

DATA SOCIETY:

Introduction to Tableau

Part 1

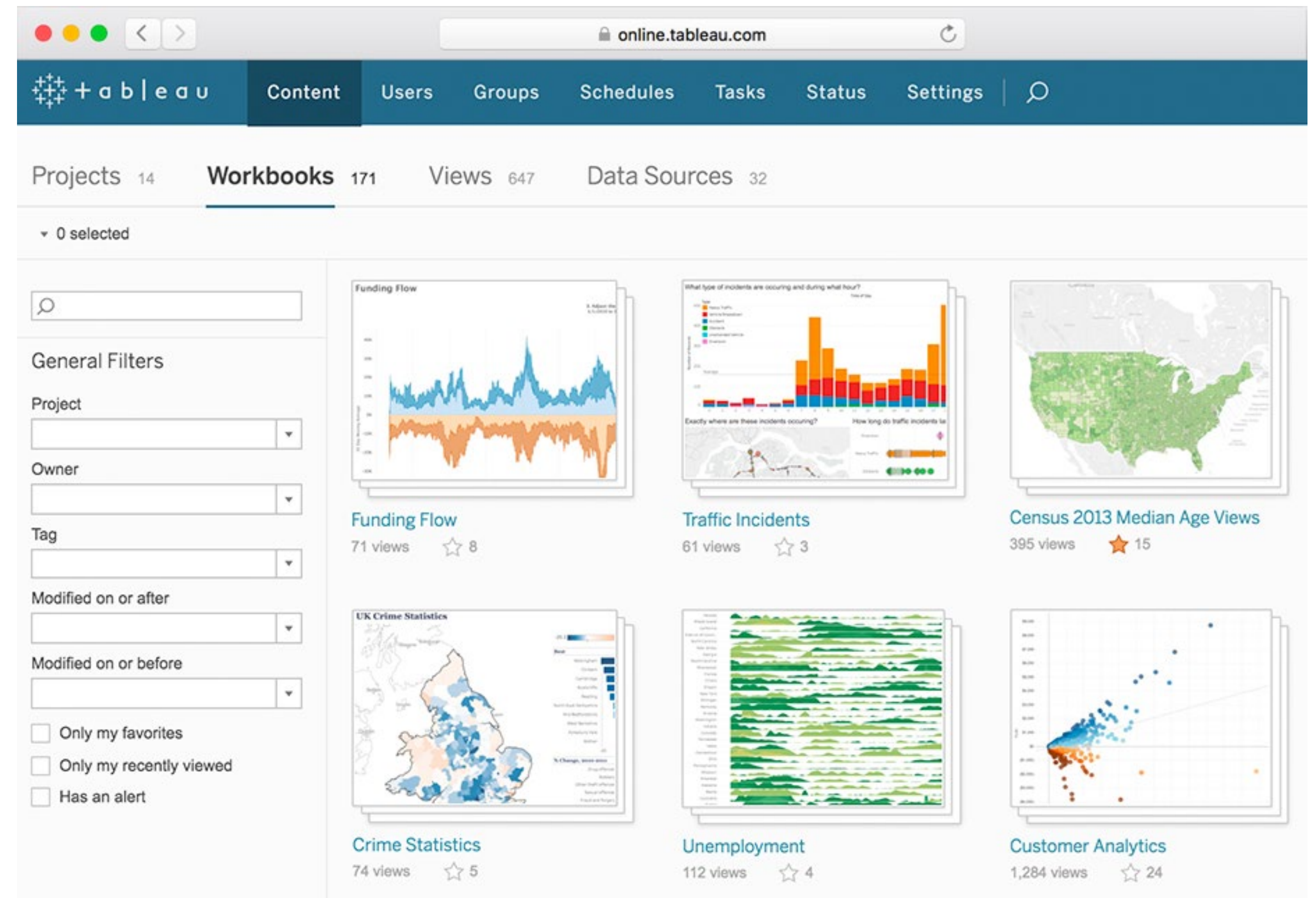


Module completion checklist

Objective	Complete
Explain the need for Tableau and describe its features	
Describe how data sources connect to Tableau	
Import the given dataset into Tableau	
Explain the concept of Relationships	
Discuss the use of joins in Tableau	

Why use Tableau?

- It offers a quick and easy way to create interactive visualizations and explore data.
- It is easy to integrate with multiple data sources.
- It is compatible with OS X, Windows, and Linux.
- It integrates with R and Python for advanced analysis.



Excel vs. Tableau

Parameters	Excel	Tableau
Purpose	Spreadsheet application used for manipulating data	Visualization tool used for data analysis
Usage	Most suitable for statistical analysis of structured data	Most suitable for quick and easy representation of large datasets, which helps resolve big data issues
Performance	Moderate speed, with no option to speed up	Moderate speed, with options to optimize and enhance the progress of an operation
Security	Relatively weak (compared with Tableau); needs regular updates	Extensive options to secure data without scripting; row-level security and permissions are built-in.

Excel vs. Tableau, cont'd.

Parameters	Excel	Tableau
User Interface	Macro and Visual Basic scripting knowledge required to maximize tool potential	Tool can be used without any coding knowledge
Business Need	Best for preparing one-off reports with small datasets	Best while working with big data
Products	Bundled with MS Office Tools	Comes with different versions, such as Tableau server, cloud, and desktop
Integration	Integrates with ~60 applications	Integrates with ~250 applications
Real-time Data Exploration	You need to have an idea of where your data leads to generate insights.	You are free to explore data without seeking concrete outcomes, especially with features like drill-down and data blending.

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Installation

- The Tableau Desktop version we have used during development is 2020.2.19, available here: [Tableau Desktop 2020.2.19](#).

The screenshot shows the Tableau Desktop 2020.2 product release and download page. The page features the Tableau logo in the top left, navigation links (Why Tableau, Products, Solutions, Resources, Partners, COVID-19), and links to PRICING, SIGN IN, and a search icon. Two orange buttons, 'TRY NOW' and 'BUY NOW', are visible. The main heading is 'Tableau Desktop 2020.2'. Below it, a message states: 'We recommend using the newest maintenance release of this version, 2020.2.10, which contains additional fixes.' A large orange button labeled 'DOWNLOAD TABLEAU DESKTOP 2020.2.10' is centered. A 'Download Link Notice' section at the bottom explains that the Windows version has been removed due to certificate issues and directs users to a Knowledge Base article. At the very bottom, there are three columns: 'Build number', 'Release date', and 'Product support'.

PRODUCT RELEASE AND DOWNLOAD

Tableau Desktop 2020.2

We recommend using the newest maintenance release of this version, [2020.2.10](#), which contains additional fixes.

[DOWNLOAD TABLEAU DESKTOP 2020.2.10](#)

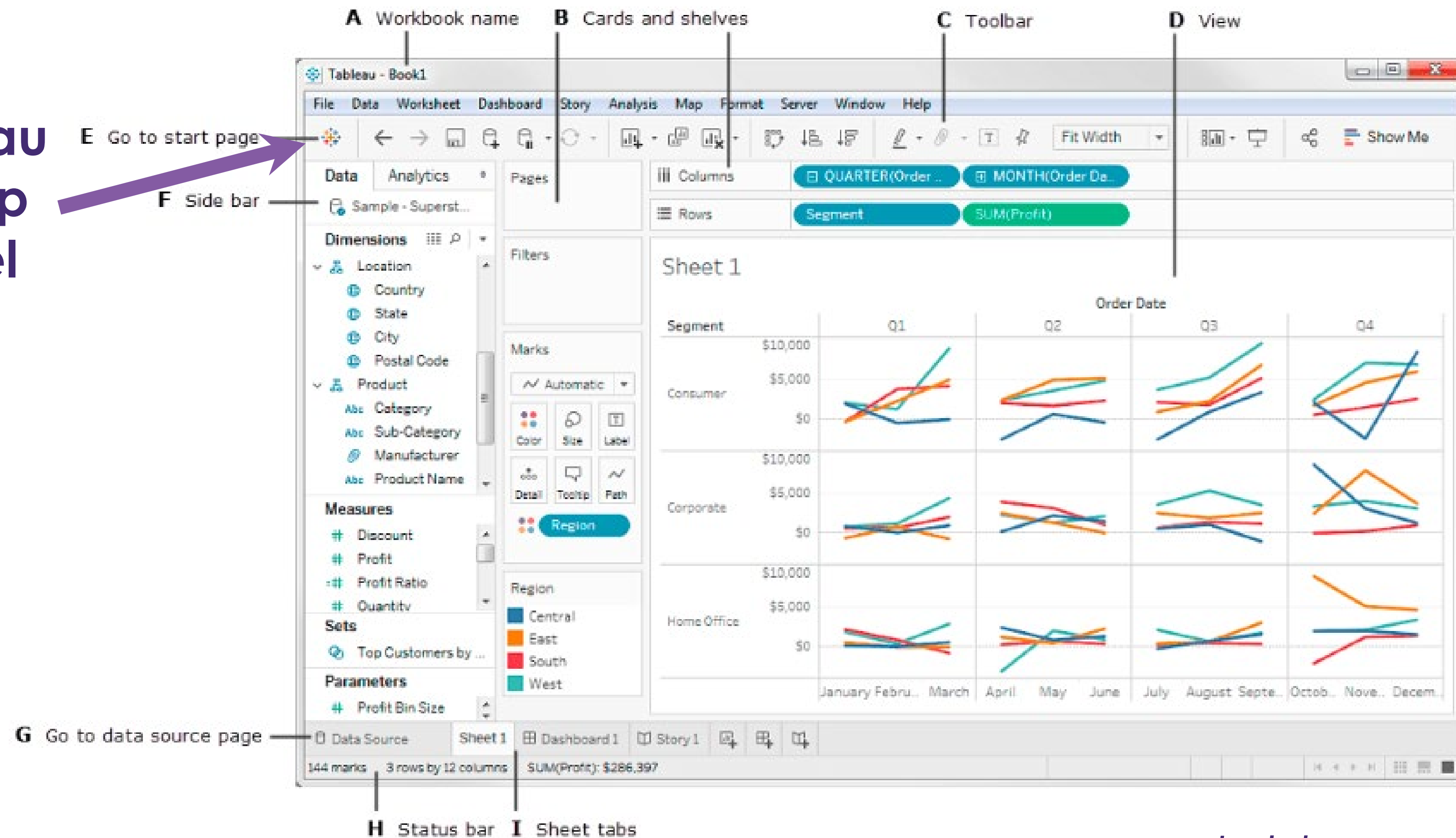
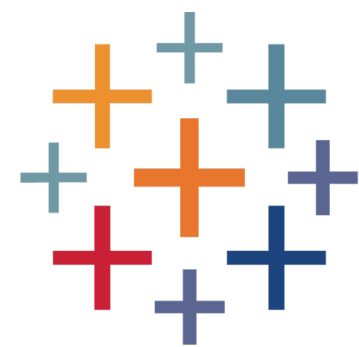
Download Link Notice

The Windows version has been removed due to an issue with certificates preventing it from being able to install correctly.
For more details, please see [this Knowledge Base article](#).

Build number	Release date	Product support
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Tableau overview

Click the Tableau logo to bring up Connect panel



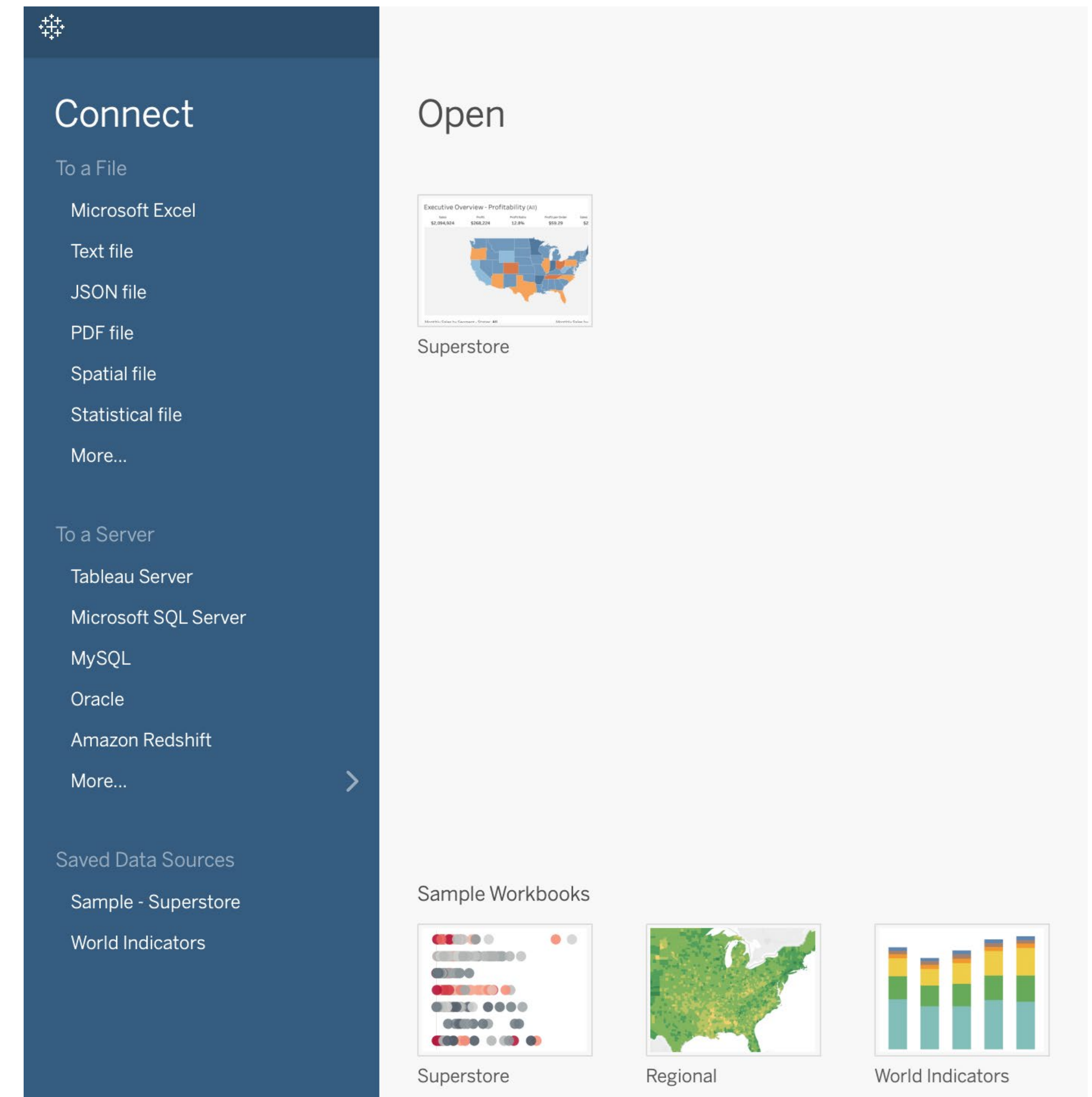
source: tableau.com

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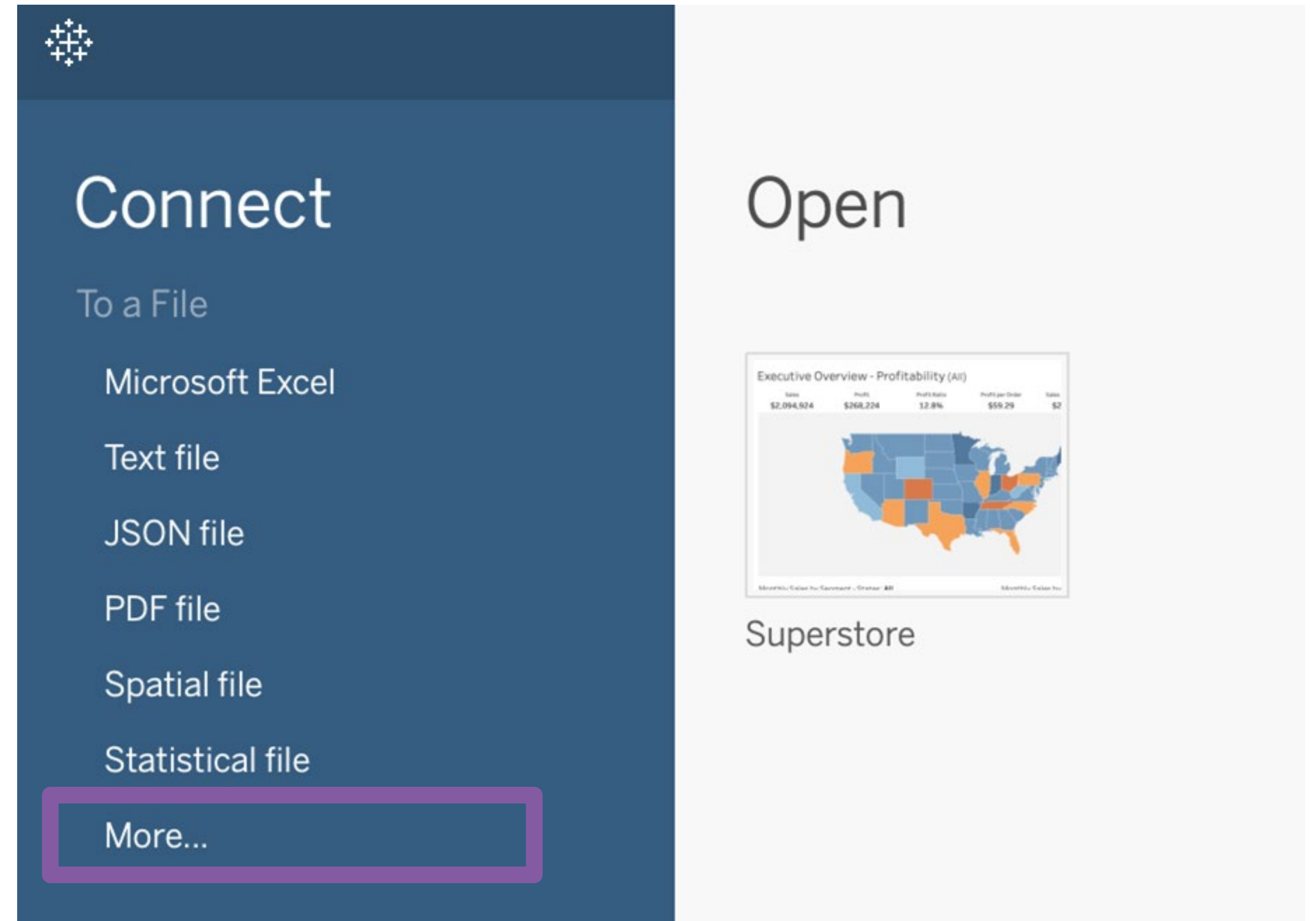
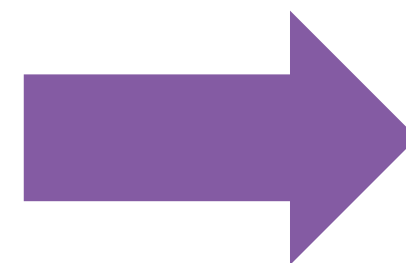
Importing data

- Import data with the **Connect** panel.
- Supports multiple formats such as:
 - Microsoft Excel (.xlsx).
 - Text (.txt, .csv).
 - JSON (.json).
 - PDF (.pdf).
 - R data format (.RData).
- Supports Database Connections such as:
 - MySQL.
 - Oracle.
 - Redshift.



Import world data : CSV

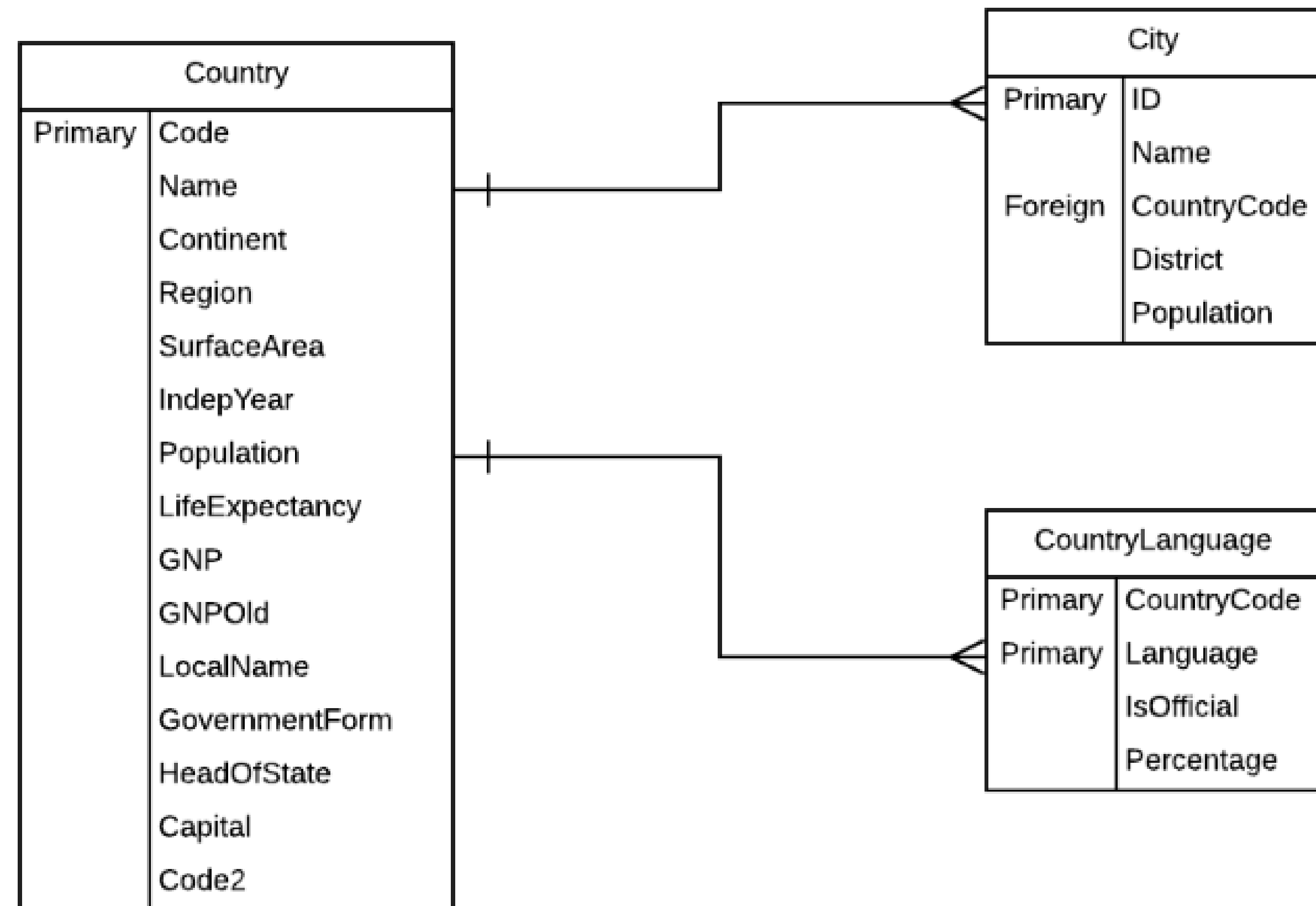
- Let's import some pieces of the world dataset today and see what sort of insights we can reveal.
- Click the “**More...**” item to browse your local CSV files.



World database

- For now, import the following three CSV files:
 - **country.csv**
 - **city.csv**
 - **countrylanguage.csv**
- We'll use the other CSV files during our Exercises.

World Database ERD



Module completion checklist

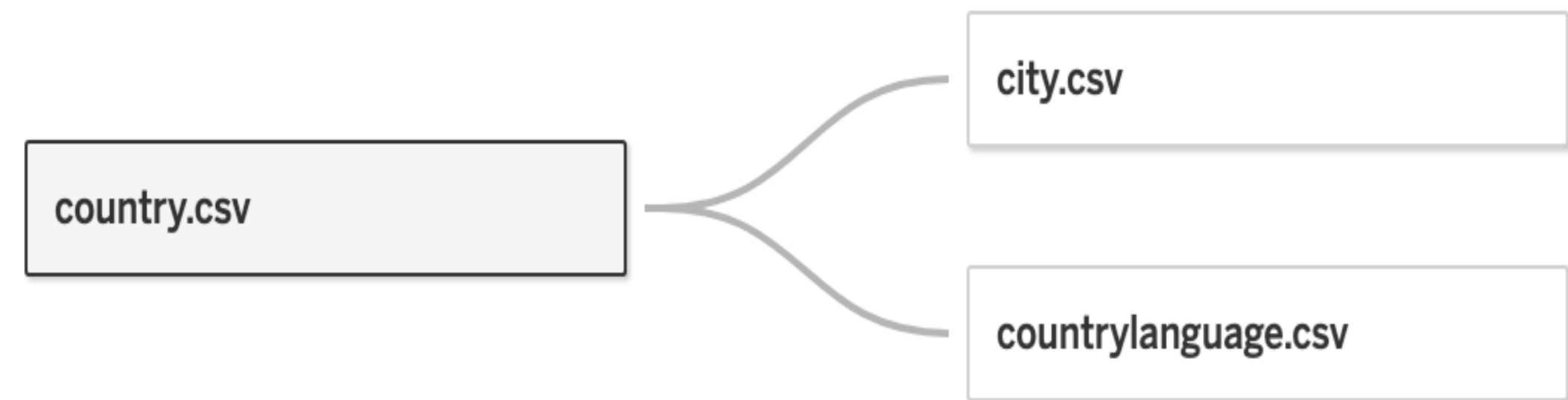
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Joining datasets using Relationships

- It is often necessary to combine data from multiple places - different tables or even data sources - to perform a desired analysis.
- Tableau has introduced a feature called **Relationships** to minimize the amount of data pre-processing required to visualize related datasets in multiple ways.
- To explore some of the concepts and features of Relationships, we're going to examine geospatial data from the World Database.

Relationships are contextual joins

- A single relationship will support all join types at the same time.
- For **Measures**, this means **all values are always retained**, even if they're unmatched nulls (not missing values).
- For **Dimensions**, relevant domains will be displayed **across tables**, and Tableau will display all values in the domain by default (even if there are no matching Measure values).



Select fields to create Relationships

- Tableau creates Relationships after **identifying the fields** you want to use to establish relationships.
- These fields should have common values that can be used to connect records from one table to another.

country.csv — city.csv

How do relationships differ from joins? [Learn more](#)

country.csv	Operator	city.csv
Select a field	=	Select a field

Select matching fields to create this relationship.

Add more fields

city
Text file

Files

Use Data Interpreter

Data Interpreter might be able to clean your Text file workbook.

bank_marketing.csv

city (1).csv

city.csv

country.csv

countrylanguage.csv

department.csv

employee.csv

paysim_large.csv

project.csv

state_data.csv

New Union

New Table Extension

city+

country.csv

city.csv

countrylanguage.csv

country.... — countrylan...

How do relationships differ from joins? [Learn more](#)

country.csv	Operator	countrylanguage.csv
Select a field	=	Select a field

Select matching fields to create this relationship.

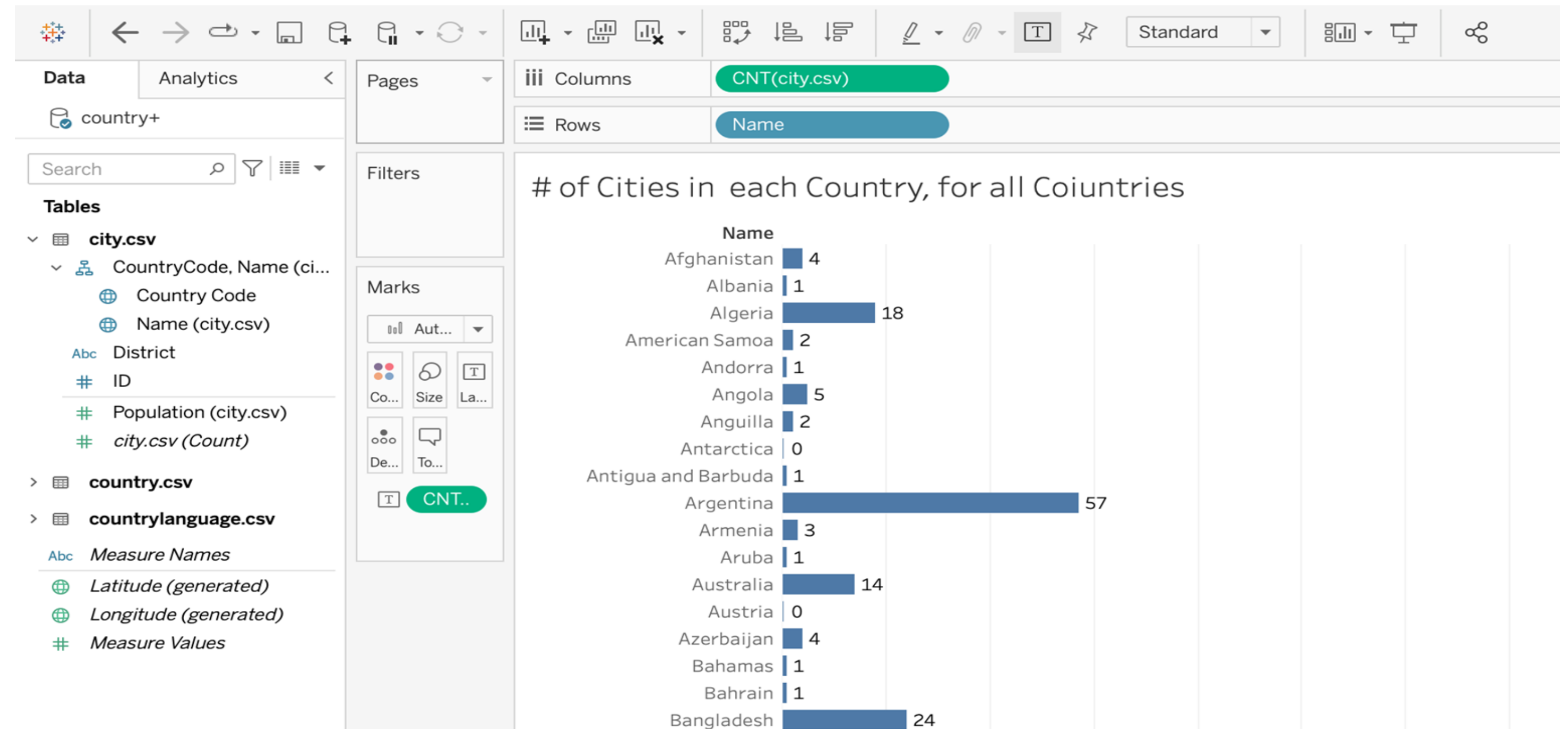
Add more fields

Introduction to Tableau - Part 1

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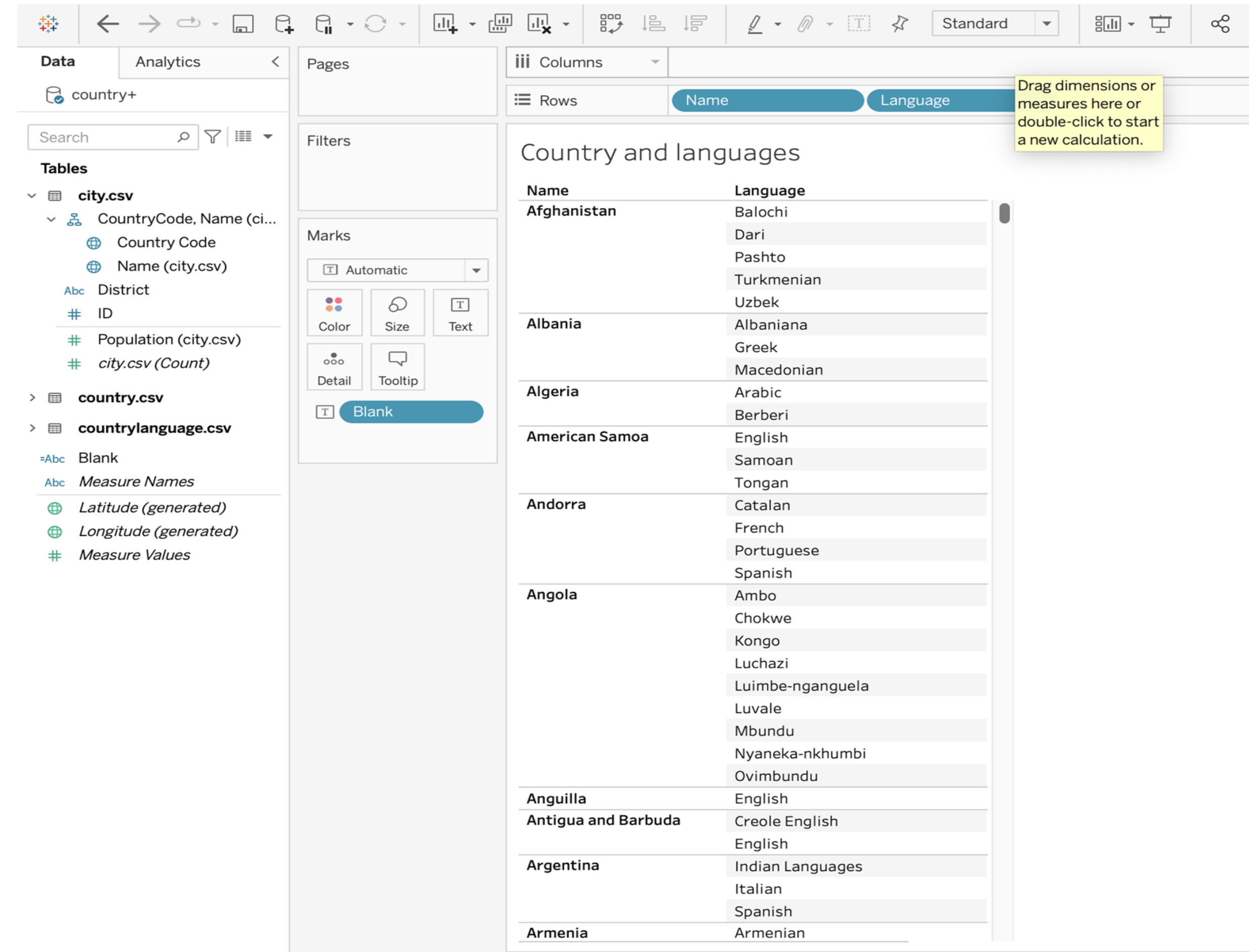
Unmatched measures as zero

- Relationships allow for unmatched entries in one dataset to display as 0s.
- Visualizing the count of cities by country shows **all** countries, even those without any corresponding cities.
- Displaying all countries helps to avoid undercounting the number of countries.



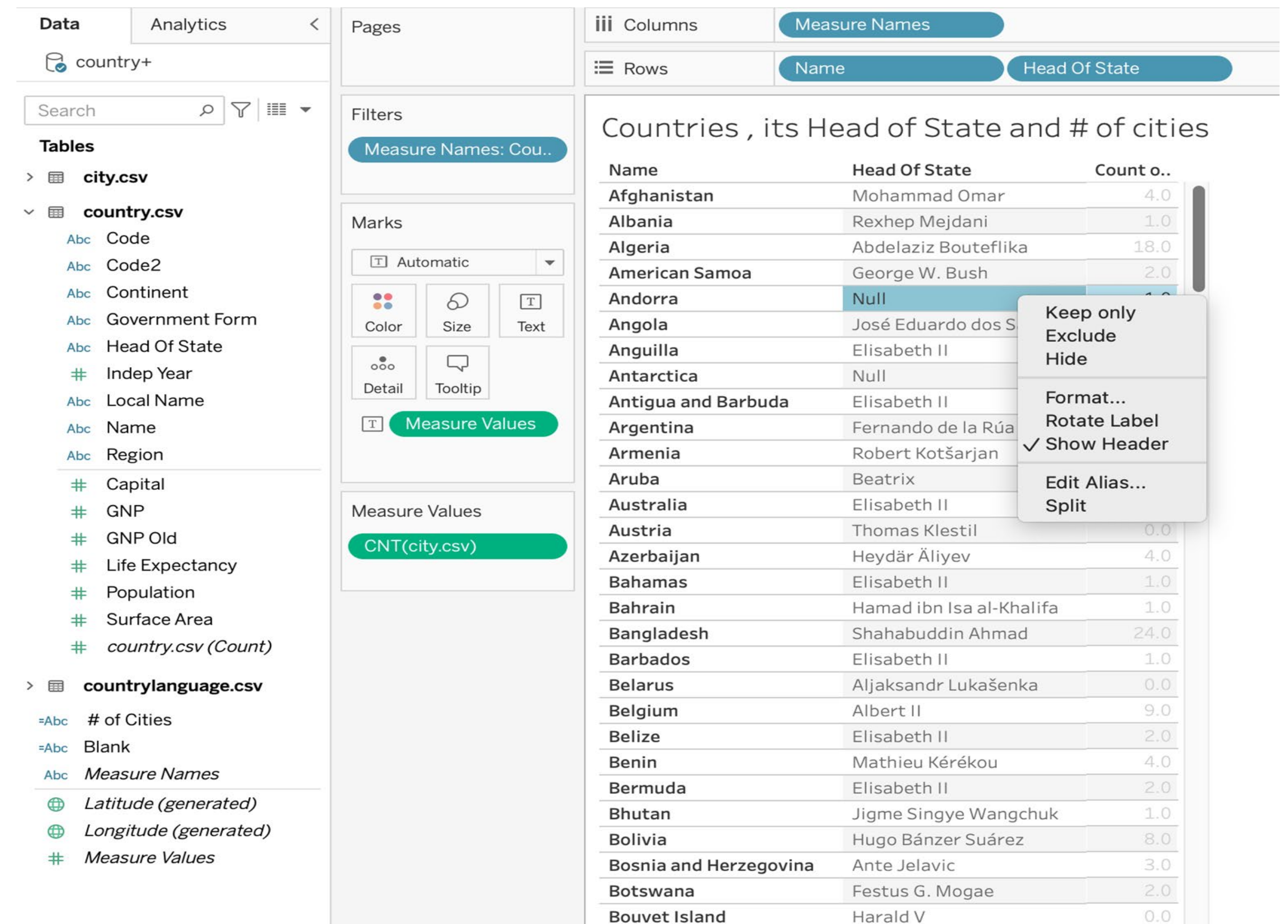
Relevant dimensions across tables

- Additionally, Relationships affect how Dimensions will behave in visualizations involving different datasets.
- When visualizing countries and languages, Tableau excludes territories like Antarctica, which may not have any languages.



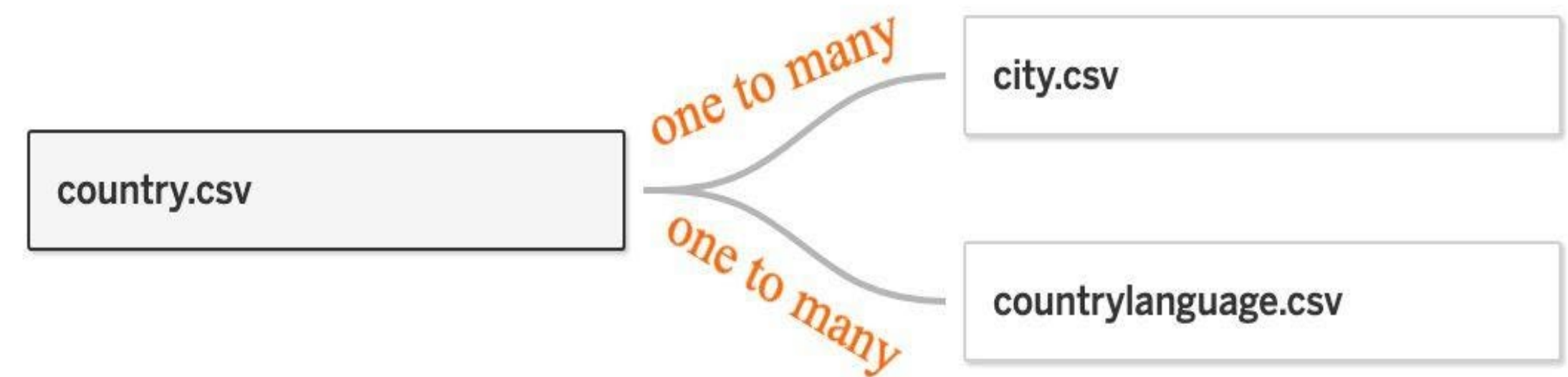
Retaining unmatched values

- A **null** appears to represent a country without Head of State (unmatched value)
- Retaining these unmatched values through the Relationship again helps avoid undercounting the number of countries in total.



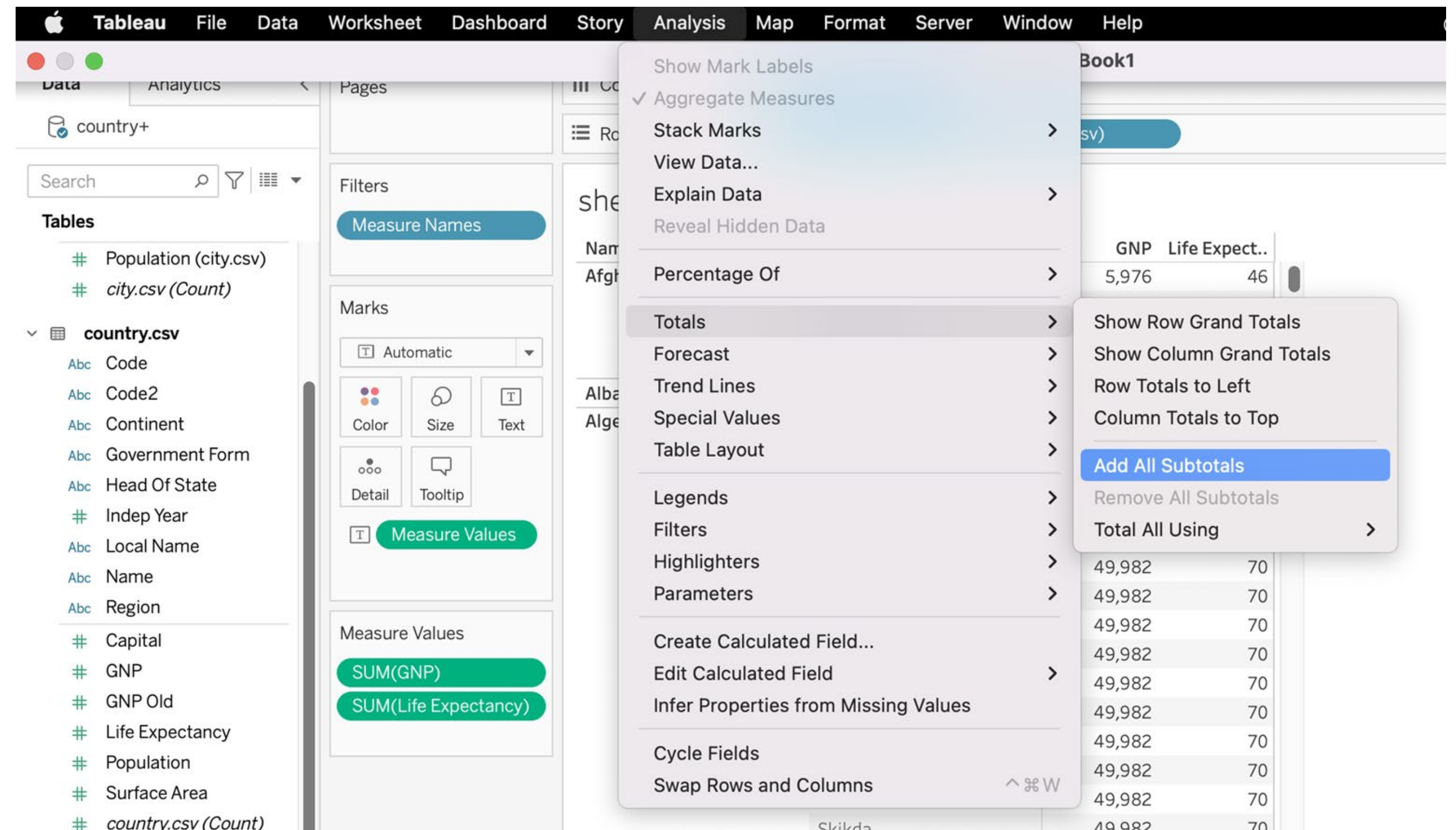
Relationships are smart aggregations

- Aggregations will resolve to the Measure's inherent level of detail from the source table.
- Measures are only replicated across **lower** levels of detail in the visualization.
- This means it is much less likely to end up with unnecessary, meaningless duplicated data in visualizations.



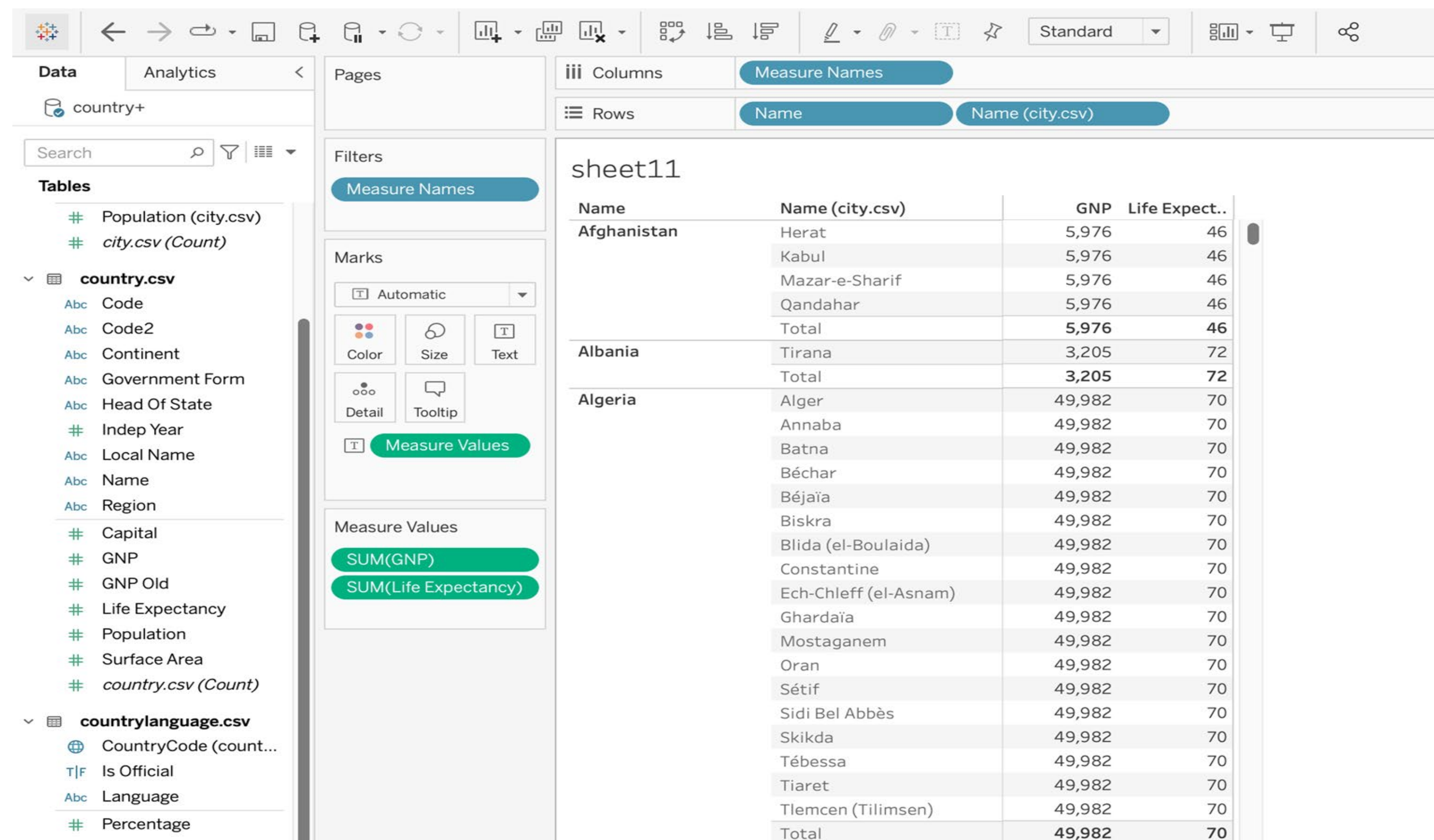
Relationships and level of detail

- Relationships resolve to a Measure's **level of detail**.
- For example, each country is linked to some cities, a GNP, and life expectancy data.
- When we add Country Name, City Name, GNP, and Life Expectancy, to a visualization, we obtain subtotals of GNP and life expectancy.



Relationships and level of detail, cont'd.

- Tableau aggregates life expectancy and GNP in accordance to Country Name.



Module completion checklist

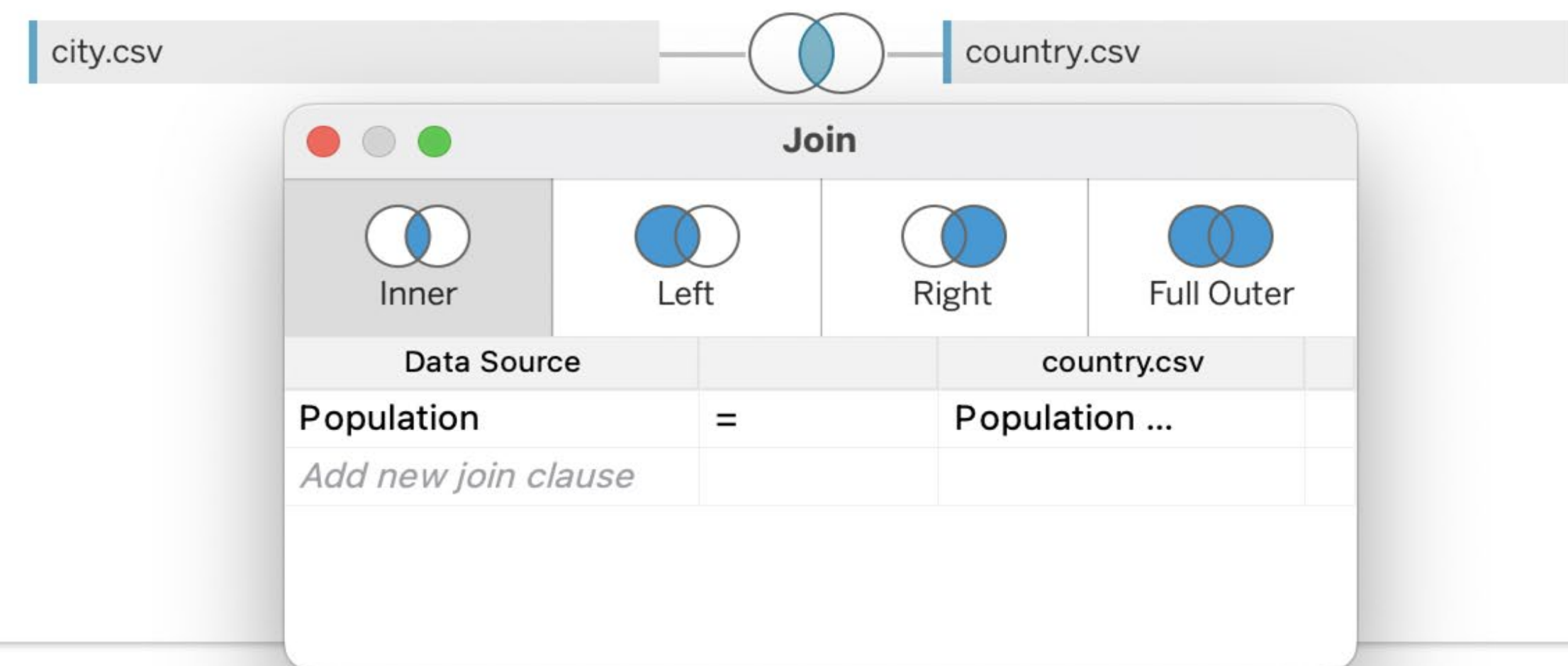
Objective	Complete
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Manually joining datasets

- Previously, Tableau utilized **joins** in order to merge and combine data.
- It is still possible to join tables **manually** by specifying the precise variables the datasets will use as common keys, but this functionality is no longer the default.

city.csv+ (Multiple Connections)

city.csv is made of 2 tables. ⓘ



Joining tables using joins, cont'd.

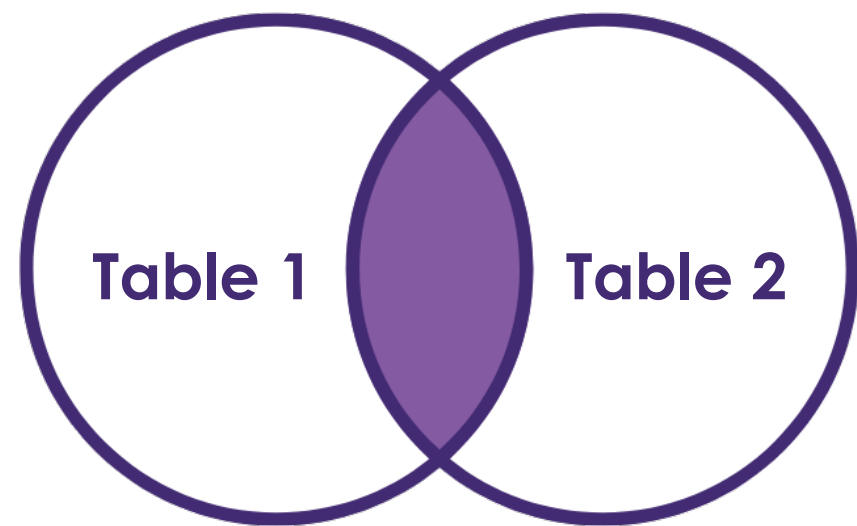
- To open the join canvas, select **Open** from the dropdown menu or **double-click** the first data source.
- In the join canvas, we can specify exactly how we want the sources to relate to one another based on four basic types of joins.

The screenshot shows the Tableau interface with the 'country' data source selected. A context menu is open over 'country.csv', showing options: 'Open...', 'Rename', 'Remove', 'Field names are in first row' (checked), 'Generate field names automatically', 'Text File Properties...', and 'Convert to Union...'. The 'Connections' pane on the left lists various CSV files, and the 'Files' pane shows a list of files including 'city.csv', 'country.csv', 'countrylanguage.csv', 'department.csv', 'employee.csv', 'project.csv', 'state_data.csv', and 'New Union'. The status bar at the bottom indicates 'country.csv' with '15 fields 239 rows'.

Need more data?
Drag tables here to relate them. [Learn more](#)

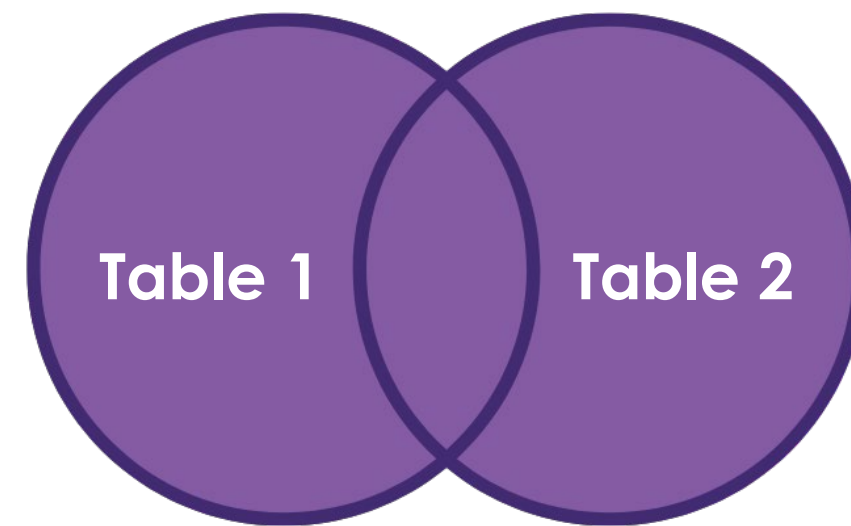
The screenshot shows the Tableau interface with the 'country' data source selected. The 'country.csv' is loaded, and the status bar at the bottom indicates 'country.csv' with '15 fields 239 rows'. The 'Connections' pane on the left lists various CSV files, and the 'Files' pane shows a list of files including 'city.csv', 'country.csv', 'countrylanguage.csv', 'department.csv', 'employee.csv', 'project.csv', 'state_data.csv', and 'New Union'. The status bar at the bottom indicates 'country.csv' with '15 fields 239 rows'.

Types of joins



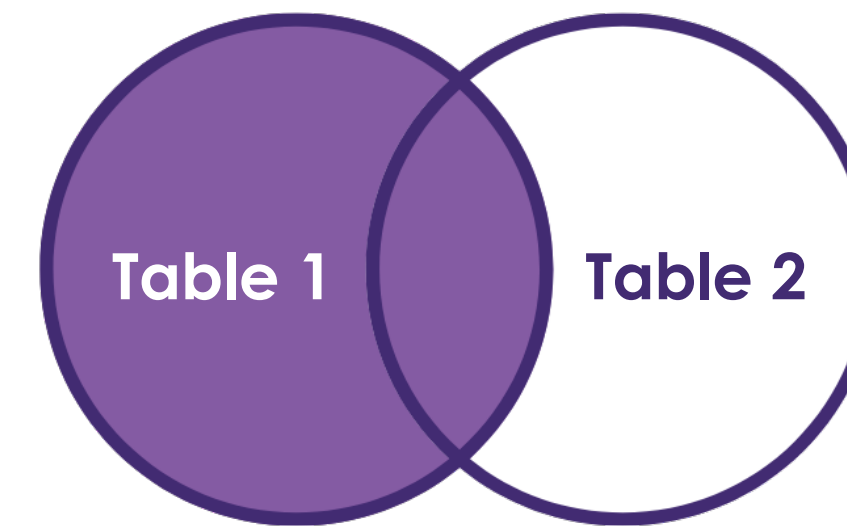
Inner join

includes matching records from both datasets



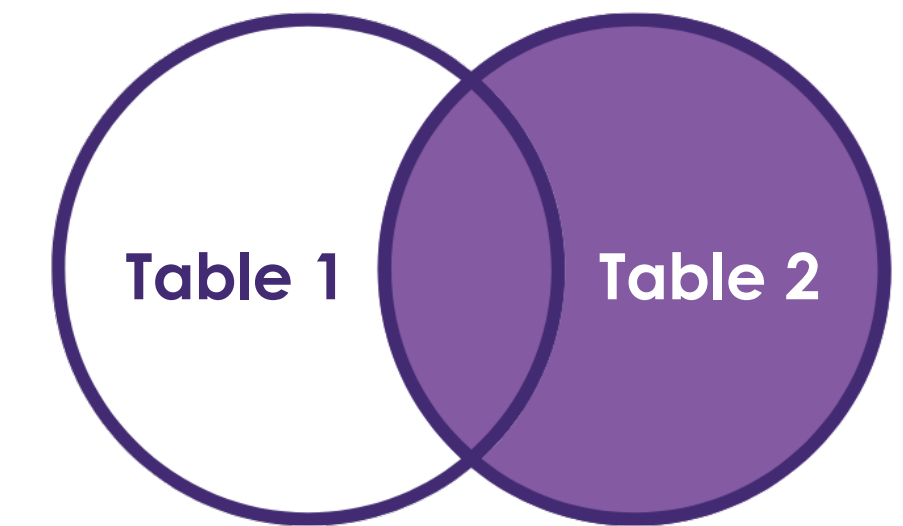
Full outer join

includes all records from both datasets



Left outer join

includes all records from left dataset and matching records from right dataset



Right outer join

includes all records from right dataset and matching records from left dataset

Best practices for using joins

- Start by joining the country and city tables.
- Here, inner join is the default join.
- Consider including left or right outer join to get all of the records in one database, even if there are no matching data points.
- Let's try all types of joins on the country and city dataset.

city+ Connection: ☒ Live ☐ Extract Filter: 0

city.csv is made of 2 tables. ⓘ

city.csv — Join — country.csv1

Join options: Inner (selected), Left, Right, Full Outer

Data Source: city.csv, country.csv1

Population = Population ...

Add new join clause

city.csv 20 fields 6 rows 6 rows

#	city.csv	city.csv	city.csv	city.csv	#	country.csv1
ID	Name	Country Code	District	Population		Code (country.csv1)
34	Tirana	ALB	Tirana	270,000		BRB
481	Portsmouth	GBR	England	190,000		VUT
485	Swindon	GBR	England	180,000		WSM
509	Ipswich	GBR	England	114,000		VCT
537	Road Town	VGB	Tortola	8,000		AIA
927	Bissau	GNB	Bissau	241,000		BLZ

Type	Field Name	Phys...	Rem...
#	ID	city.csv	ID
Abc	Name	city.csv	Name
🌐	Country Code	city.csv	Count...

Join multiple datasets

- Now join the **countrylanguage** dataset.
- Does the order in which you import tables matter?
- Why did you choose that order?
- Why did you choose those types of joins?

city+ Connection: ☒ Live ☐ Extract

city.csv is made of 3 tables. ①

city.csv country.csv1 country.csv2

city.csv 35 fields 478 rows 100

#	city.csv	city.csv	city.csv	city.csv	city.csv	country.csv!
ID	Name	Country Code	District	Population	Code (co	
34	Tirana	ALB	Tirana	270,000	BRB	
481	Portsmouth	GBR	England	190,000	VUT	
485	Swindon	GBR	England	180,000	WSM	
509	Ipswich	GBR	England	114,000	VCT	

Type	Field Name	Phys...	Rem...
#	ID	city.csv	ID

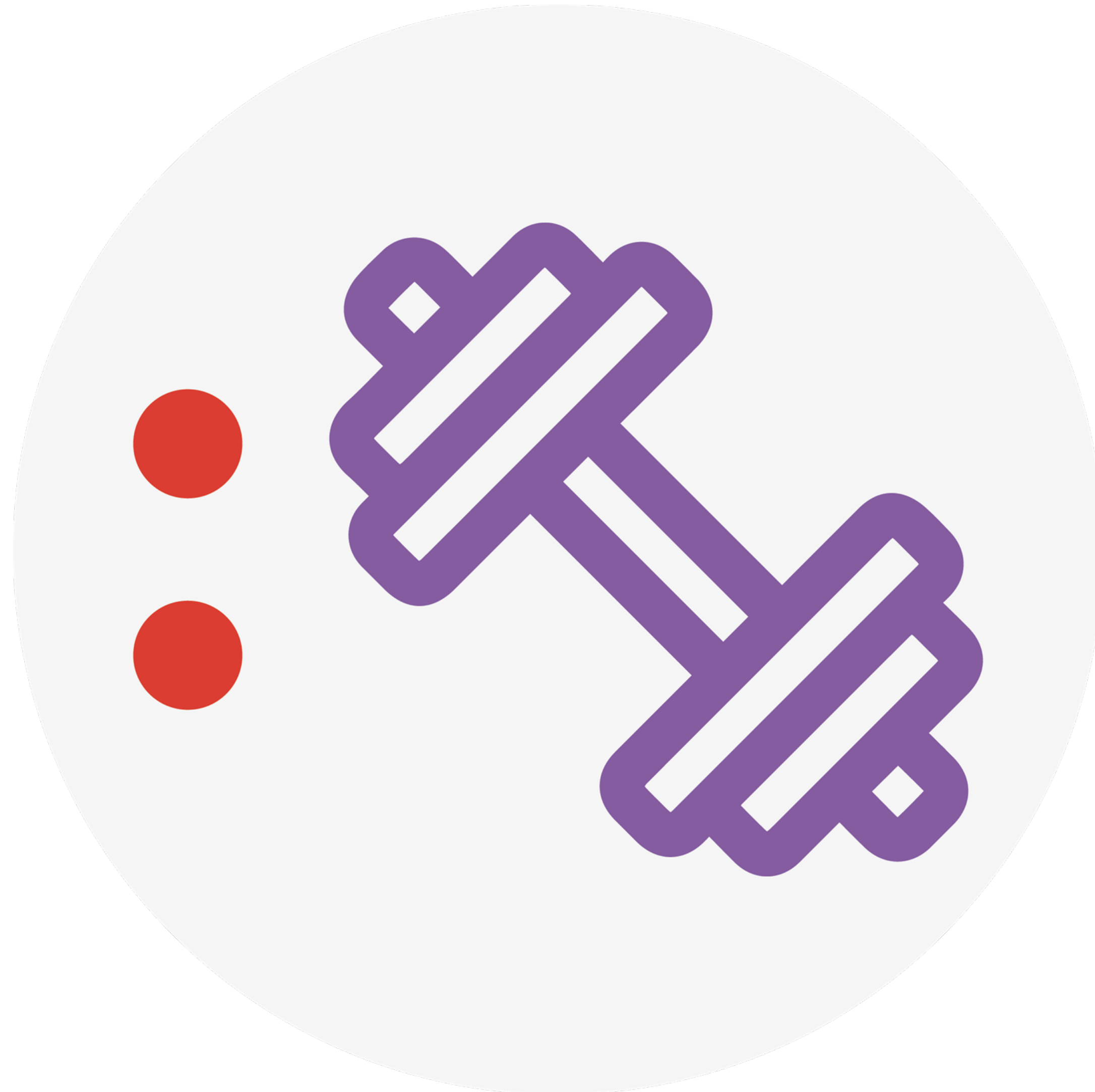
Relationships vs. joins

Relationships	Joins
Describes how two, independent, logical tables(in logical layer) are related to each other (the tables are not merged)	Combine two tables into one (in physical layer)
Maintains the same level of detail in the data sources	Will sometimes duplicate data stored at differing levels of detail
All measures are kept, even the ones that do not match	Some measures get filtered
Do not allow us to decide on the join type	Can select the way we want to join the data

Knowledge check 1



Exercise 1



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● End of Part 1

