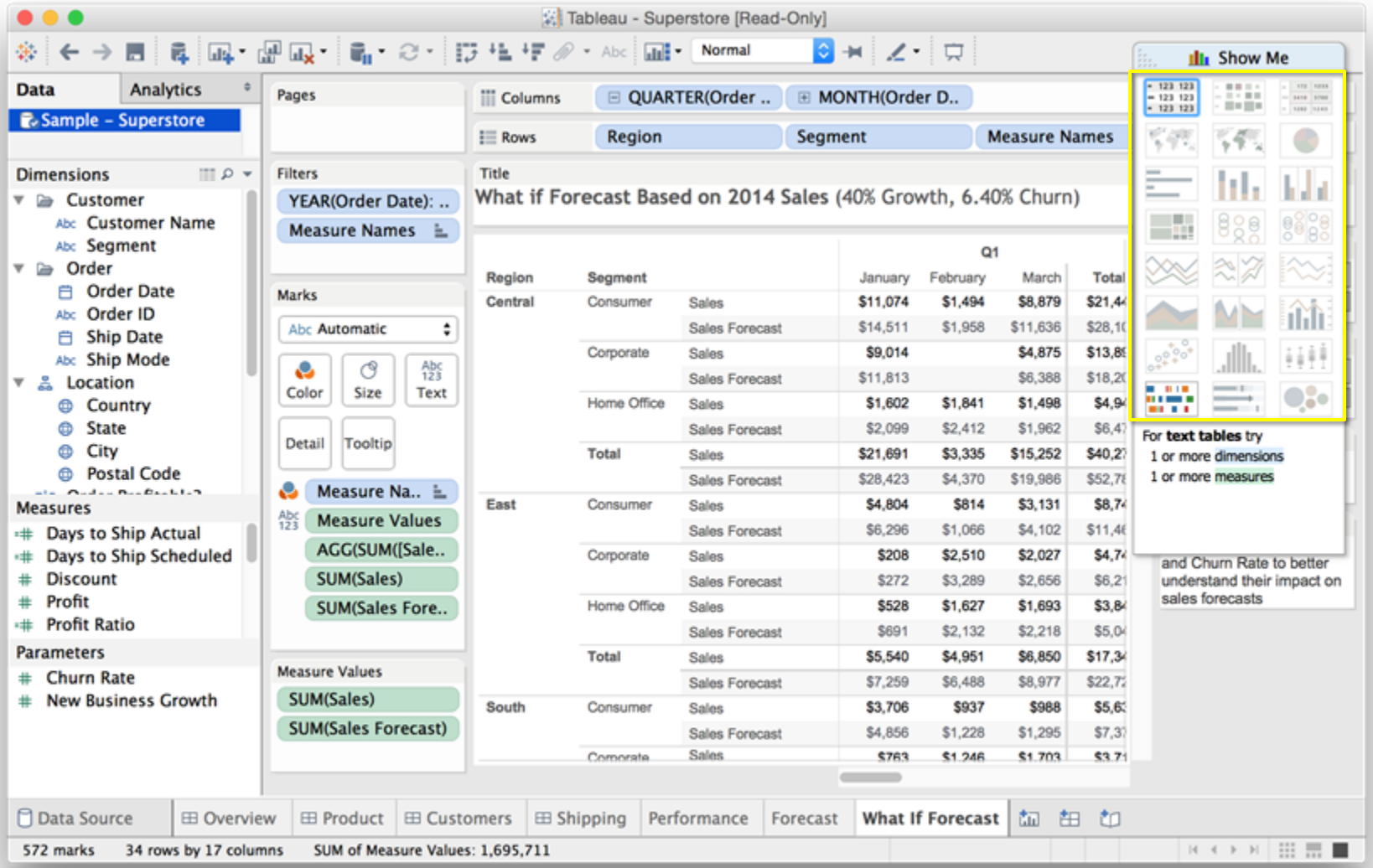

Tableau basics

21 Available Views

- Tables
- Maps
- Pie charts
- Bar charts
- Treemaps
- Circle views
- Line charts
- Area charts
- Combination charts
- Scatterplots
- Histograms
- Box-and-whisker plots
- Gantt
- Bullet plots
- Packed circles

Tableau basics

Lab pt. 1: Getting Started

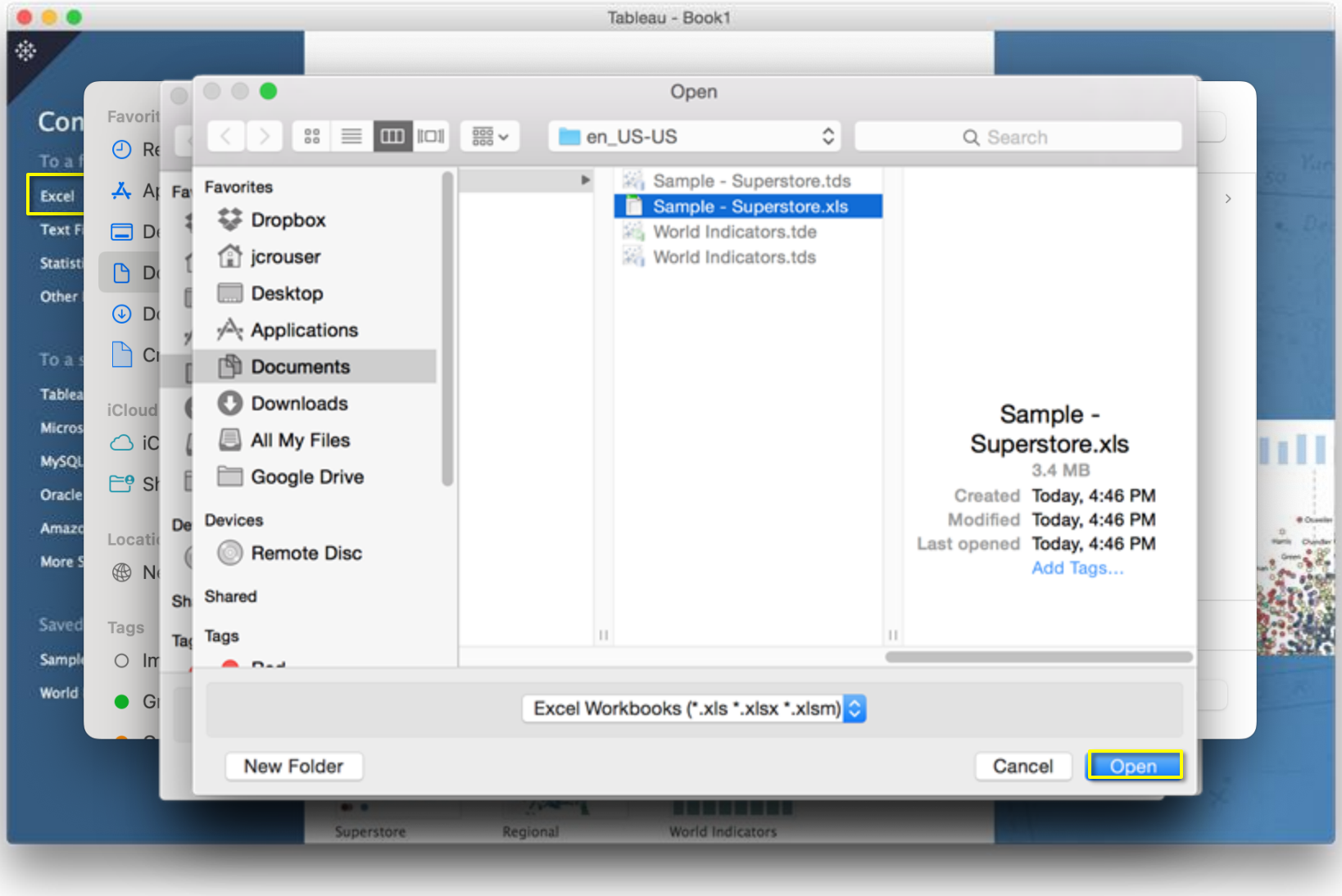

Tableau basics

Connecting to a Data File

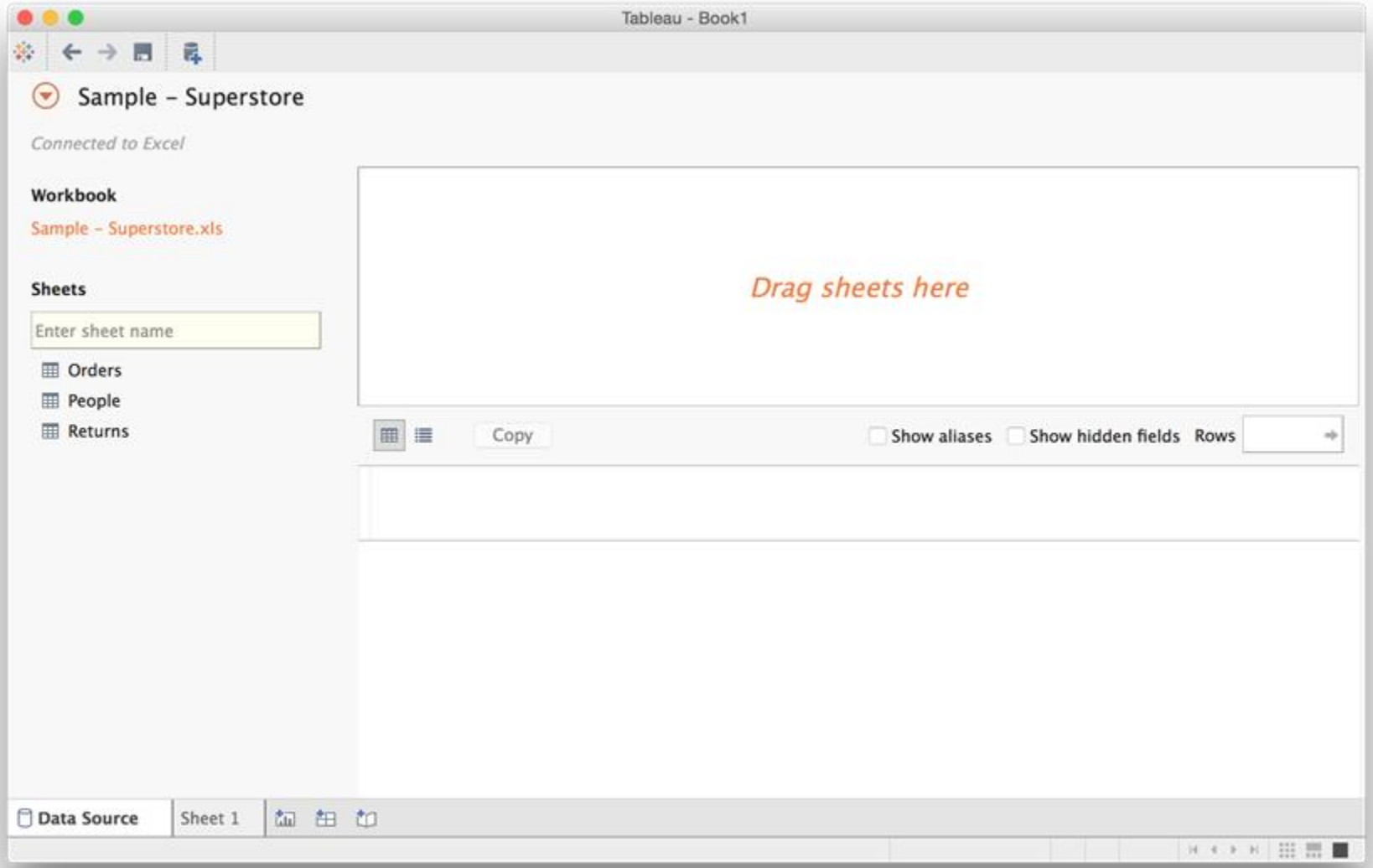

Tableau basics

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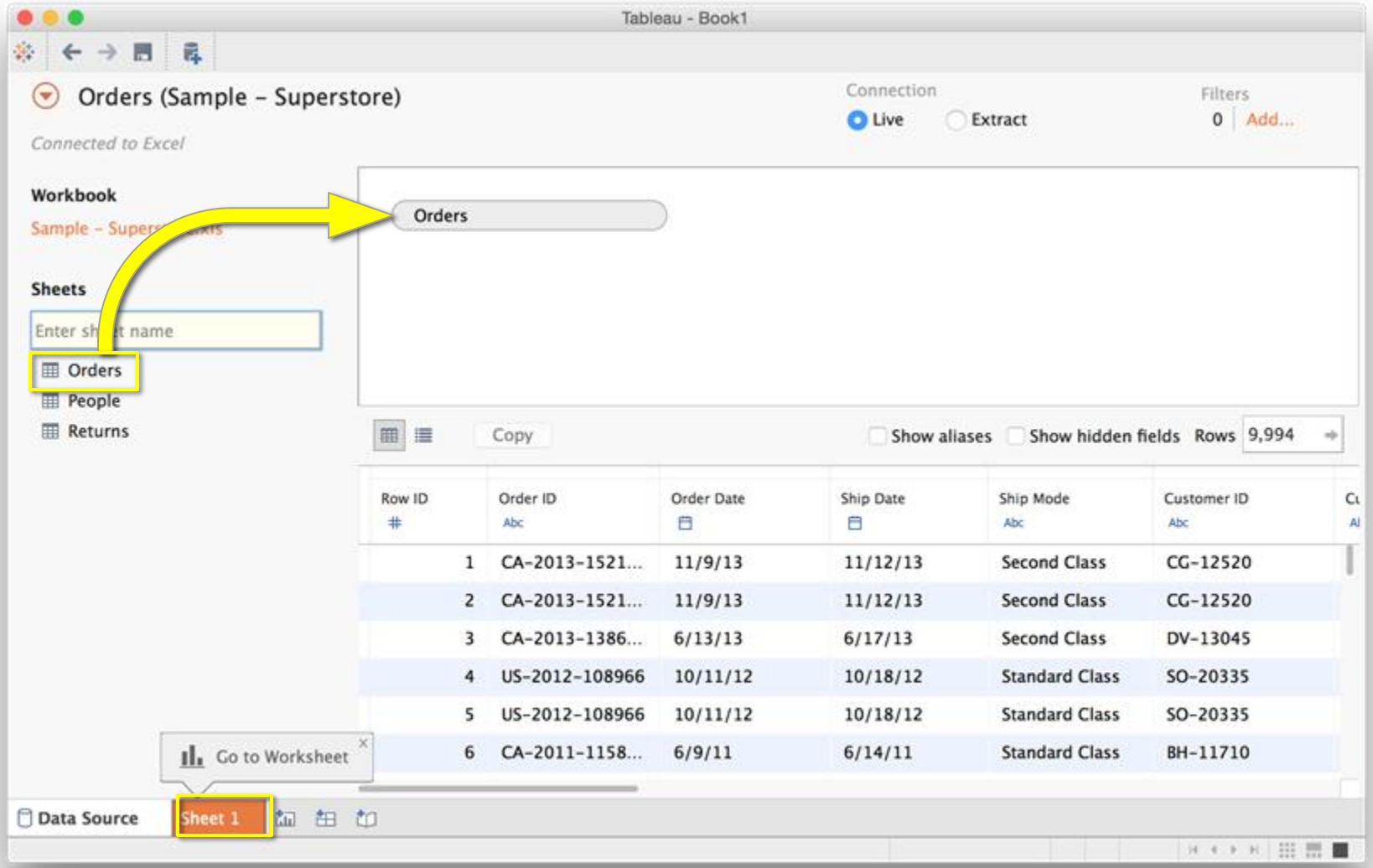


Tableau basics

Creating Views

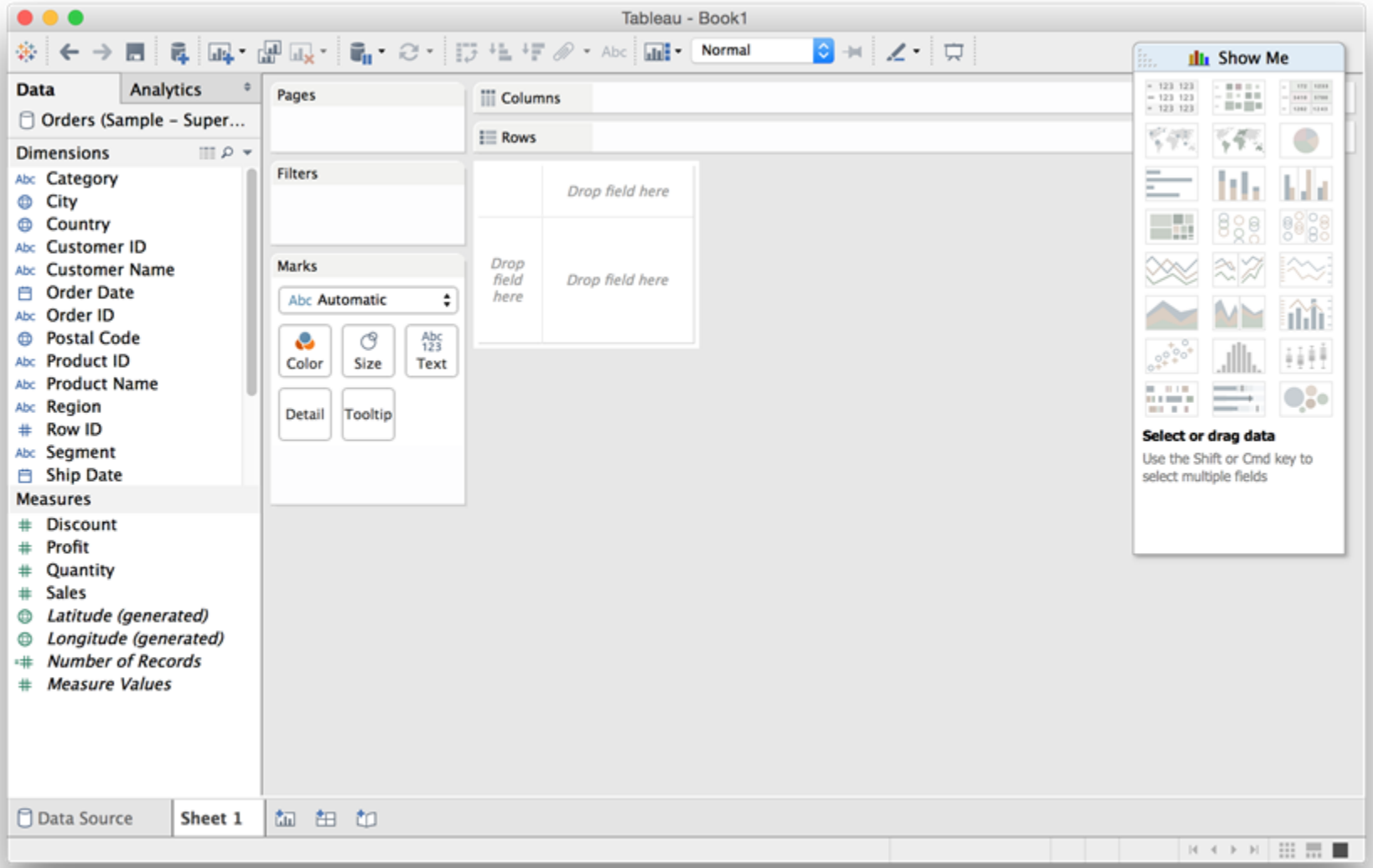


Tableau basics

Drag a dimension to "Columns"

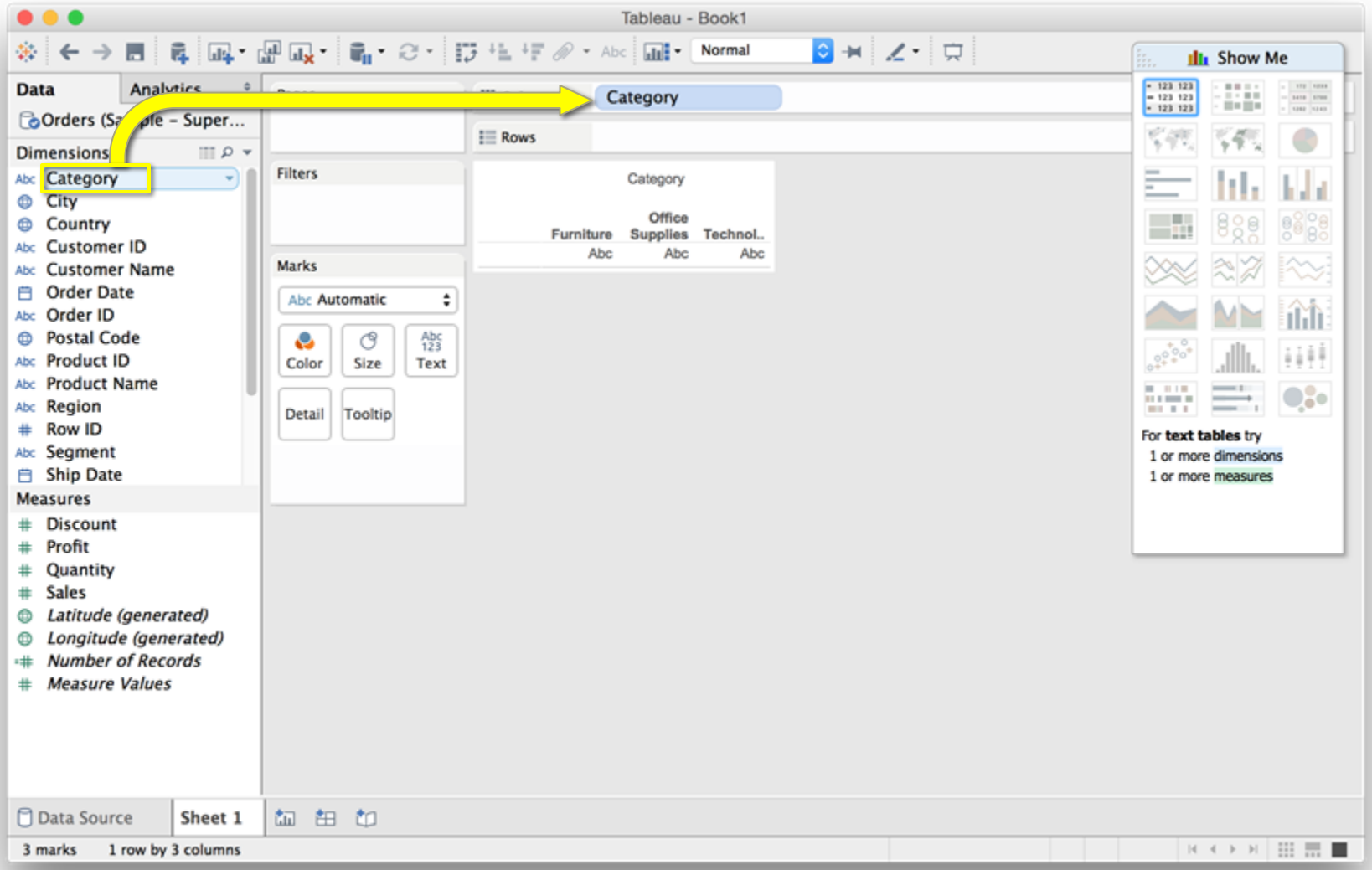


Tableau basics

Drag a dimension to “Rows”

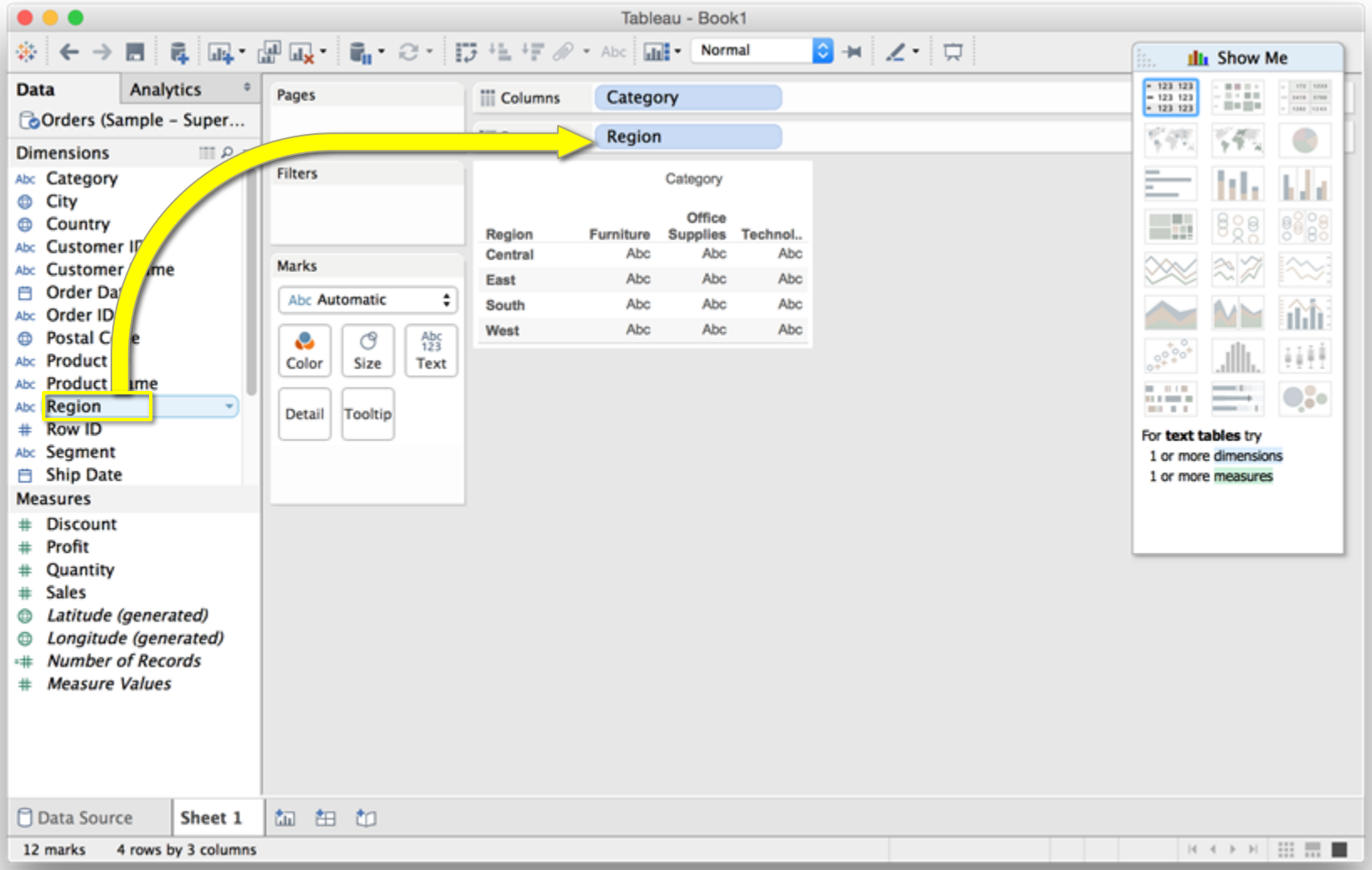


Tableau basics

Drag a measure onto “Text”

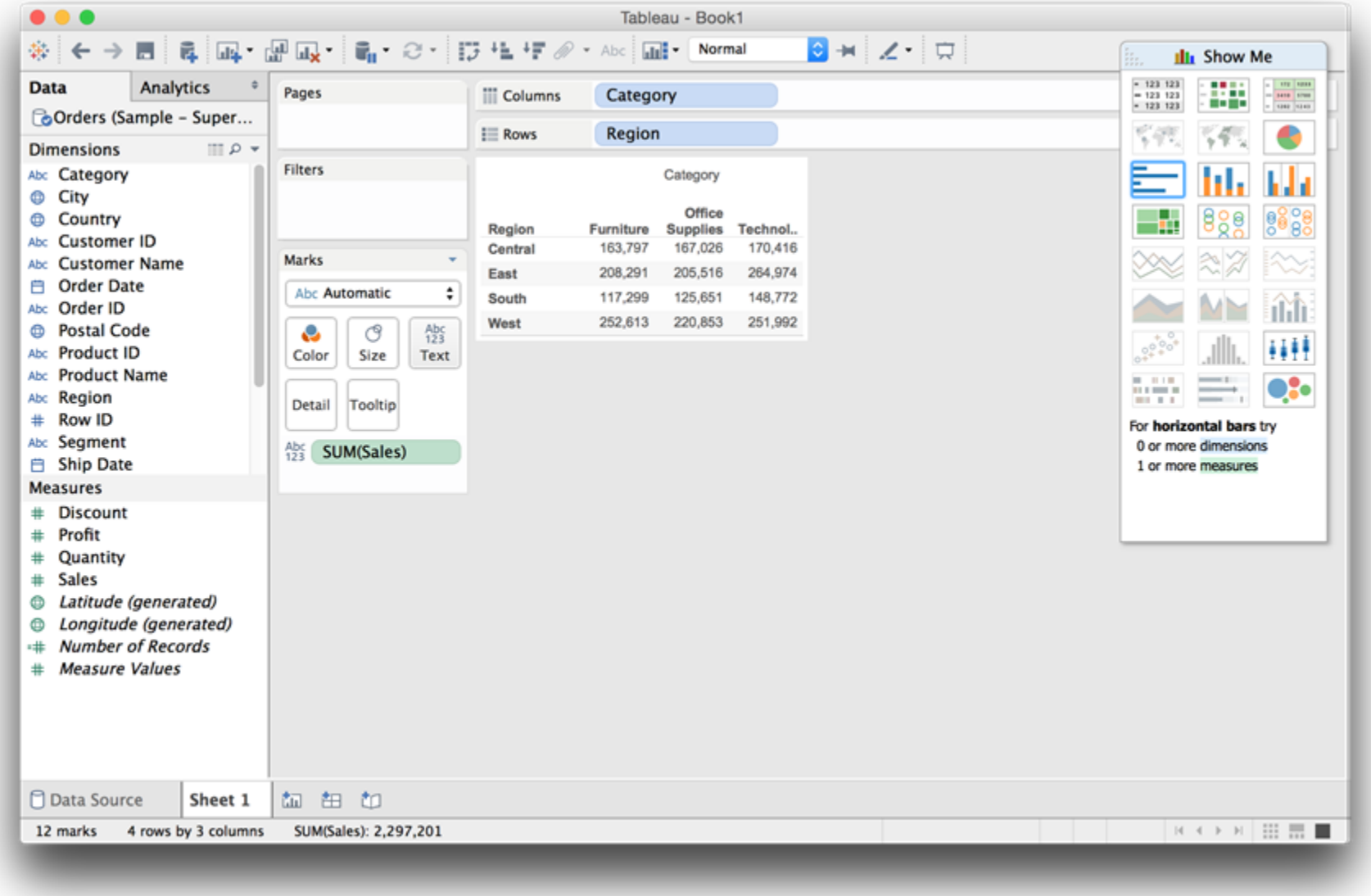


Tableau basics

Further refine by subdividing

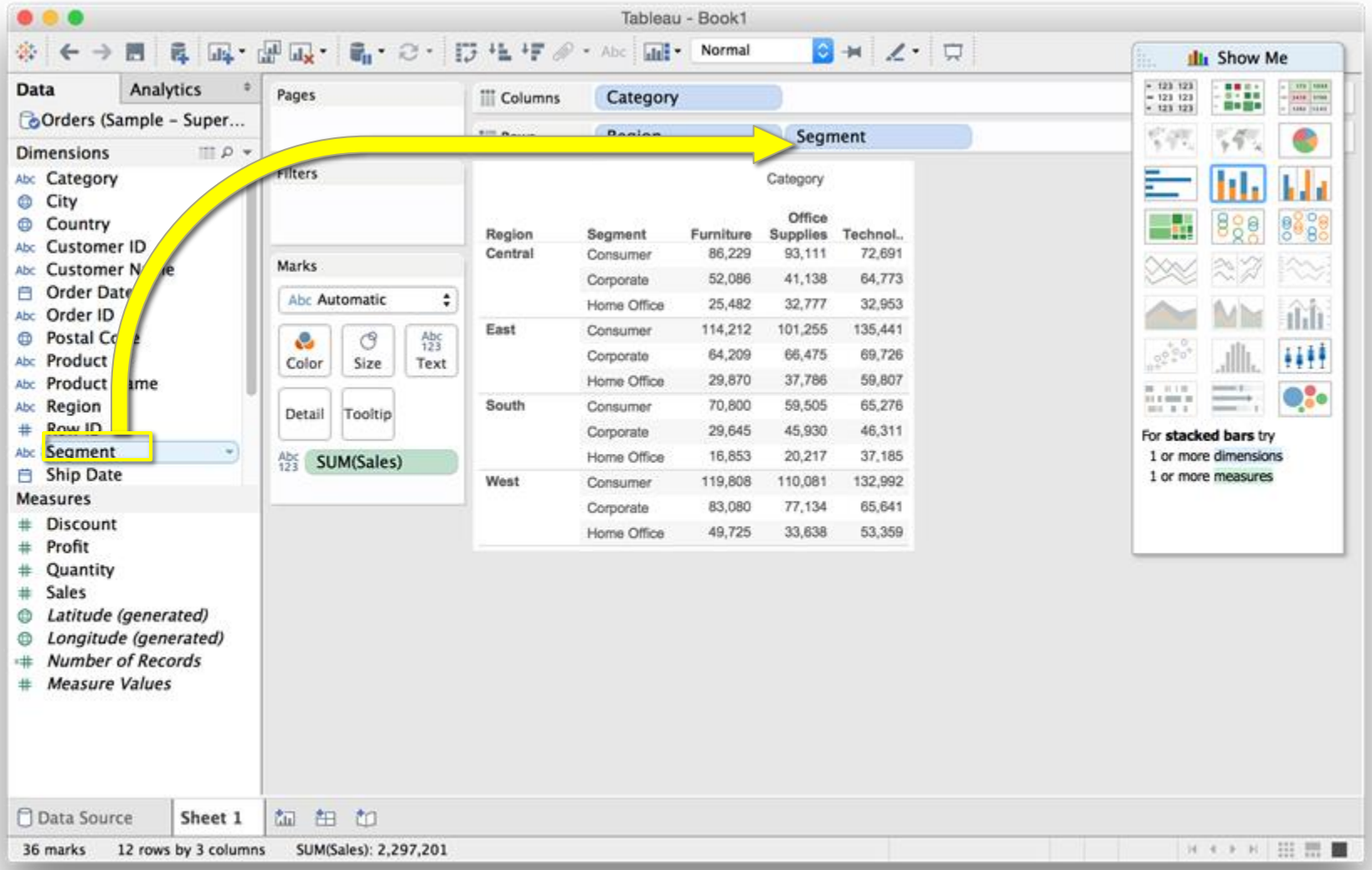


Tableau basics

From Text Table to Bar Chart

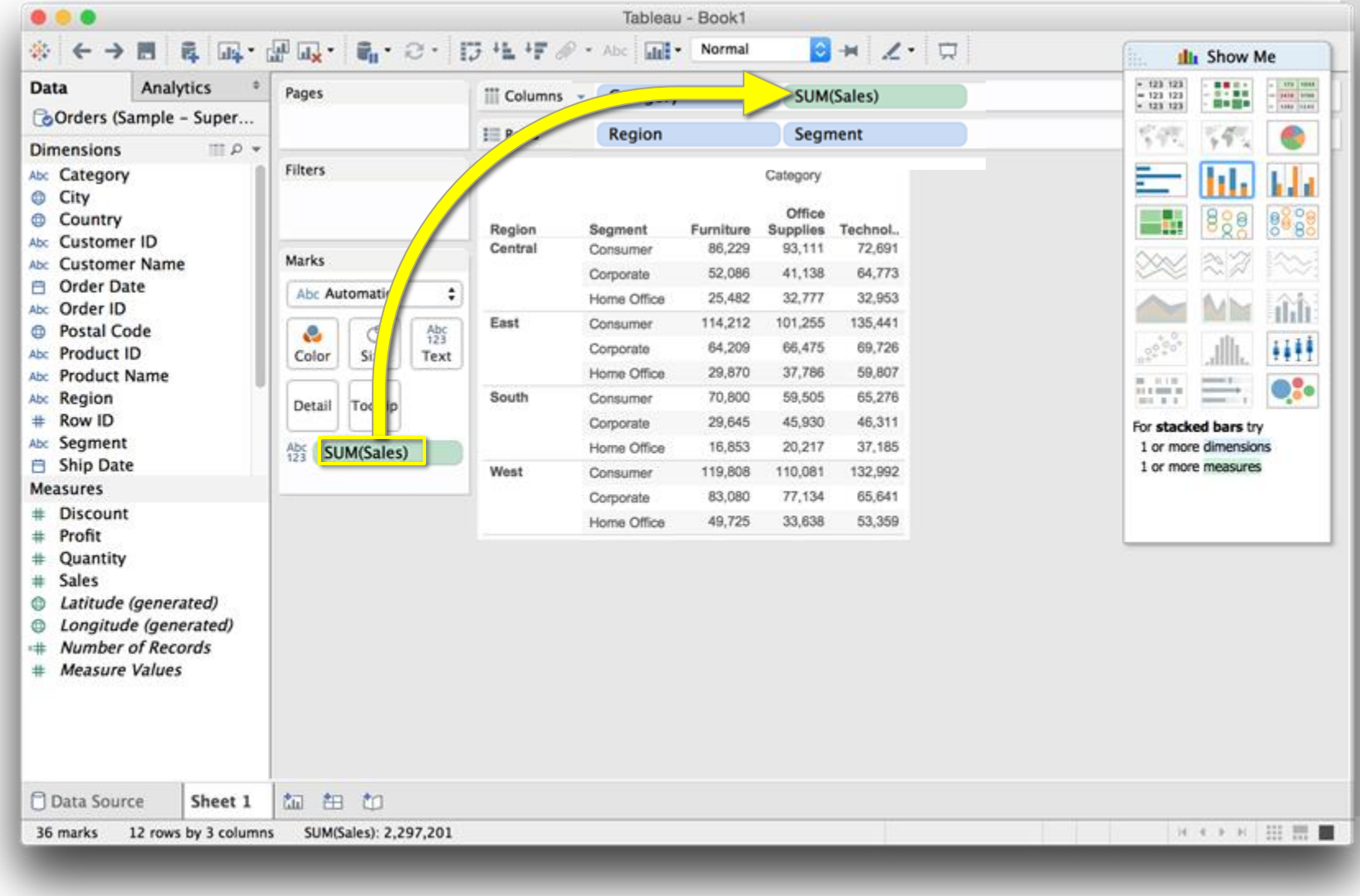


Tableau basics

Dual encoding using color

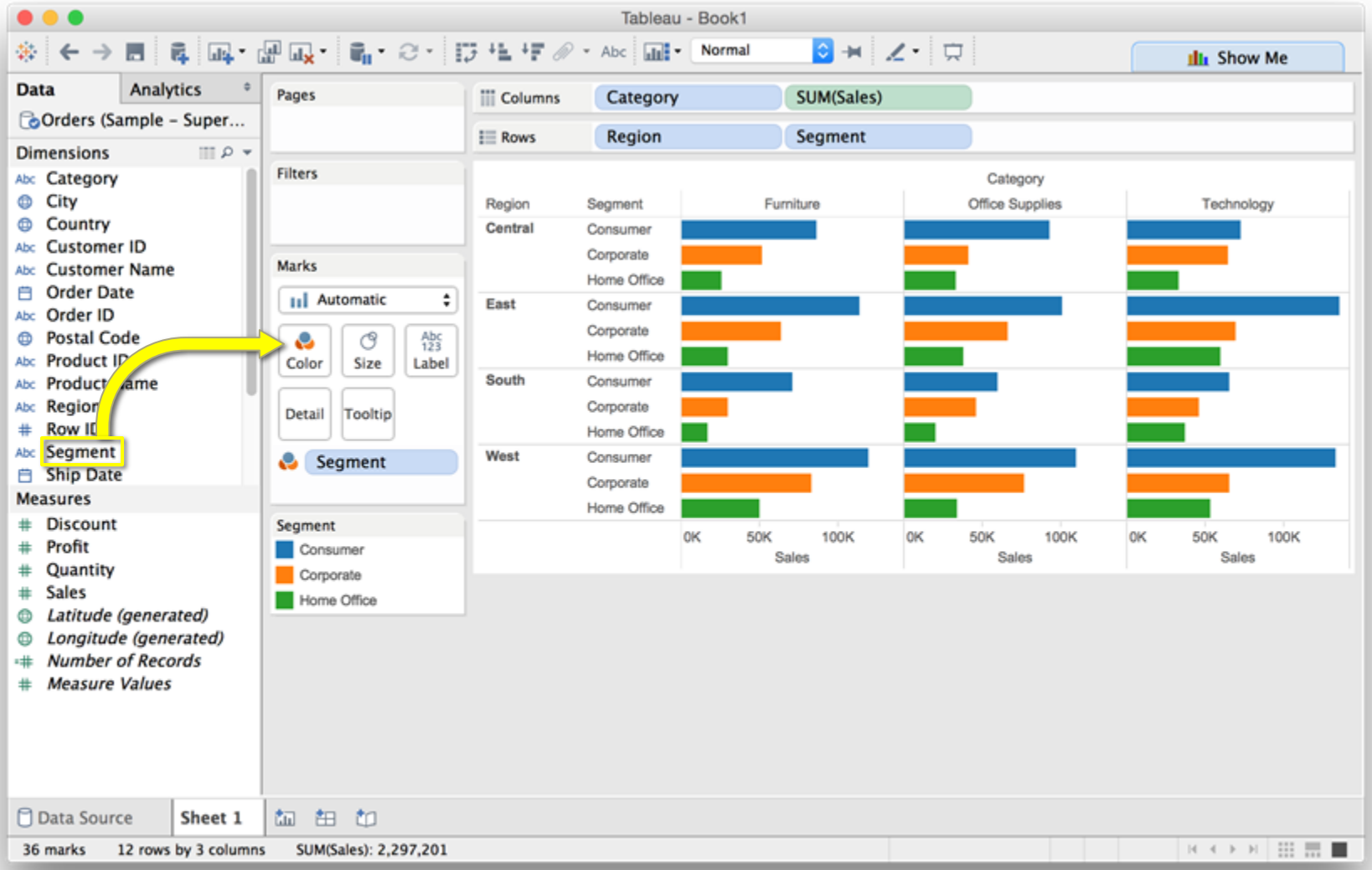


Tableau basics

Creating a new sheet

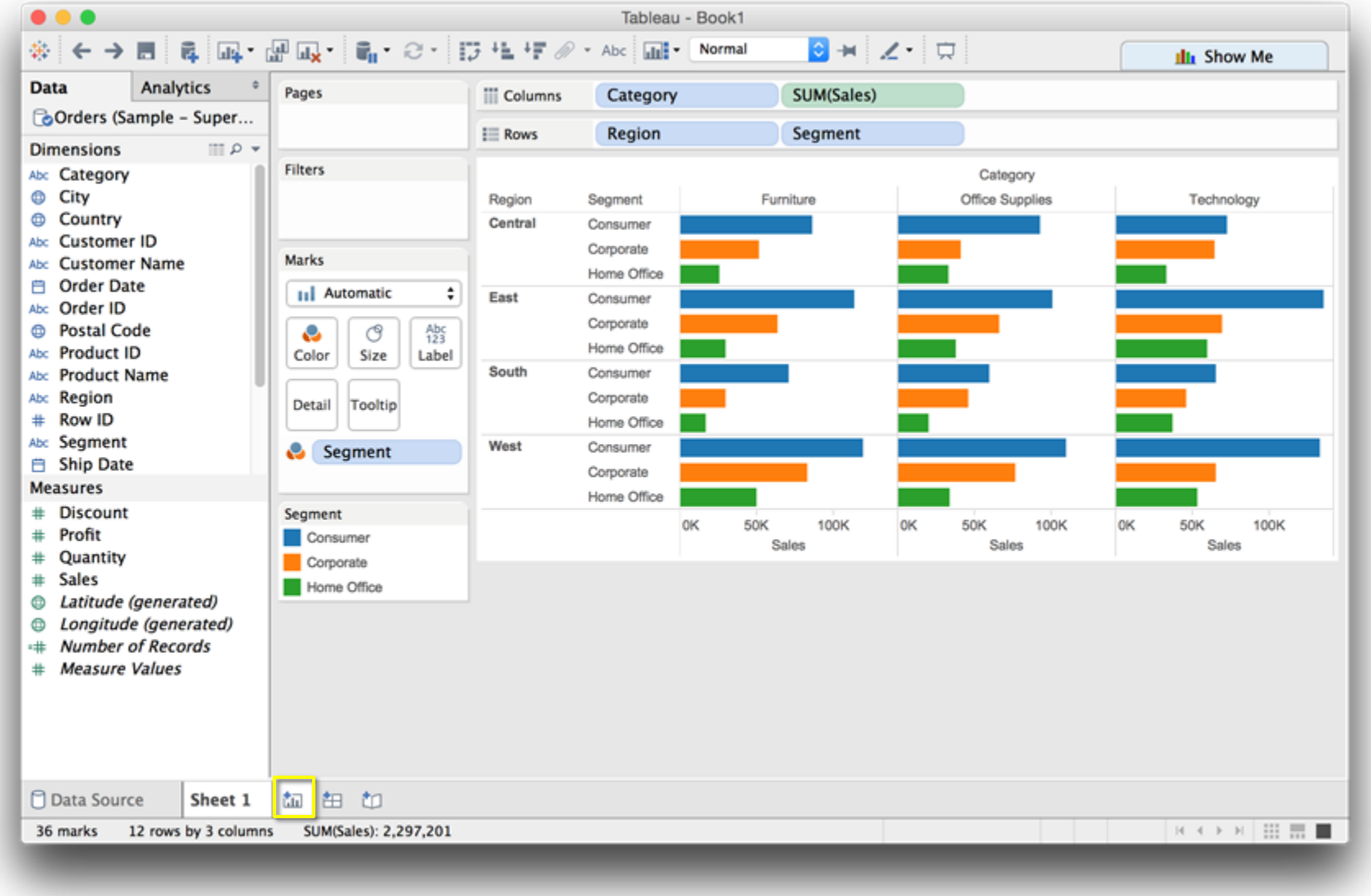
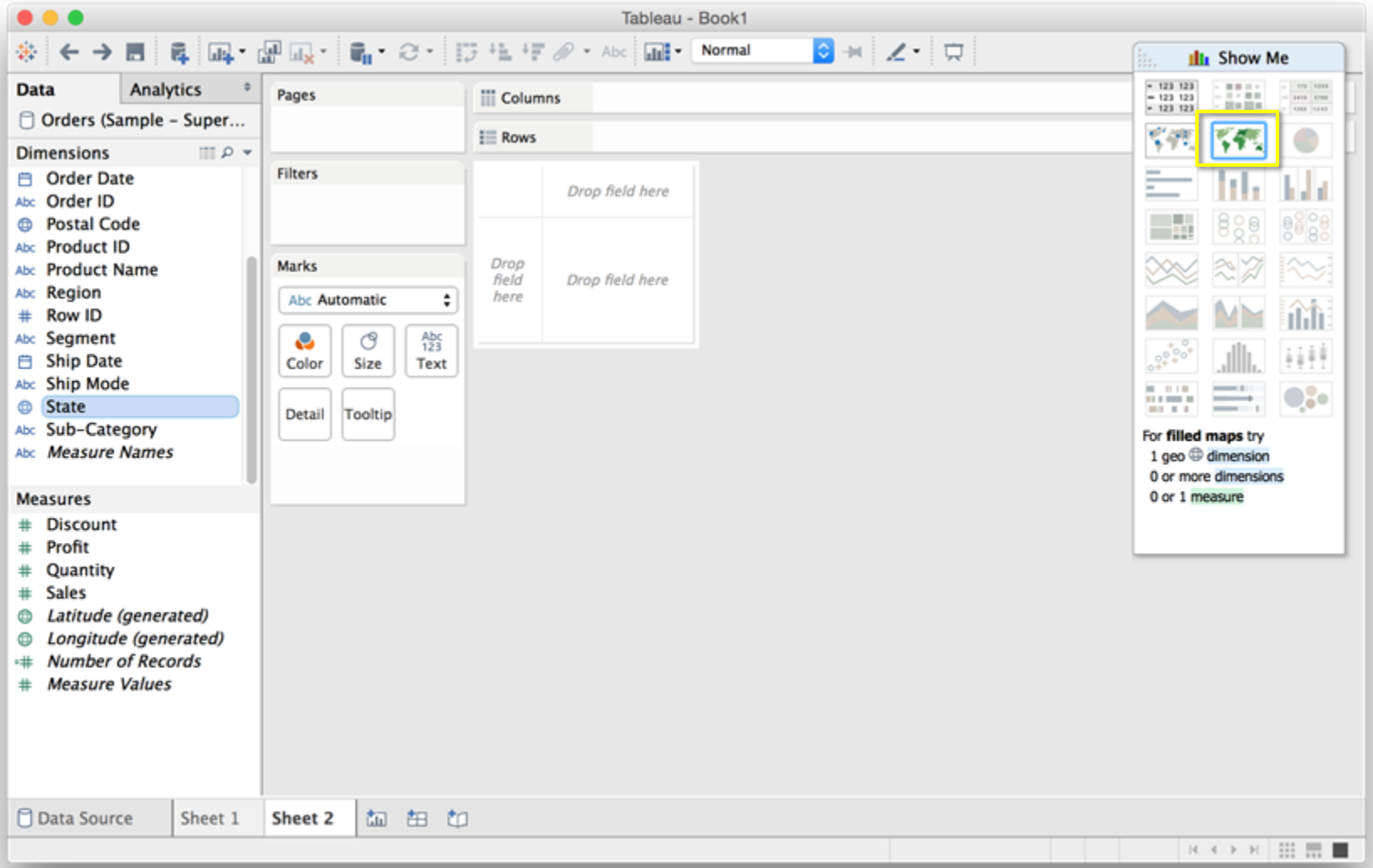


Tableau basics

Using "Show Me": a VIS recommender



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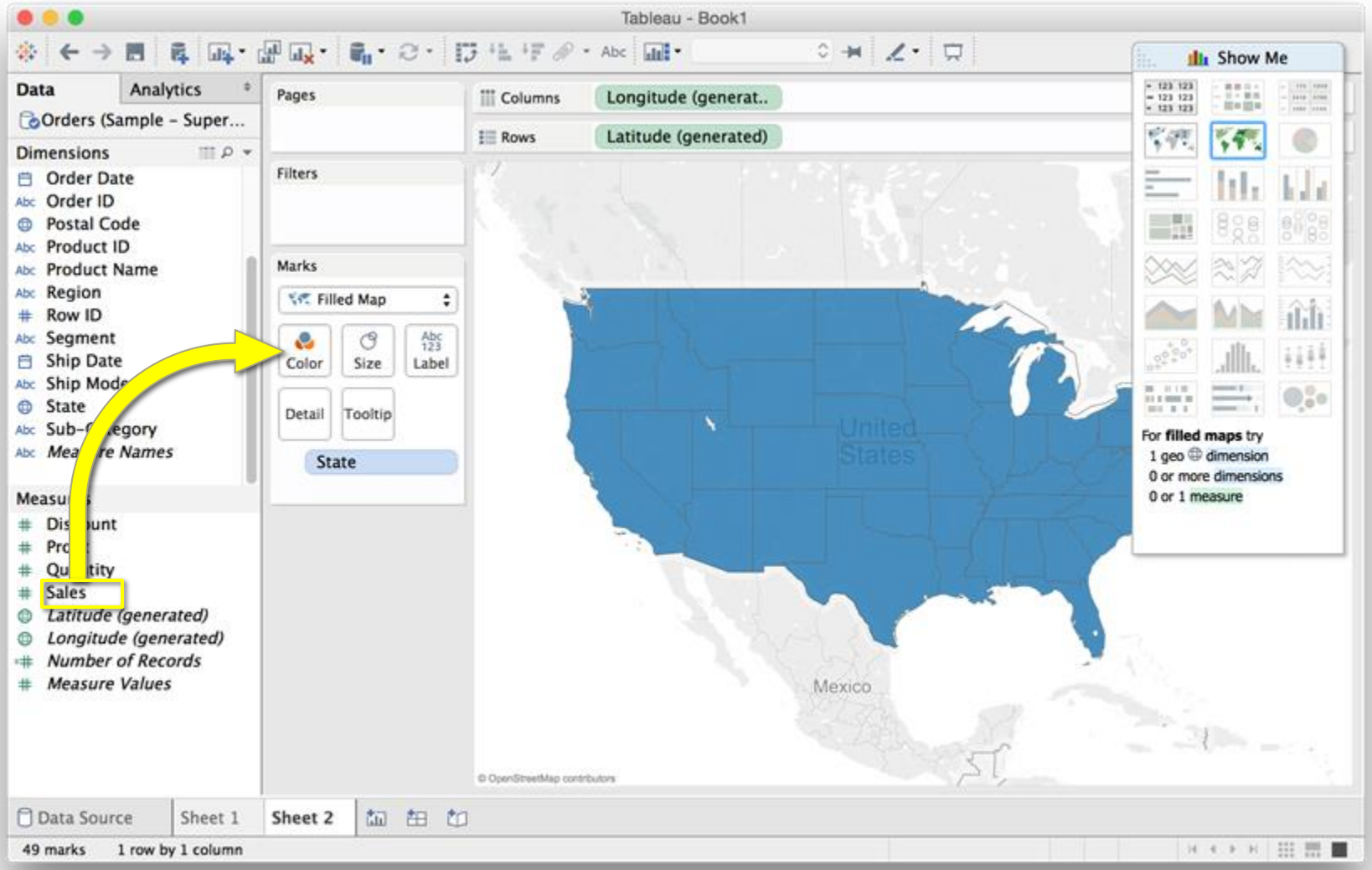

Tableau basics

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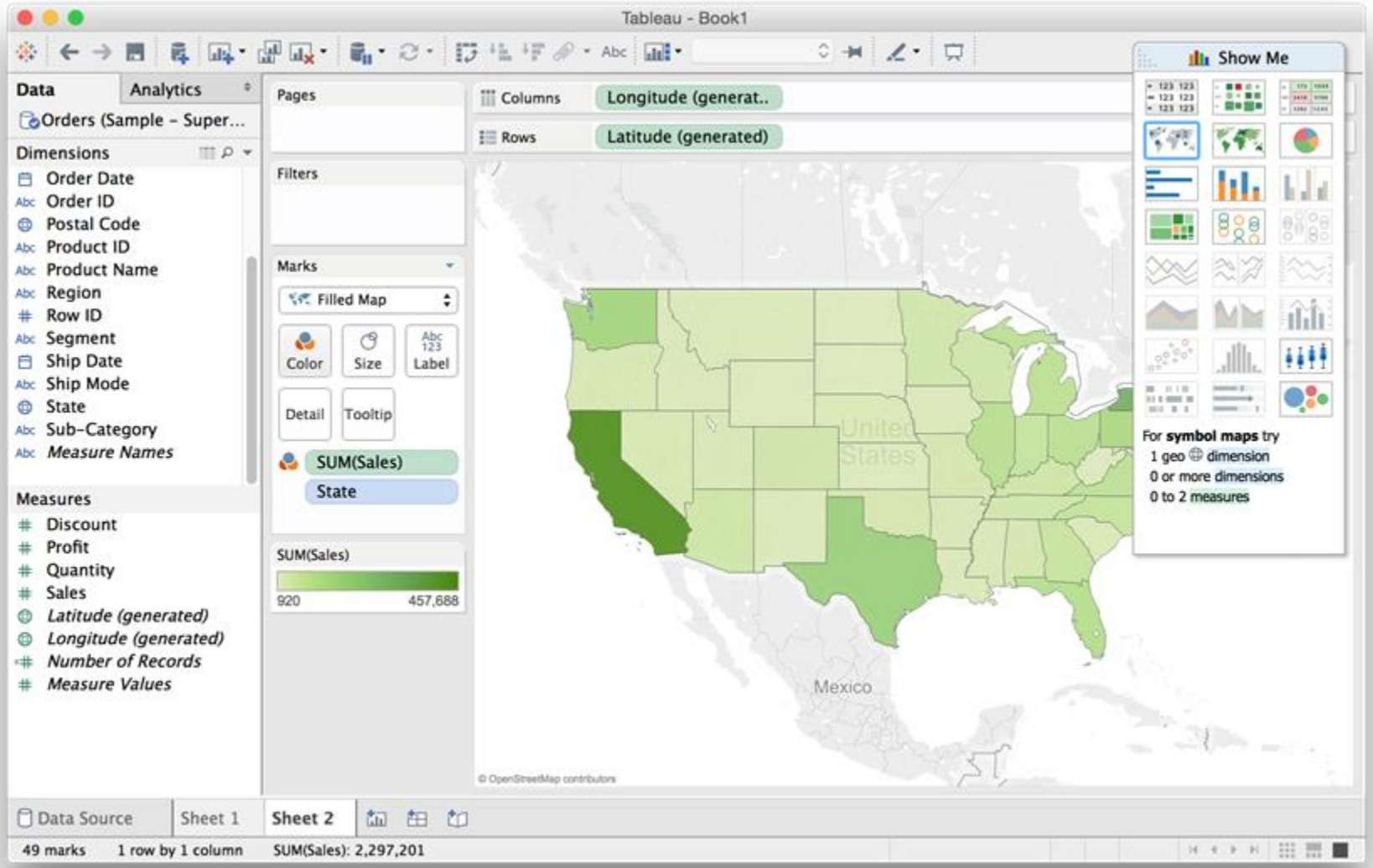

Tableau basics

Building Stories from Multiple Views

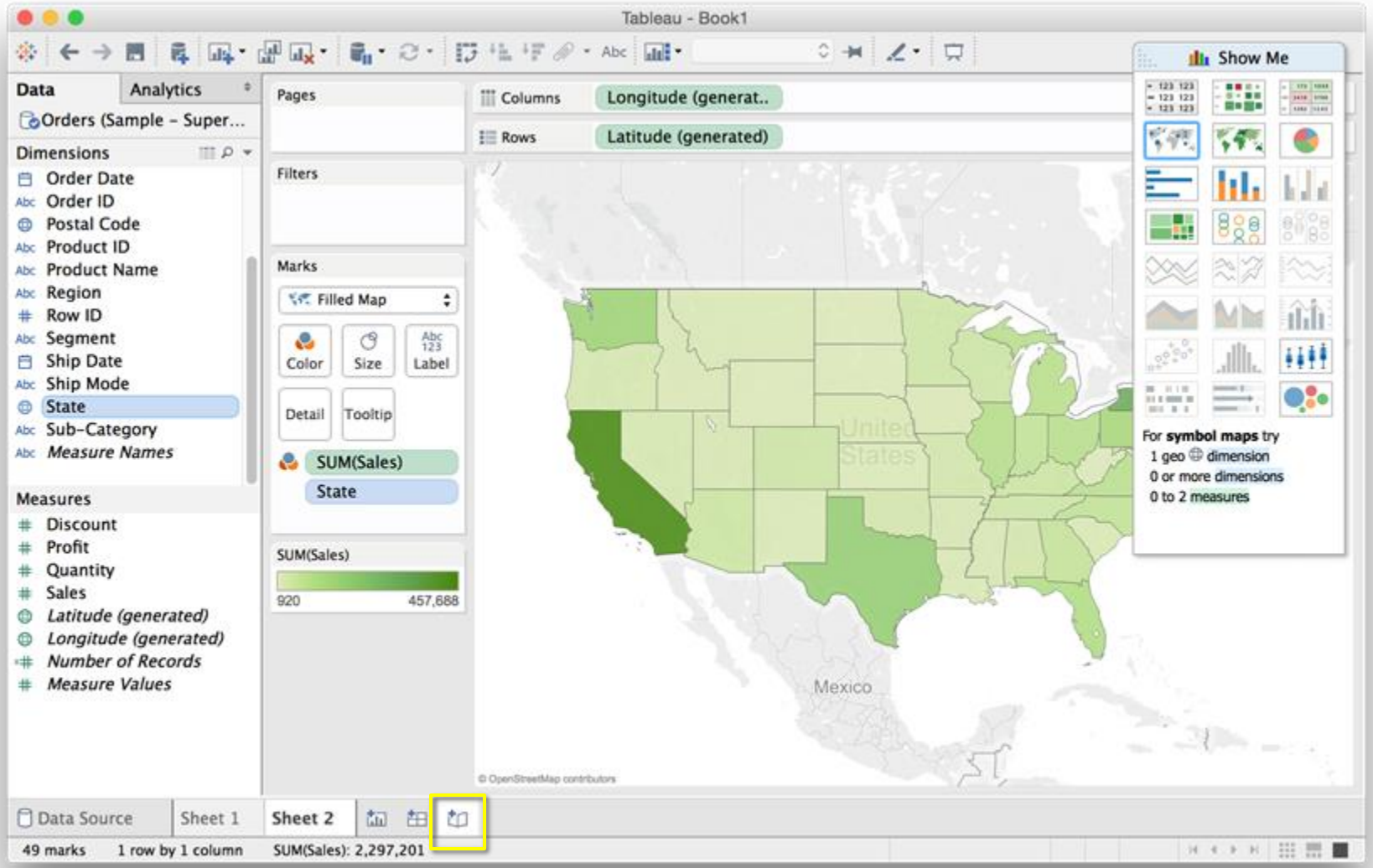

Tableau basics

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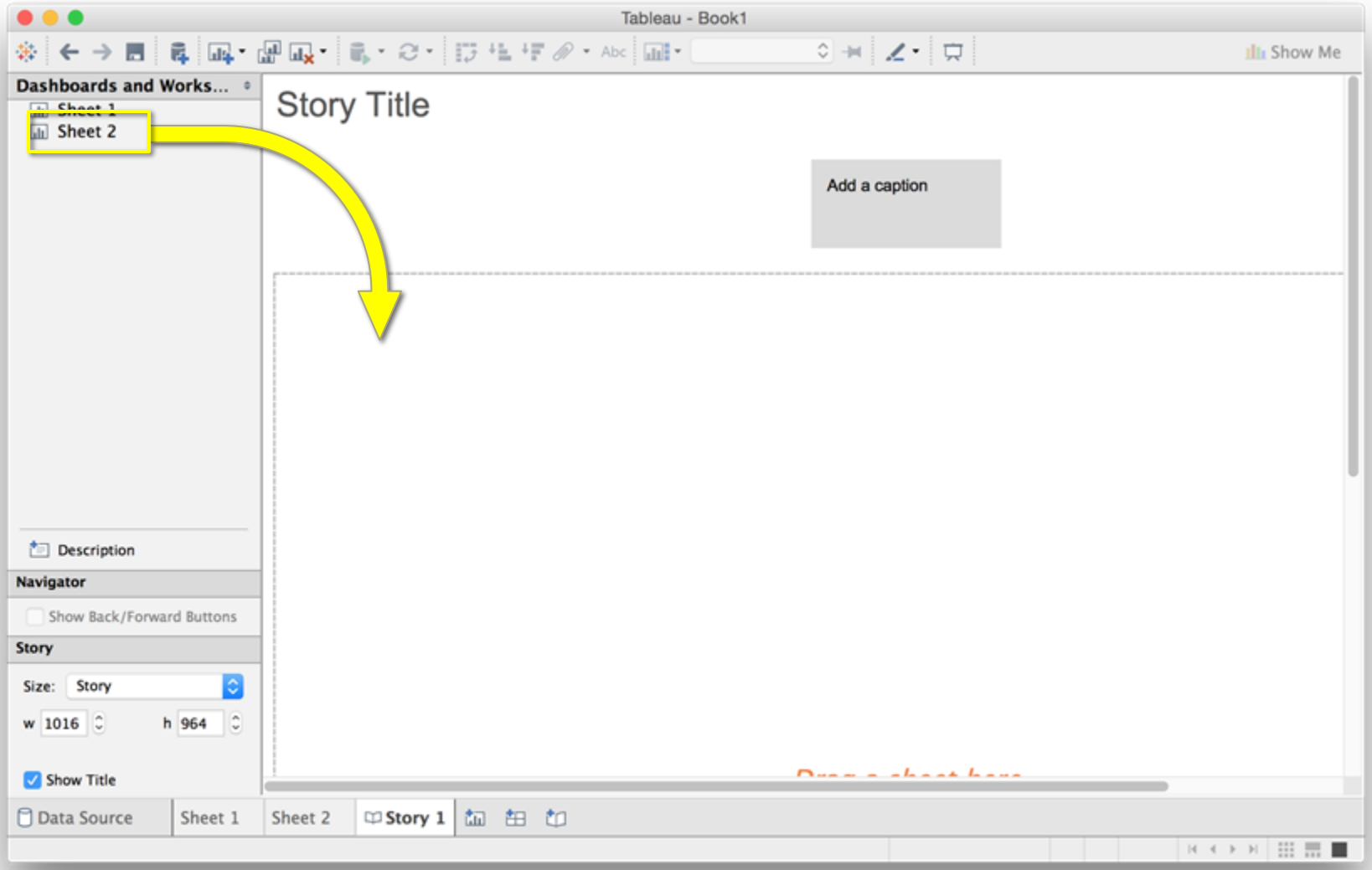
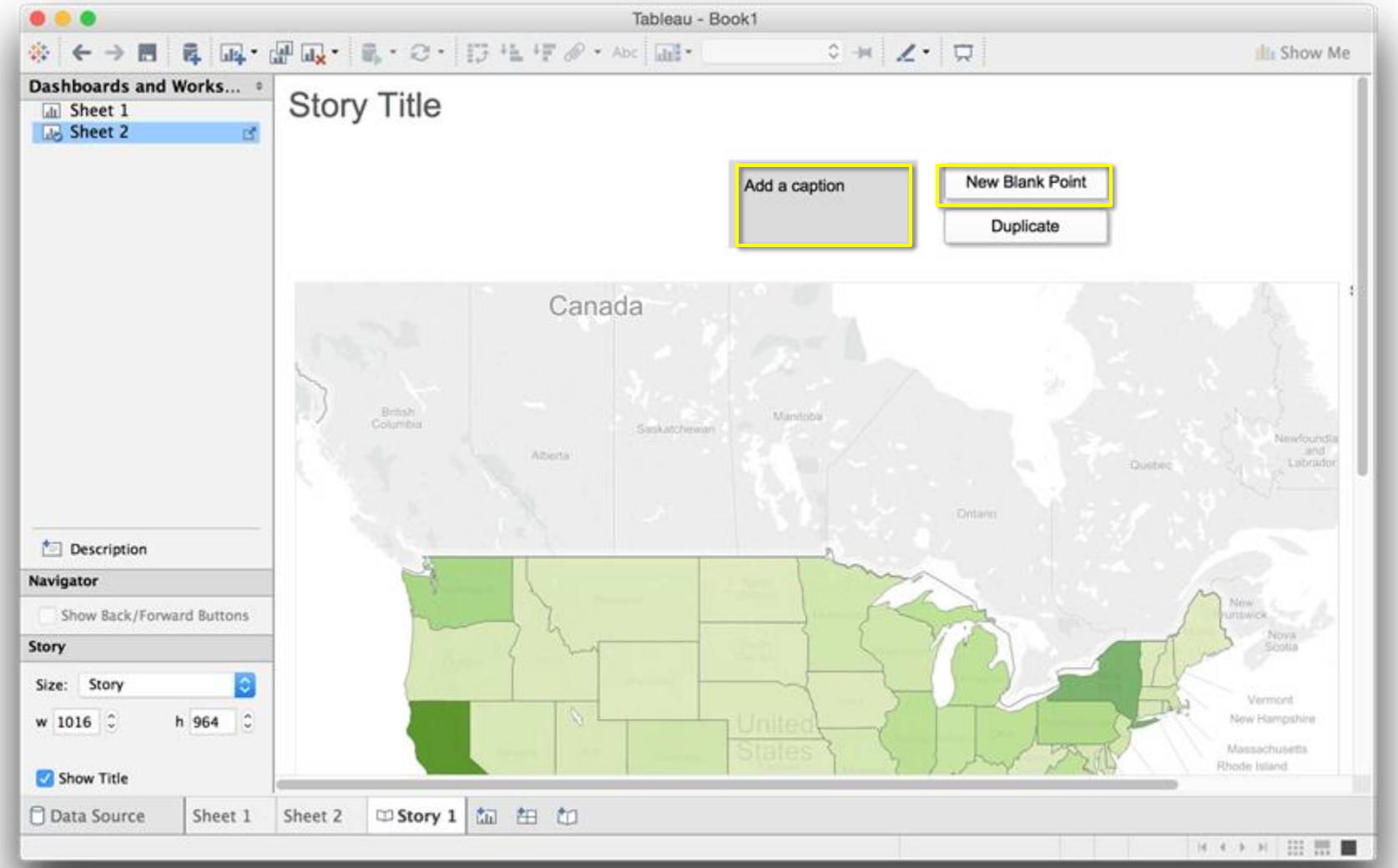


Tableau basics

Building Stories from Multiple Views



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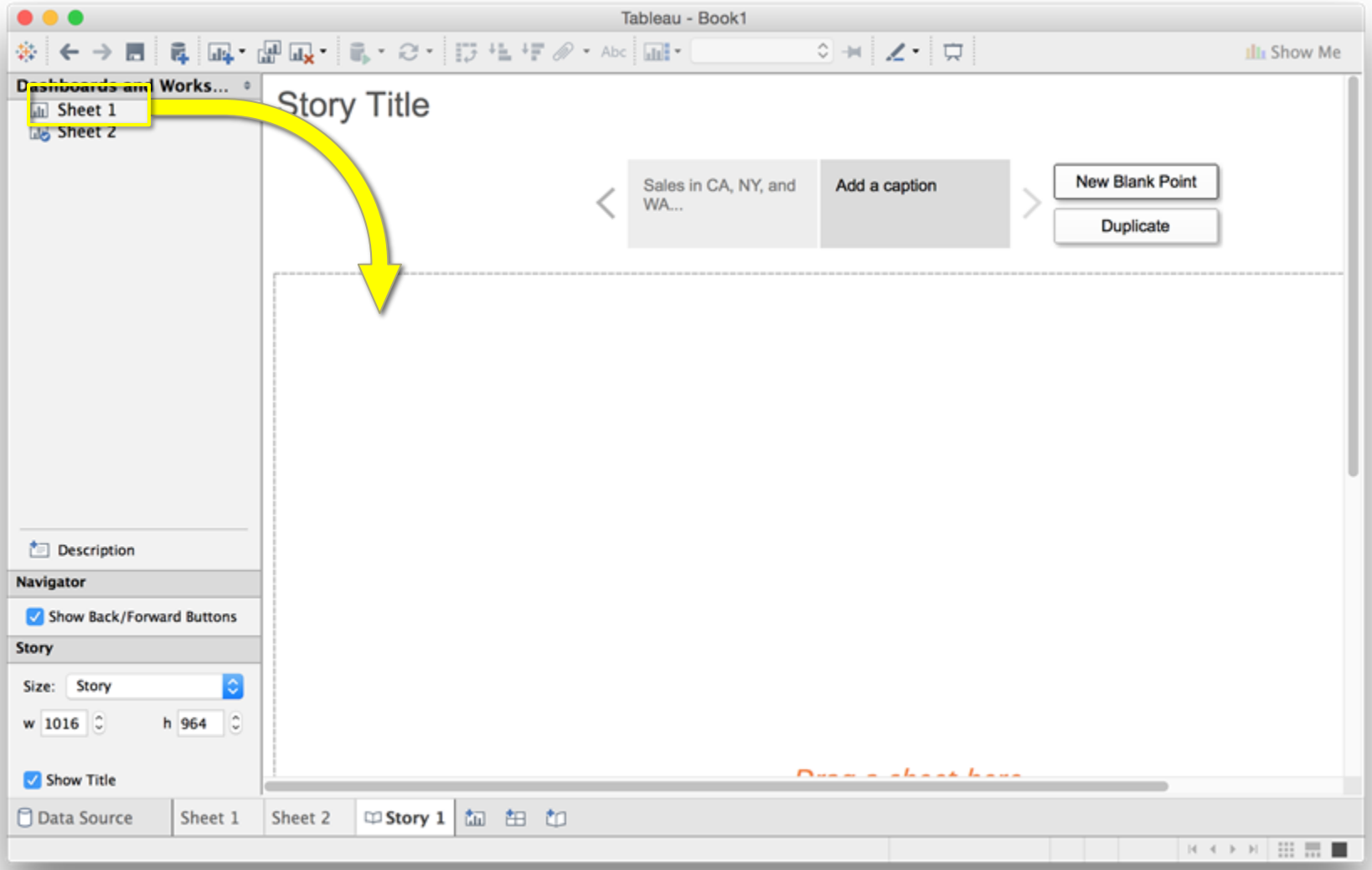

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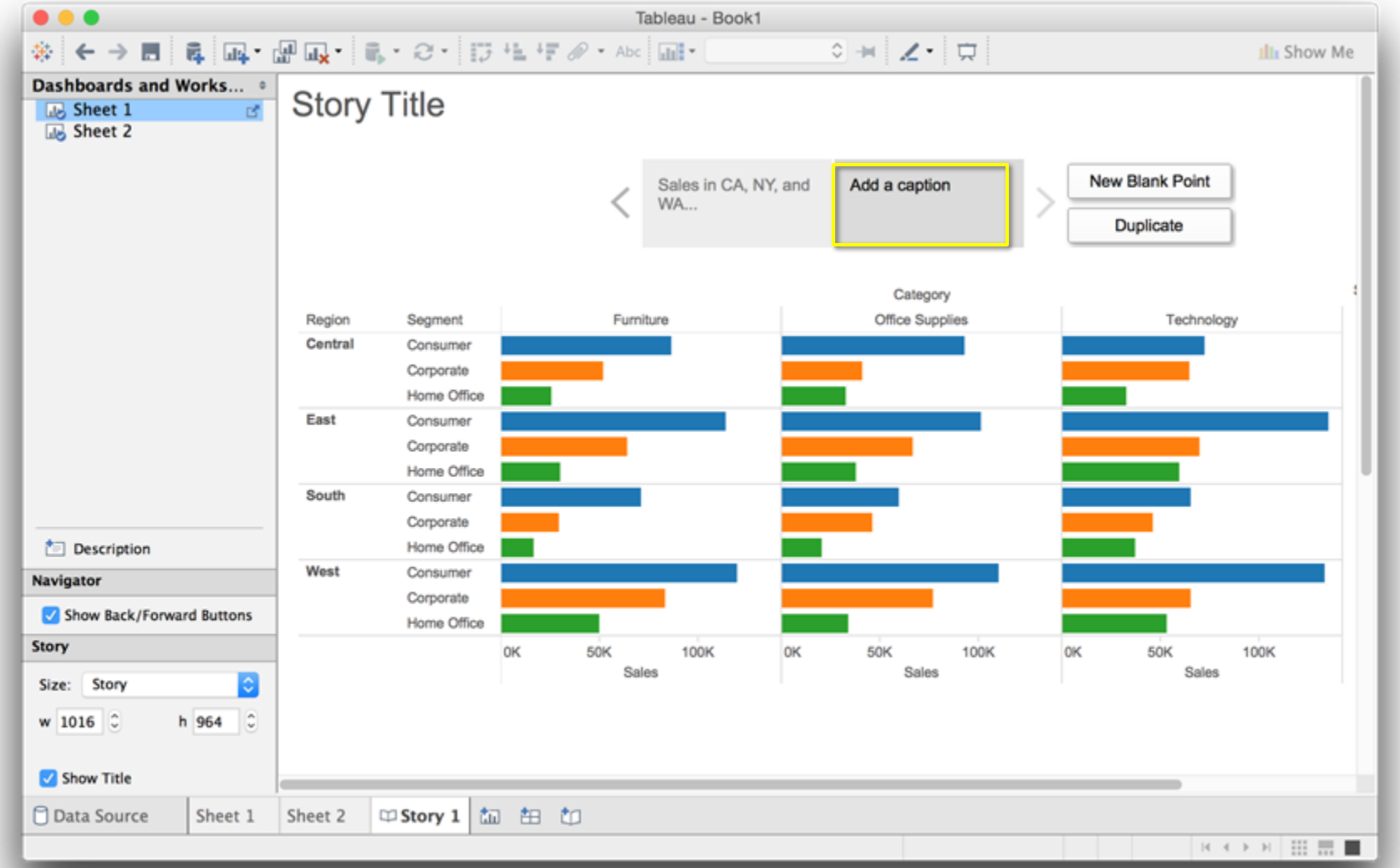
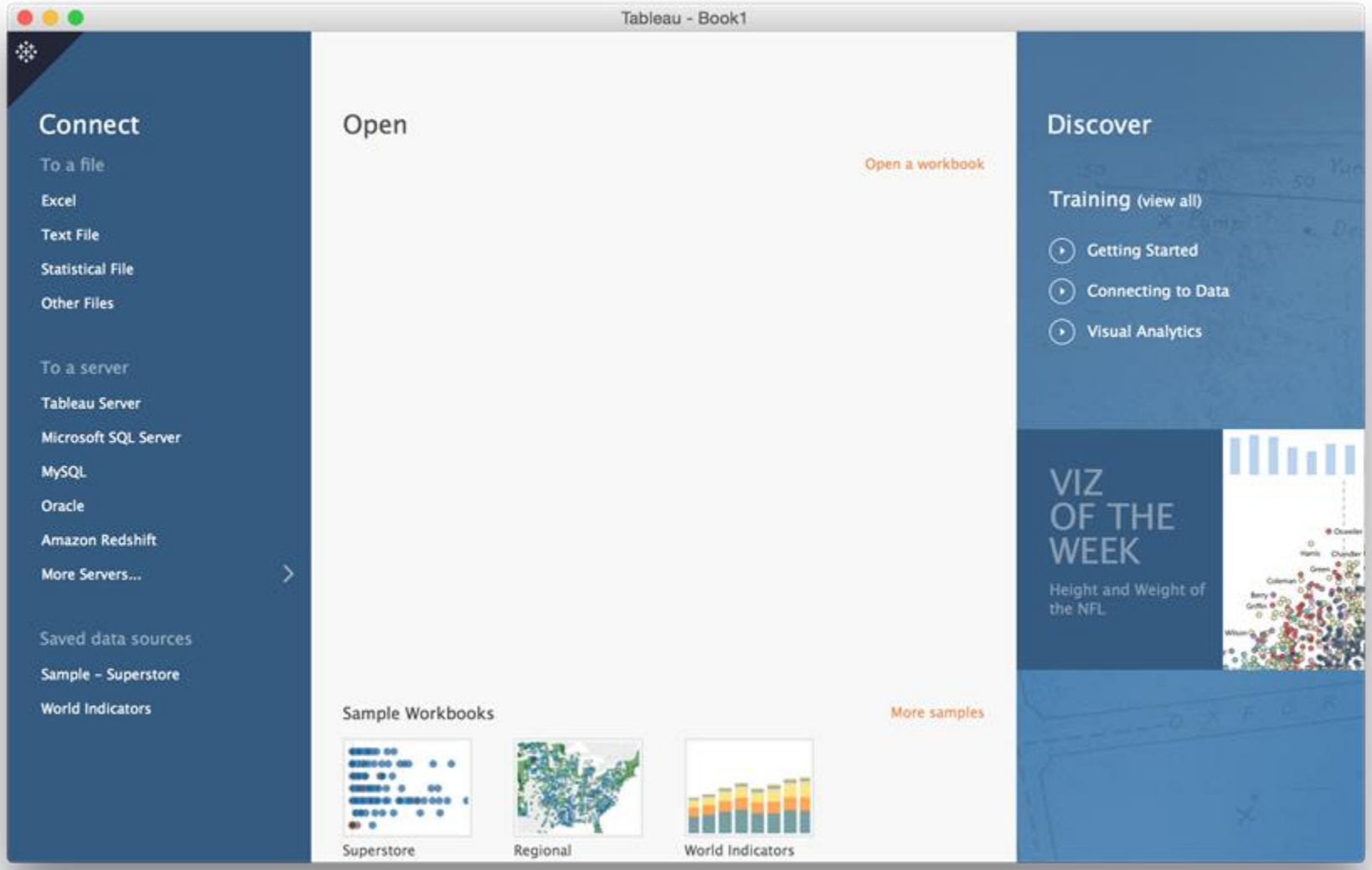


Tableau basics

Questions?

Lab pt. 2: Exploring Other Datasets

Tableau basics



Your turn!

- Form groups of 2
- Choose a dataset of interest to you from this list: goo.gl/kcbqfc
- Create two visualizations in Tableau that show something interesting in the dataset
  - They must show different variables
  - They must be different visual encodings
- Link the two visualization to create a story

- Pair up with another group
- Let the other group view your visualization *without any explanation from you*
- Provide feedback to each other
  - What are two specific things you saw that you liked?
  - What are two specific things you would have done differently?

Tableau basics

Discussion

- What are some of Tableau's strengths? Weaknesses?
- What are your initial thoughts after using it?