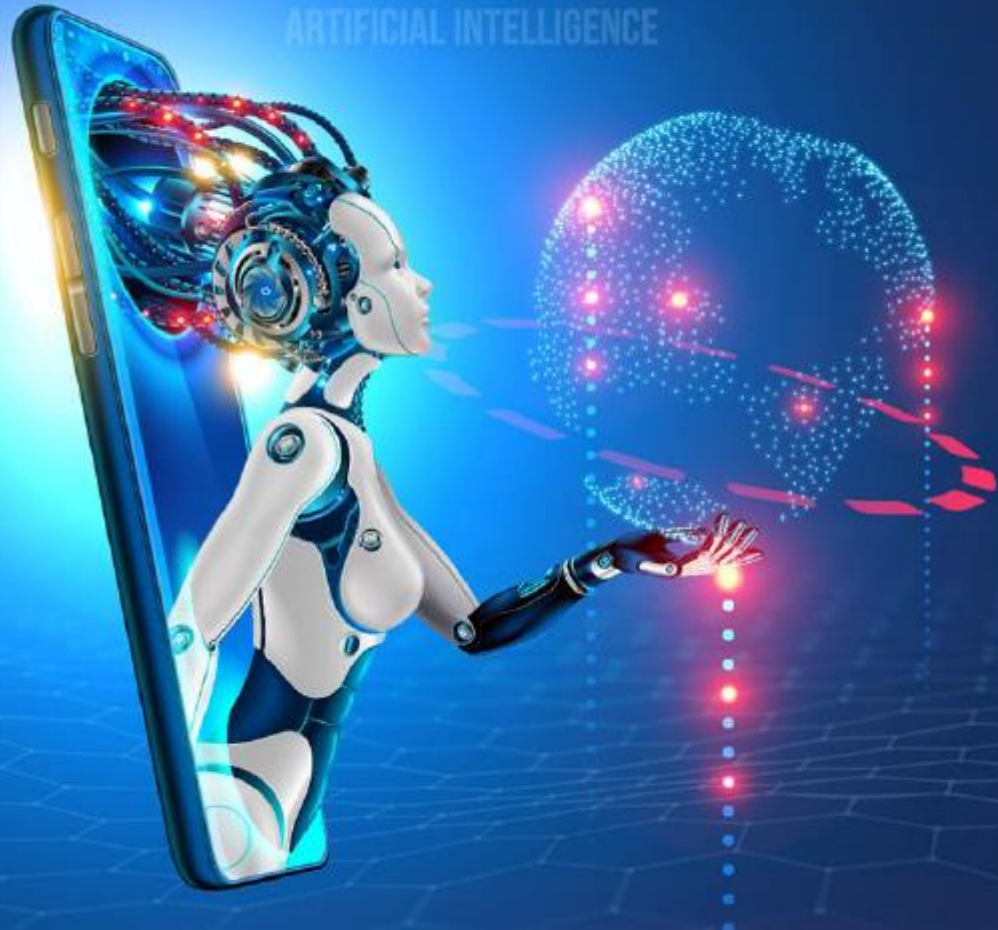







# DATA AND ARTIFICIAL INTELLIGENCE



**Data Manipulation and Reporting with  
Power BI**

## Learning Objectives

By the end of this lesson, you will be able to:

-  Understand the capabilities of Data and Relationship views
-  Explore different data transformations
-  Learn how to set up relationship using auto detect option
-  Learn how to create user defined relationships
-  Learn how to manage relationships between multiple tables

# Data View

- Data View enables you to inspect, explore, and understand the underlying data in the Power BI Desktop.
- With Data View, you're looking at your data after it has been loaded into the model.
- Before creating new columns or measures or identifying a data type or data category, it's helpful to see the actual data in a table.

Modeling  
ribbon  
Formulae  
bar  
Data View  
icon

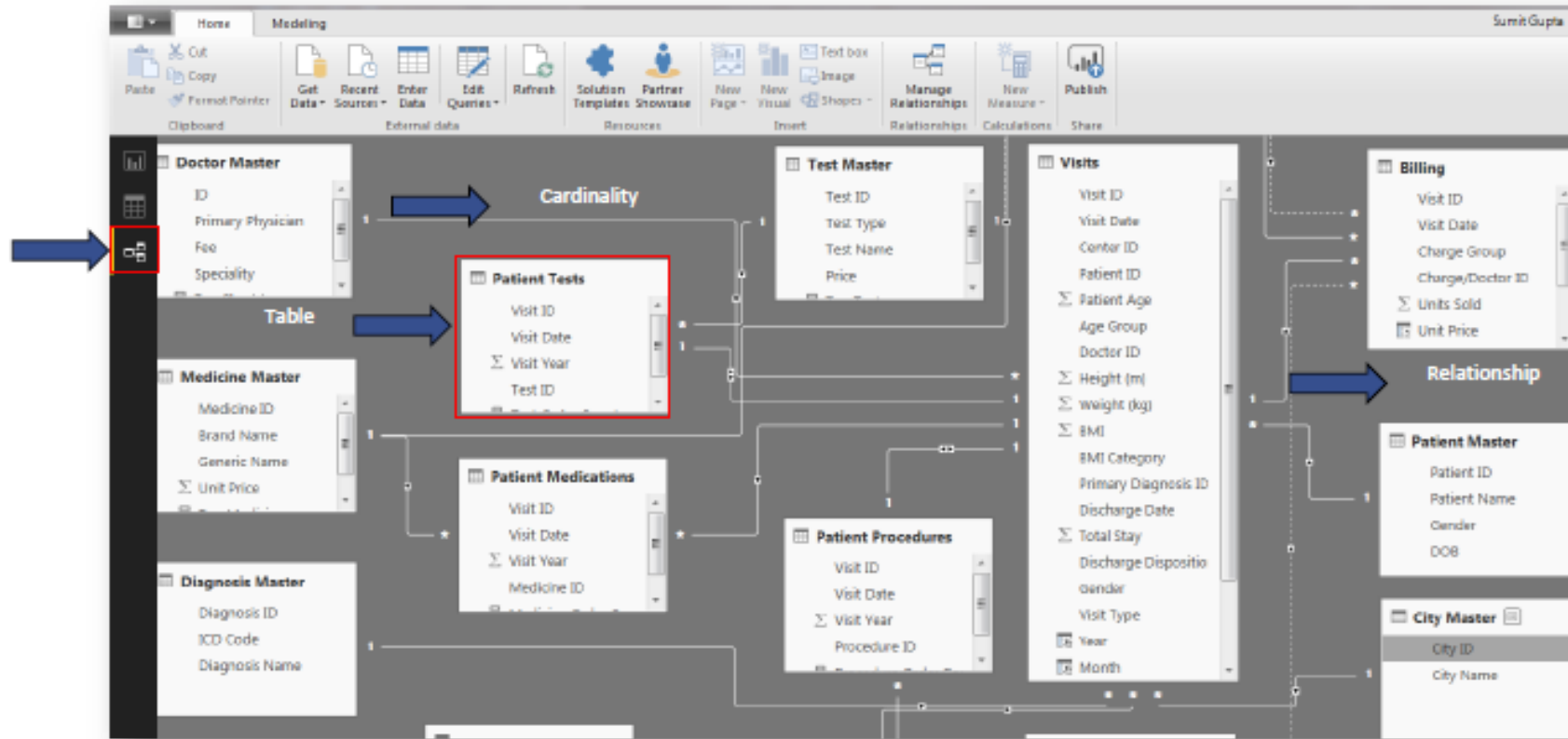
Data  
grid

Patient ID	Patient Name	Gender	DOB
1	Tara Shal	Female	Friday, October 08, 1942
3	Chandrabhika Kola	Female	Sunday, August 21, 1954
4	Ria Nairi	Female	Tuesday, January 28, 1924
5	Archita Sita	Female	Tuesday, April 07, 1939
7	Leah Nitin	Female	Tuesday, June 26, 2001
9	Isha Sani	Female	Sunday, July 07, 1974
13	Indhumathi Raga	Female	Friday, March 30, 1979
14	Pavitra Sani	Female	Wednesday, December 26, 2012
15	Abigail Kunal	Female	Saturday, March 05, 1985
20	Dilvini Raga	Female	Friday, December 18, 1997
24	Diksha Patel	Female	Monday, June 15, 1953
25	NID 568	Female	Monday, November 02, 1942
27	Anushri Laud	Female	Monday, May 28, 1960
29	Dawn Kabra	Female	Saturday, November 13, 1971
30	Laxanya Raji	Female	Sunday, December 31, 1950
33	Prachi Niu	Female	Wednesday, July 12, 1995
32	Prachi Niki	Female	Sunday, April 22, 1943
38	Angelikodi	Female	Sunday, September 06, 2011
34	Tara Minal	Female	Sunday, August 10, 1991
35	Di Vijay	Female	Wednesday, August 17, 1927
38	Rahita Kumar	Female	Sunday, July 01, 1934
42	Croony Nanyo	Female	Sunday, August 13, 1938
42	Prachi Nani	Female	Monday, November 11, 1986
45	Anushri Patel	Female	Thursday, October 01, 1985

# Relationship View

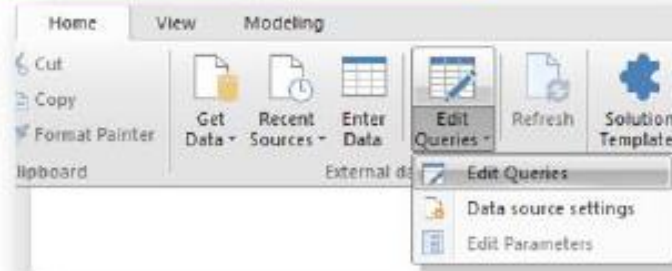
Relationship View shows all of the tables, their associated columns, and the relationships in your model. This can be especially helpful when your model has tables coming in from varied data sources and you wish to build a complex relationship between them.

Relationship  
p  
view icon



# Getting Familiar to Query Editor

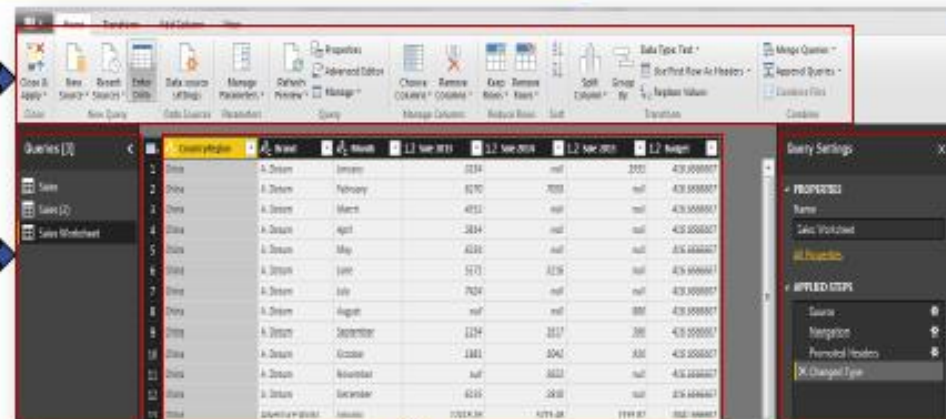
You can use the Navigator window, or Home tab to launch the Query Editor.



You can use the Query Editor to clean and transform your data.

Transform Menu

Left Pane



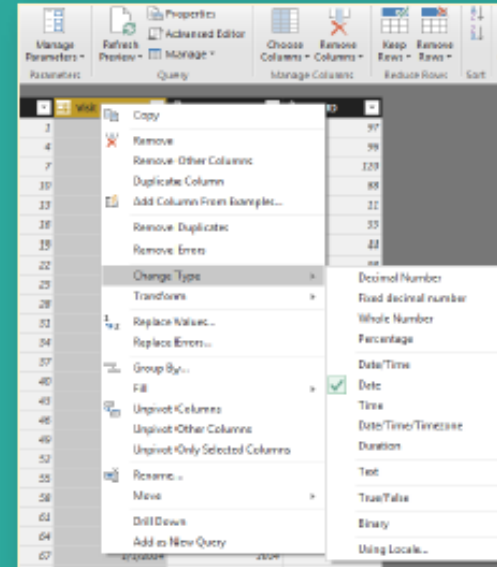
Center  
Pane

Query Settings

## Shaping Data – Change Data Type

As soon as the data is imported in Power BI, the system automatically attempts to convert the data type of the source column into a data type that better supports more efficient storage, calculations, and data visualization. For example, a column without any fractional values would be converted to a “Whole Number” data type by Power BI Desktop. Following are the data types supported in Power BI:

- Decimal number
- Fixed decimal number
- Whole number
- Percentage
- Date/Time
- Date
- Time
- Date/Time/Timezone
- Duration
- Text
- True/False





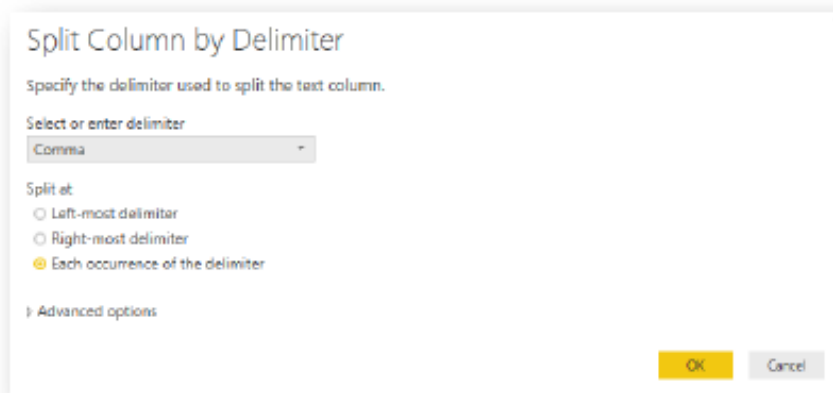
## Shaping Data – Split Columns

Power BI allows you to split a column either by,

- Delimiter

There are additional options available as well to split at the,

- ✓ Left most delimiter
- ✓ Right most delimiter or
- ✓ Each occurrence of the delimiter



Split Column by Delimiter

Specify the delimiter used to split the text column.

Select or enter delimiter

Comma

Split at

☐ Left-most delimiter

☐ Right-most delimiter

☒ Each occurrence of the delimiter

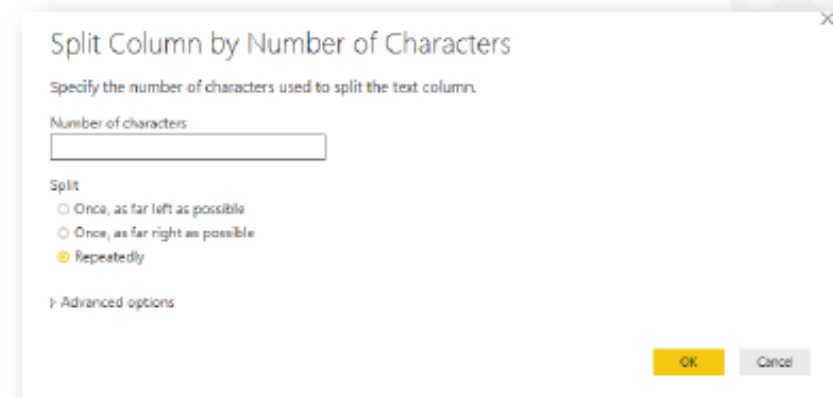
Advanced options

OK Cancel

- Number of characters

Power BI allows you to split a column by number of characters either,

- ✓ Once as far left as possible
- ✓ Once as far right as possible or
- ✓ Repeatedly



Split Column by Number of Characters

Specify the number of characters used to split the text column.

Number of characters

Split

☐ Once, as far left as possible

☐ Once, as far right as possible

☒ Repeatedly

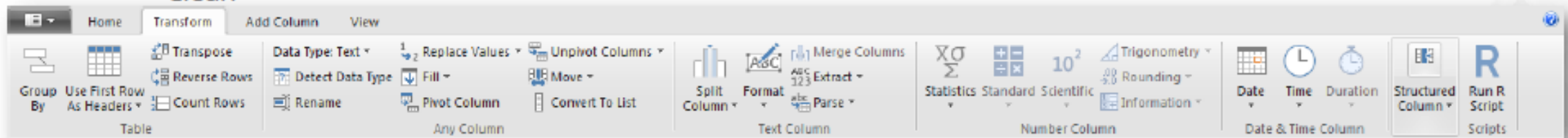
Advanced options

OK Cancel

# Shaping Data – Text Transforms

Following are some of the commonly used text transformations available in Power BI:

- Lowercase
- Uppercase
- Capitalize each word
- Trim
- Clean

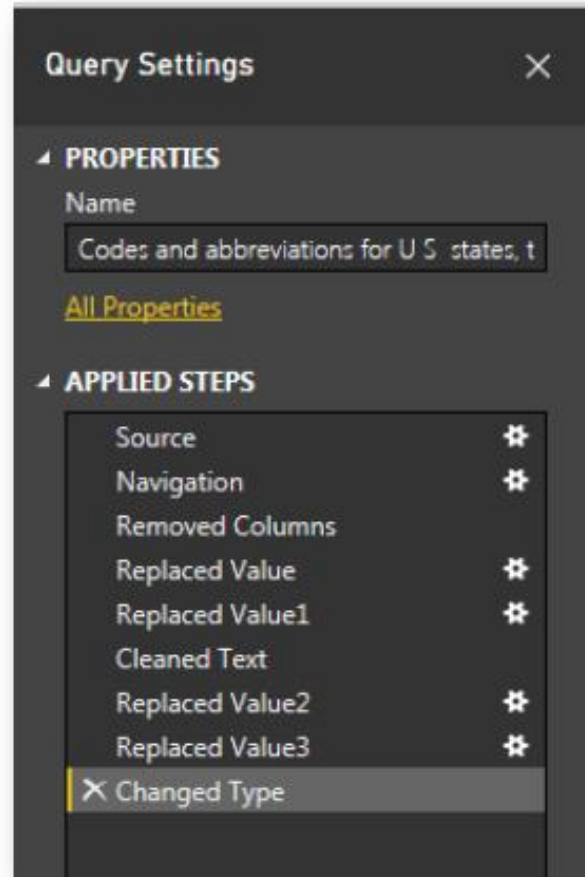


- Reverse rows



## Shaping Data – Applied Steps

You can apply different transformations, such as renaming columns or tables, changing text to numbers, removing rows, and so on to shape your data. You can use the Query Editor to shape your data.



# Combine Data — Merge Queries

You can merge the queries when you want to add one or more columns to another query. There should be joining or matching criteria between two queries. Following are the types of joins available for merging queries.

- Left outer join
- Right outer join
- Full outer join
- Inner join
- Left anti join
- Right anti join

Merge

Select a table and matching columns to create a merged table.

Codes and abbreviations for U S states, territories and other regions

United States Of America	Federal state	US USA 840.1
Alabama	State	US
Alaska	State	US
Arizona	State	US
Arkansas	State	US
California	State	US

Table 0

Rank	State	Cost of living	Weather	Health care quality	Crime	Tax	Culture	Senior
1	New Hampshire	40	45	4	3	7	6	14
2	Colorado	33	20	7	25	16	9	46
3	Maine	58	44	1	2	55	19	2
4	Iowa	14	35	9	15	20	35	9
5	Minnesota	30	47	3	14	43	7	34

Join Kind

Left Outer (all from first, matching from second)

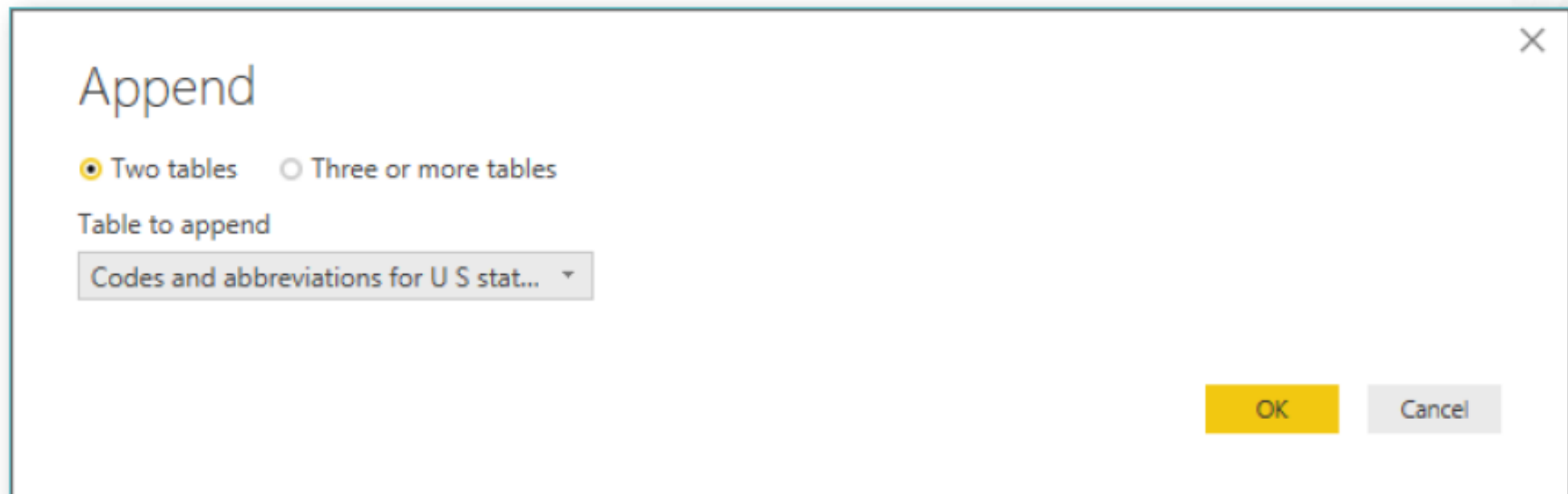
✓ The selection has matched 46 out of the first 46 rows.

OK

Cancel

## Combine Data — Append Queries

- You can append queries when you want to add one or more rows to an existing query.
- Using the “Append Queries” option, you can append different set of data rows coming in from different queries.
- It’s important to have the same number and name of columns for this option to work accurately.



The screenshot shows a dialog box titled "Append" with a close button (X) in the top right corner. Inside the dialog, there are two radio button options: "Two tables" (which is selected) and "Three or more tables". Below these options is a label "Table to append" followed by a dropdown menu. The dropdown menu currently displays the text "Codes and abbreviations for U S stat...". At the bottom right of the dialog, there are two buttons: "OK" (highlighted in yellow) and "Cancel" (in a light gray box).

Append

☒ Two tables ☐ Three or more tables

Table to append

Codes and abbreviations for U S stat... ▼

OK Cancel

## Why to Set up Relationships?

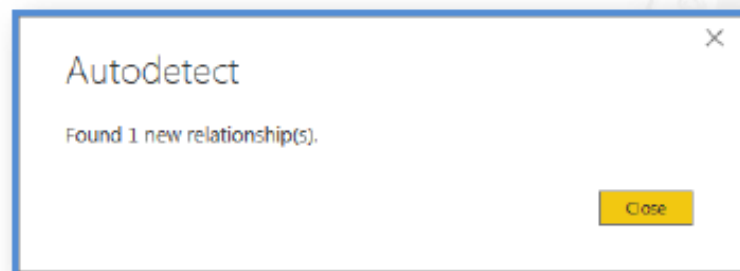
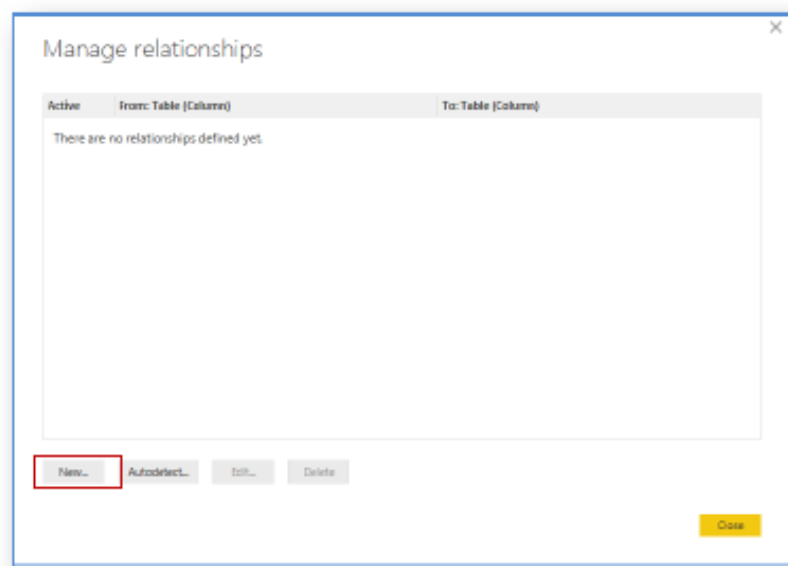
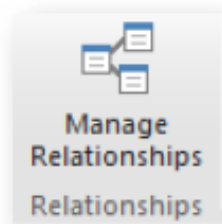
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- When you work on multiple tables, chances are you're going to do some analysis using data from all those tables.
- You must set up relationships between those tables in order to calculate results and display the correct data in your dashboards. Power BI Desktop makes creating those relationships easy.
- Power BI Desktop allows you to set up relationships using two ways.
- You can use automatic, or manual method to create relationships between multiple tables.



## Auto Detect Relationship

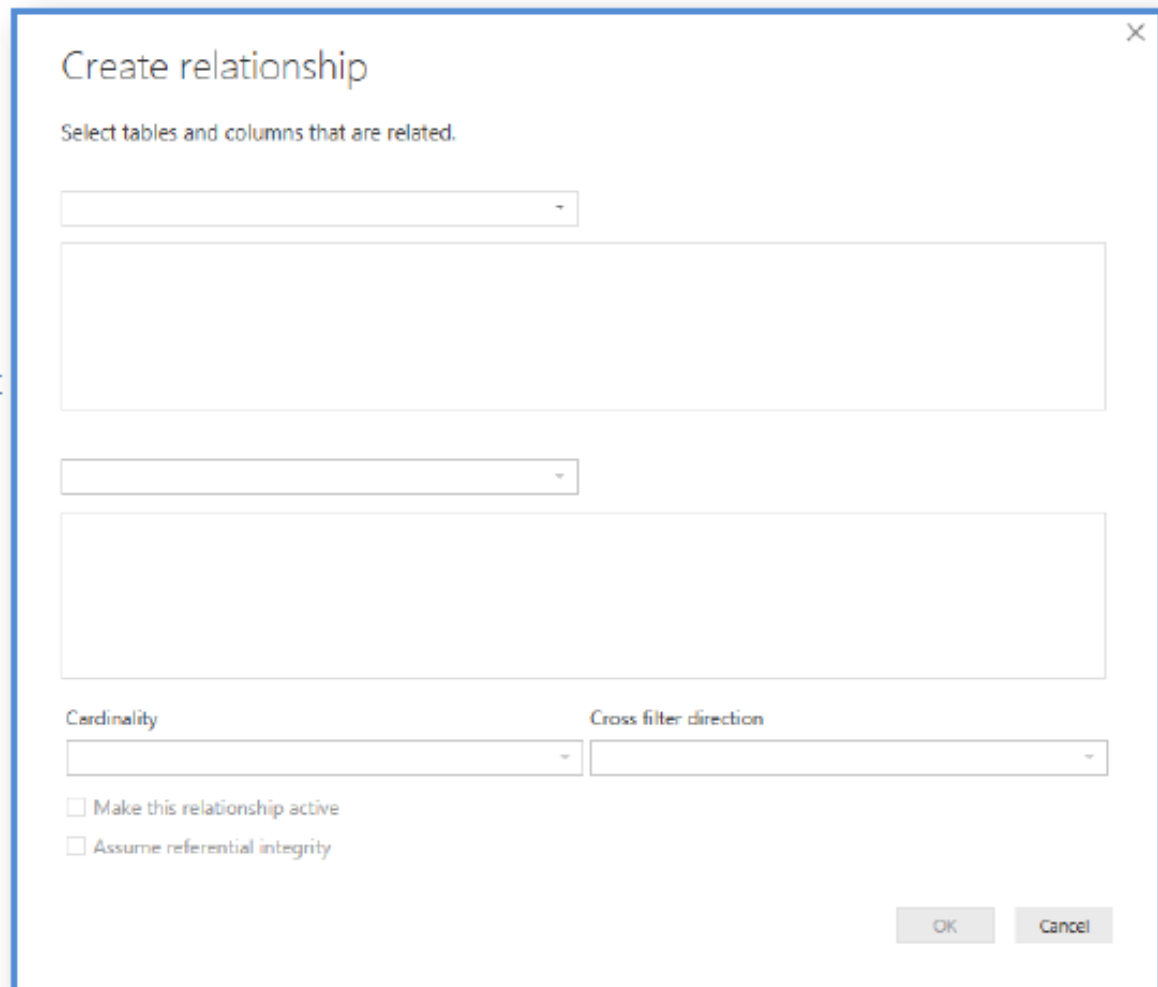
- When you query multiple tables at the same time, Power BI Desktop tries to find and set relationships for you.
- Power BI Desktop looks at column names in the tables you are querying to decide if there are any possible relationships. You use the manage relationship option to auto detect relationships.



## Custom Relationship

Steps to create a custom relationship are:

1. On the **Home** tab, select **Manage Relationships**.
2. In the **Manage Relationships** window, click **New**.
3. Use the drop-down list to select the columns you want to use in the relationship.
4. Click **OK**.



The screenshot shows the 'Create relationship' dialog box. At the top, it says 'Create relationship' with a close button (X). Below that, it says 'Select tables and columns that are related.' There are two identical sections for selecting tables and columns. Each section consists of a small drop-down list for the table and a larger rectangular area for selecting columns. Below these sections, there are two more drop-down lists: 'Cardinality' and 'Cross filter direction'. At the bottom, there are two checkboxes: 'Make this relationship active' and 'Assume referential integrity'. Finally, there are 'OK' and 'Cancel' buttons at the bottom right.



# Configuring Custom Relationship

When you set up or edit a relationship, you can configure different options such as cardinality and direction of cross filter.

Create relationship

Select tables and columns that are related.

CATEGORY

CATEGORY_ID	CATEGORY_NAME	DEPARTMENT_ID
1	Cell Phones & Accessories	1
2	Laptops	1
3	Cameras	1

SUBCATEGORY

SUBCAT_ID	SUBCATEGORY	CATEGORY_ID
1	SmartPhones	1
2	Headsets	1
3	Chargers	1

Cardinality

One to many (1:\*)

Cross filter direction

Single

☒ Make this relationship active

☐ Assume referential integrity

OK

Cancel

## Configuring Custom Relationship : Cardinality

- By default, Power BI Desktop configures the cardinality, and cross filter direction based on data in your tables.
- You can set the cardinality to many to one, one to many, or one to one.

One to many (1:\*)

Many to one (\*:1)

One to one (1:1)

One to many (1:\*)



## Configuring Custom Relationship : Cross Filter Direction

- You can configure cross filtering direction to single, or both.
- **Single** – In the single filter direction, filtering choices in connected tables work on the table where values are being aggregated.
- **Both** - The both filter direction considers both tables as a single table. This is the most commonly used, and default direction.

Cross filter direction

Single

Single

Both

Knowledge  
Check

1

Which data combine option is used to club rows coming in from different queries?

- a. Append Queries
- b. Merge Queries

Knowledge  
Check

2

Is it possible to selectively undo an applied transformation?

- a. Yes
- b. No

Knowledge  
Check

3

Can Power BI auto detect relationships between queries coming in from different data sources?

- a. Yes
- b. No



## Key Takeaways

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Now, you are able to:

- ➊ Understand the capabilities of Data and Relationship views
- ➋ Explore different data transformations
- ➌ Learn how to set up relationship using auto detect option
- ➍ Learn how to create user defined relationships
- ➎ Learn how to manage relationships between multiple tables