Data Manipulation and Reporting with Power BI

simplilearn

Data Modeling

Learning Objectives

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

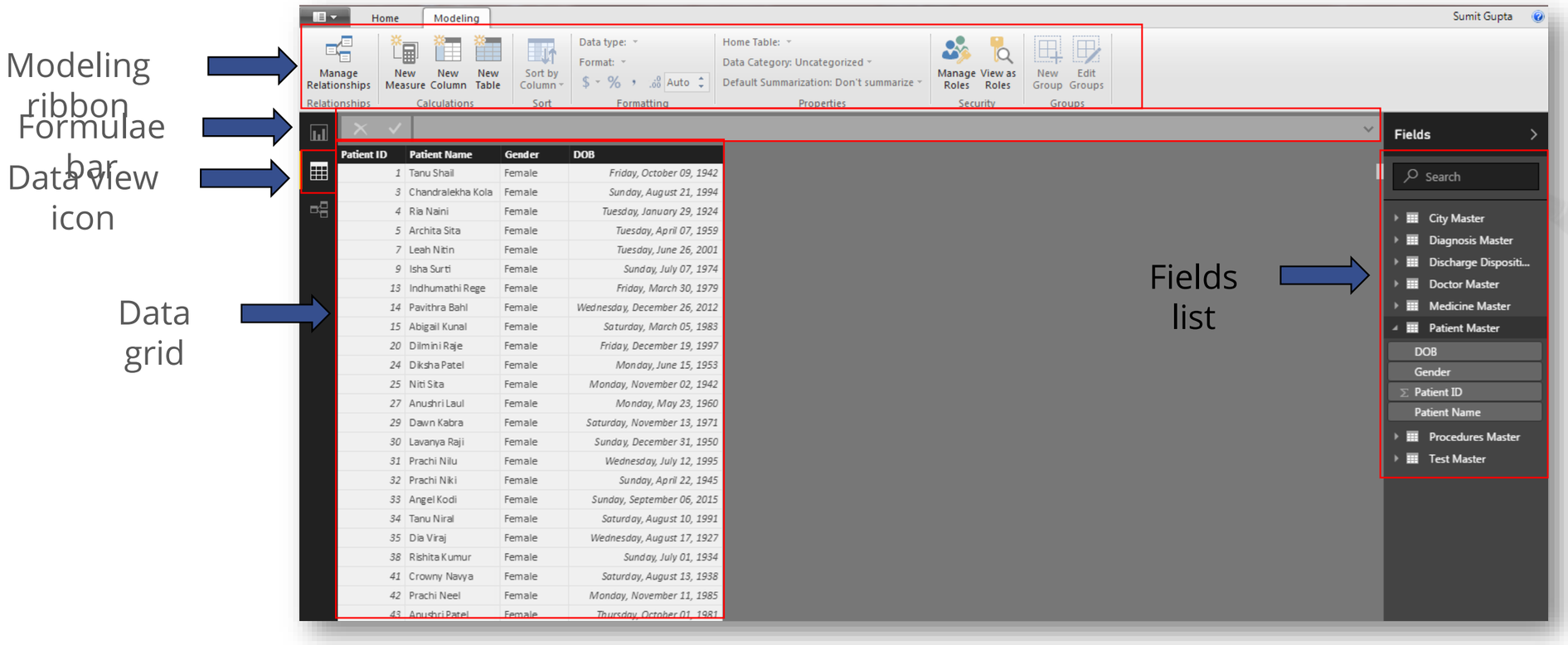
- Understand the capabilities of Data and Relationship views
- Explore different data transformations
- Learn how to set up relationship using auto detect option
- Learn how to create user defined relationships
- Learn how to manage relationships between multiple tables

DATA AND
ARTIFICIAL INTELLIGENCE

Data and Relationship Views

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.

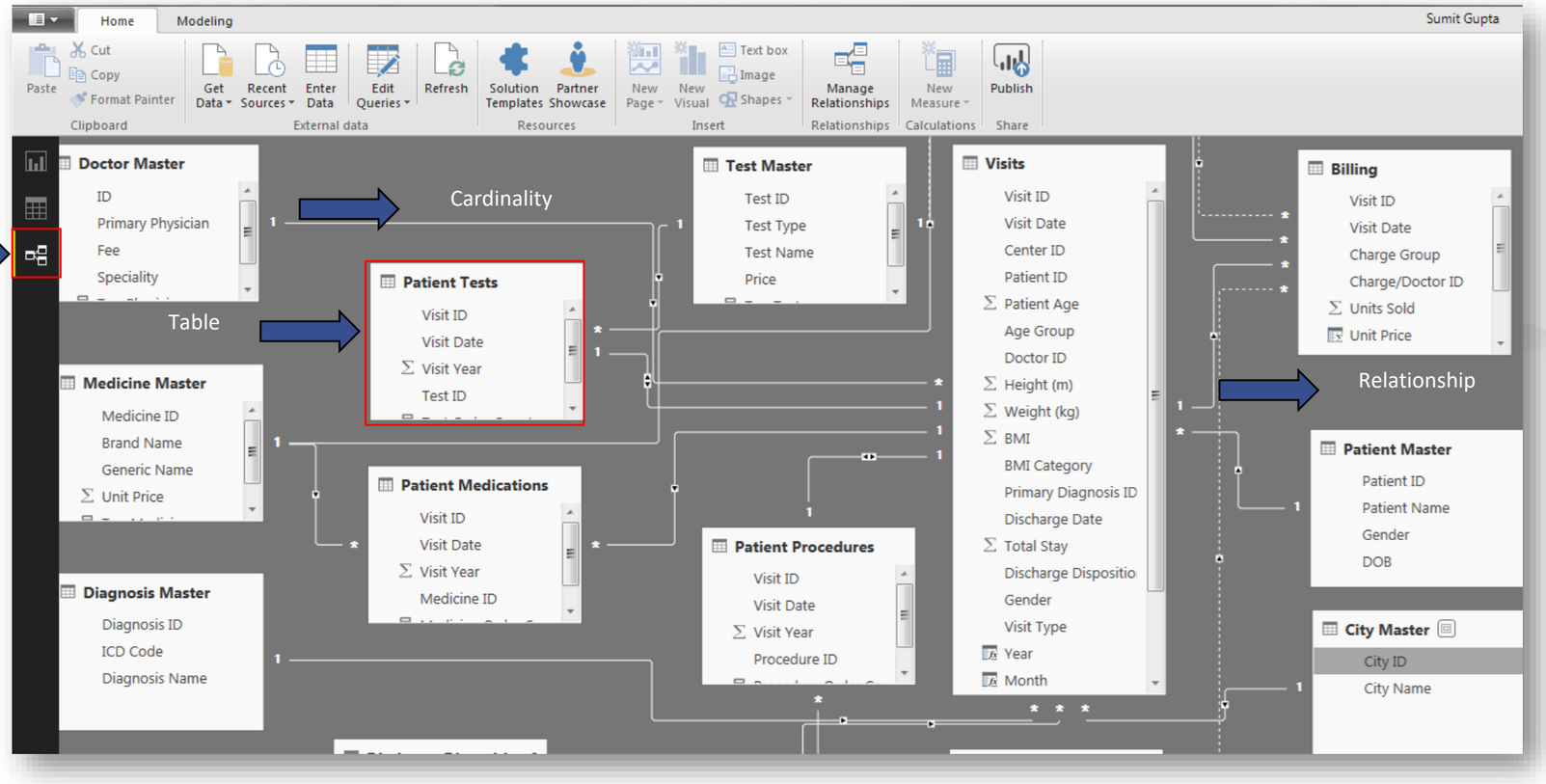


Patient ID	Patient Name	Gender	DOB
1	Tanu Shail	Female	Friday, October 09, 1942
3	Chandralekha Kola	Female	Sunday, August 21, 1994
4	Ria Naini	Female	Tuesday, January 29, 1924
5	Archita Sita	Female	Tuesday, April 07, 1959
7	Leah Nitin	Female	Tuesday, June 26, 2001
9	Isha Surti	Female	Sunday, July 07, 1974
13	Indhumathi Rege	Female	Friday, March 30, 1979
14	Pavithra Bahl	Female	Wednesday, December 26, 2012
15	Abigail Kunal	Female	Saturday, March 05, 1983
20	Dilmini Raje	Female	Friday, December 19, 1997
24	Diksha Patel	Female	Monday, June 15, 1953
25	Niti Sita	Female	Monday, November 02, 1942
27	Anushri Laul	Female	Monday, May 23, 1960
29	Dawn Kabra	Female	Saturday, November 13, 1971
30	Lavanya Raji	Female	Sunday, December 31, 1950
31	Prachi Nilu	Female	Wednesday, July 12, 1995
32	Prachi Niki	Female	Sunday, April 22, 1945
33	Angel Kodi	Female	Sunday, September 06, 2015
34	Tanu Niral	Female	Saturday, August 10, 1991
35	Dia Viraj	Female	Wednesday, August 17, 1927
38	Rishita Kumur	Female	Sunday, July 01, 1934
41	Crowny Navya	Female	Saturday, August 13, 1938
42	Prachi Neel	Female	Monday, November 11, 1985
43	Anushri Patel	Female	Thursday, October 01, 1981

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 view icon



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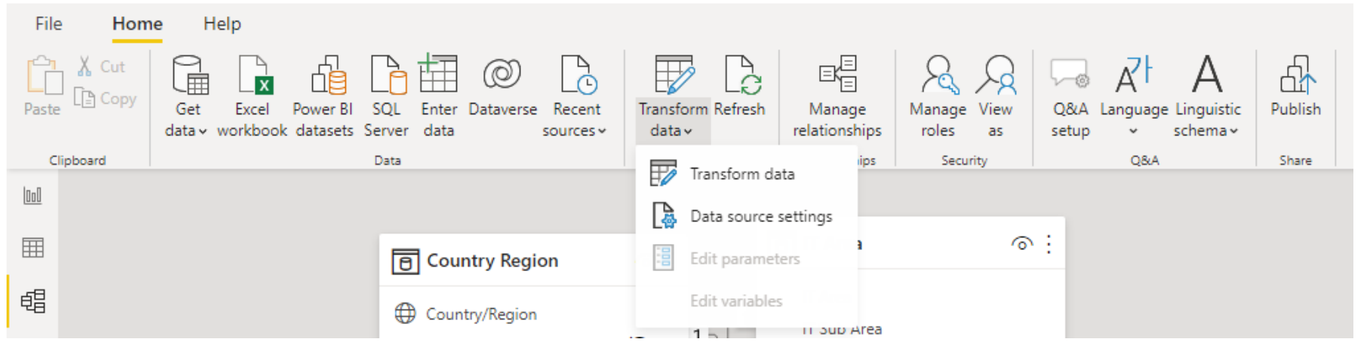
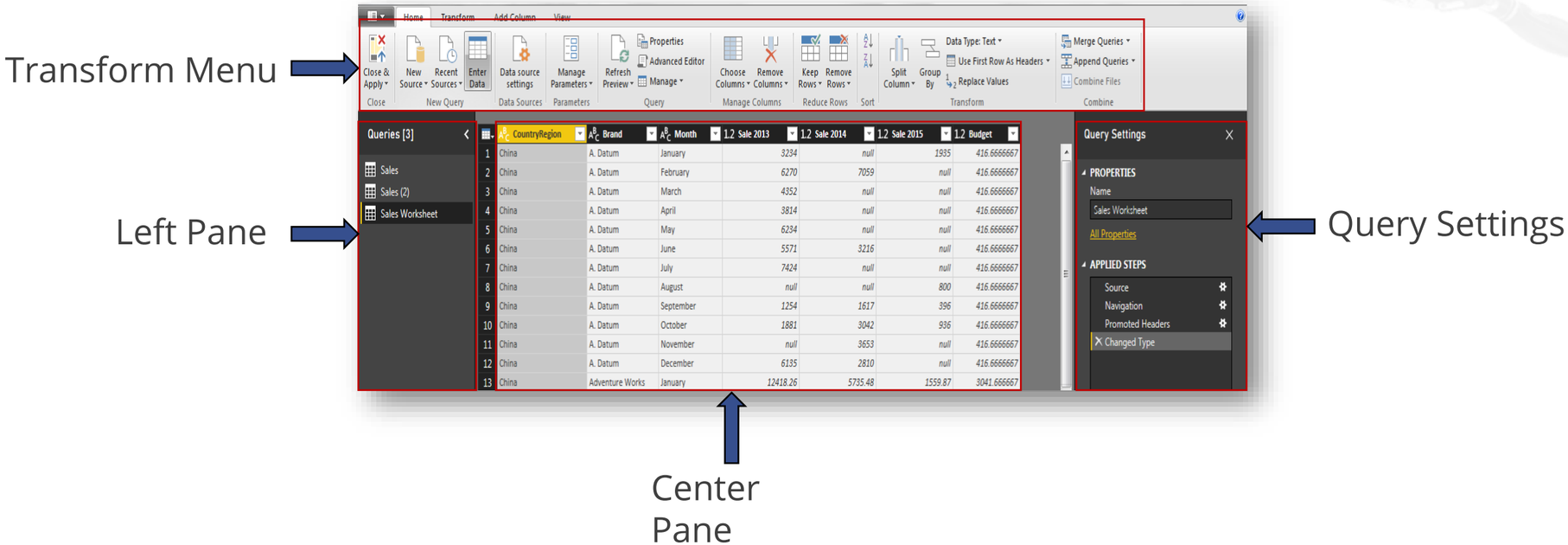
Introduction to Query Editor

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.



DATA AND
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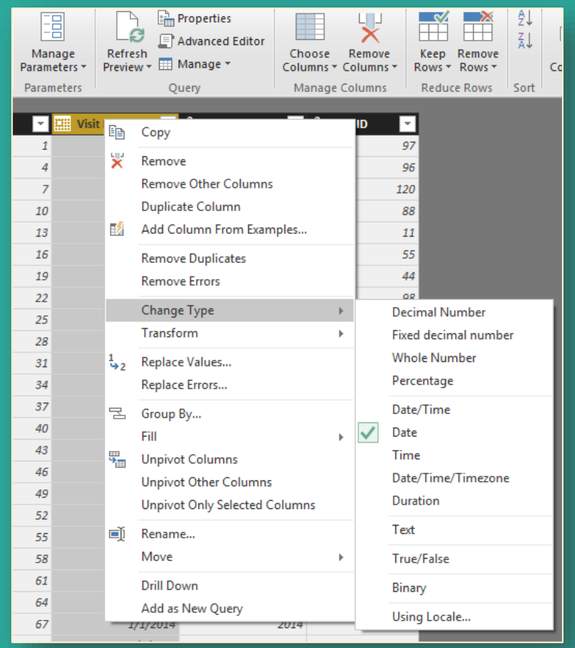
Data Transformation

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



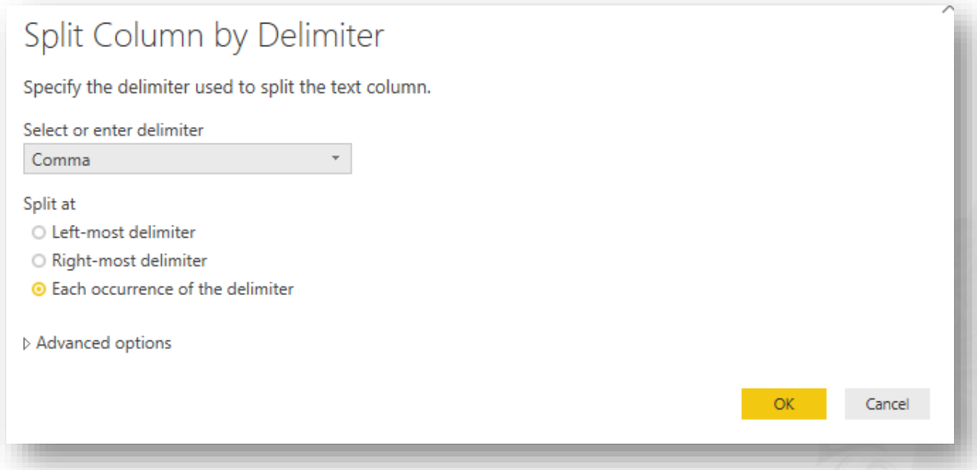
Shaping Data: Split Columns

Power BI allows you to split a column either by,

- Delimiter

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

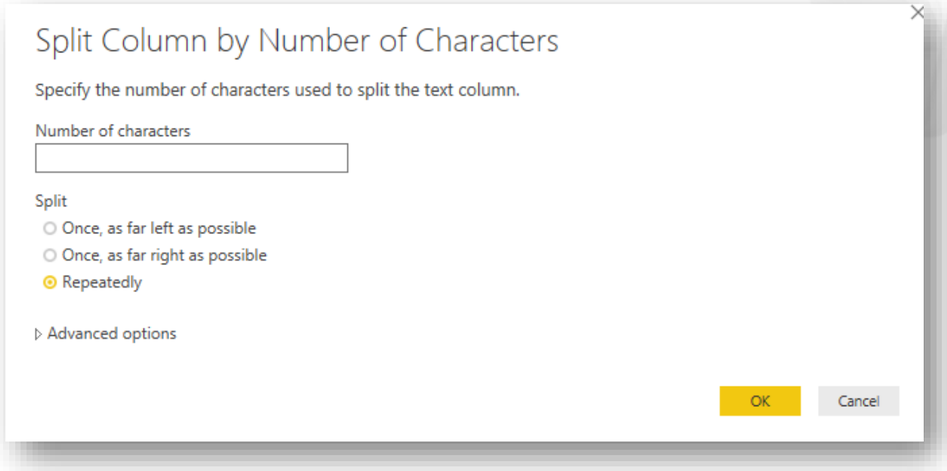
- ✔ Left most delimiter
- ✔ Right most delimiter or
- ✔ Each occurrence of the delimiter



- Number of characters

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

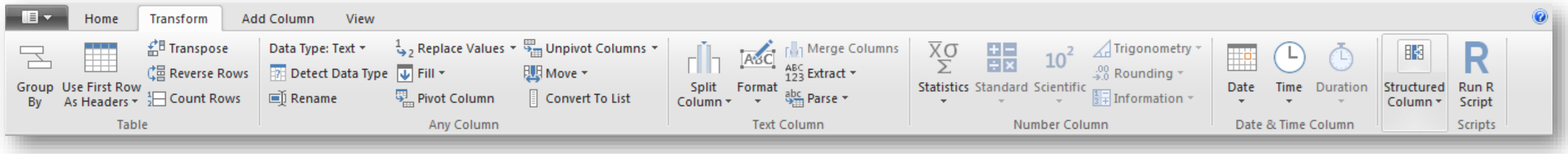
- ✔ Once as far left as possible
- ✔ Once as far right as possible or
- ✔ Repeatedly



Shaping Data – Text Transforms

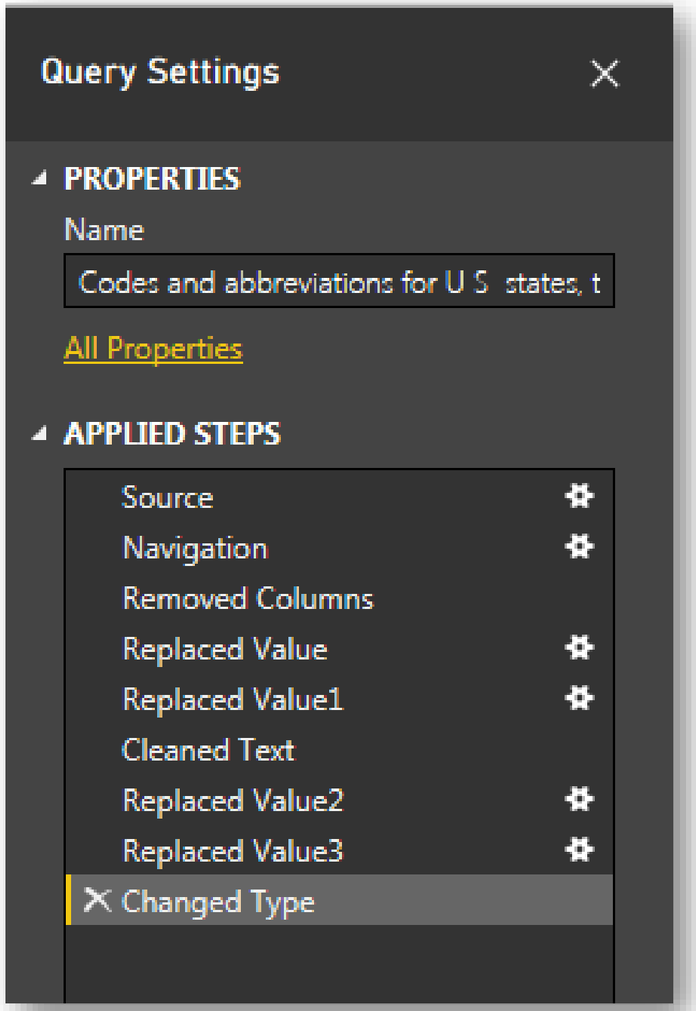
Following are some of the commonly used text transformations available in Power BI:

- Lowercase
- Uppercase
- Capitalize each word
- Trim
- Clean
- Length
- Transpose
- Fill
- Reverse rows



Shaping Data – Applied Steps

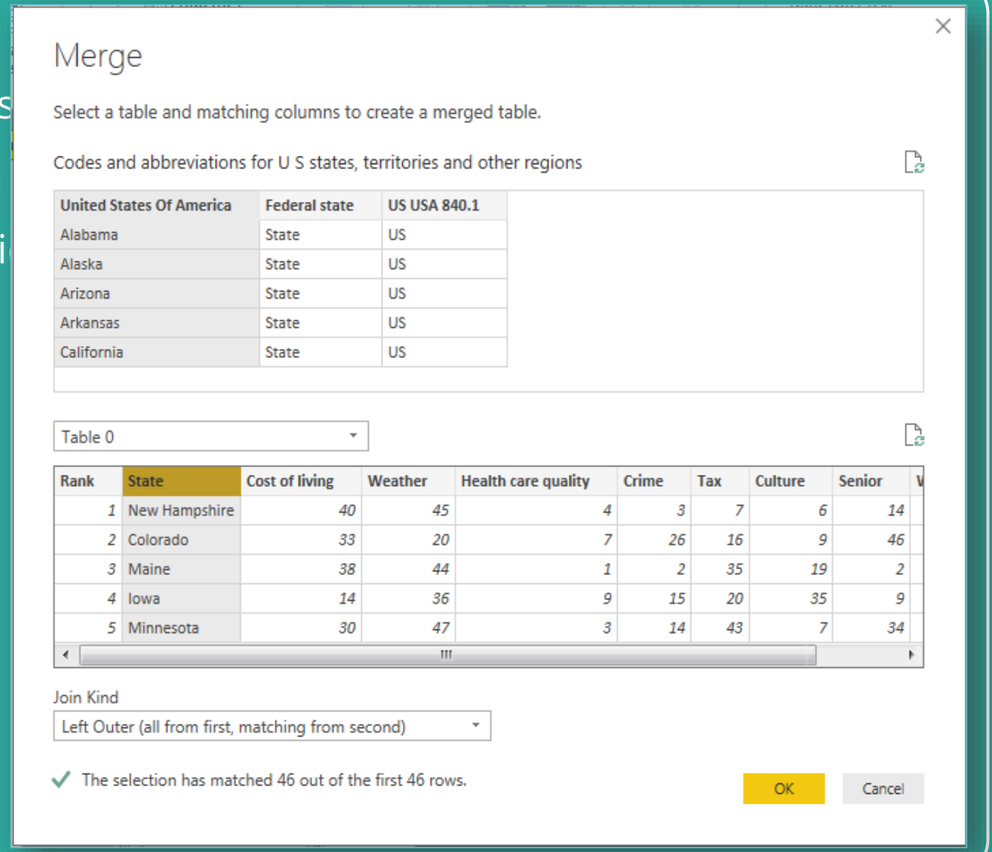
You can apply different transformations, such as renaming columns or tables, changing text to numbers, removing rows, and so on to shape your data. You can use the Query Editor to shape your data.



Combine Data — Merge Queries

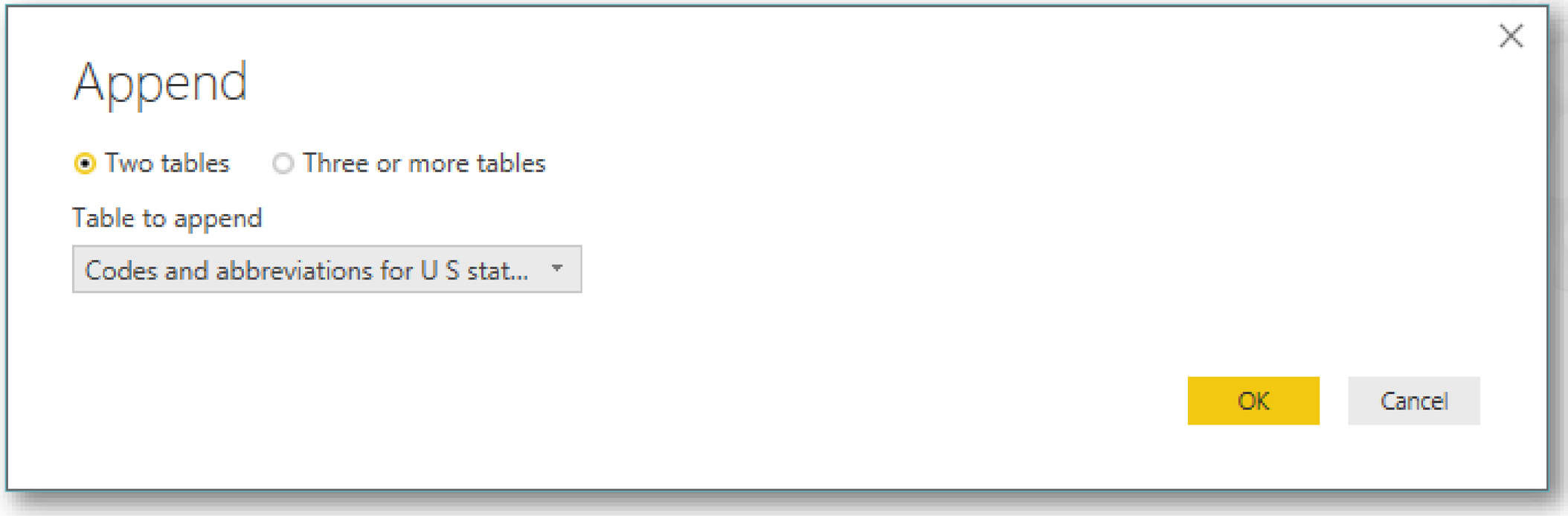
You can merge the queries when you want to add one or more columns to another query. There should be joining or matching criteria between two queries. Following are the types of joins available for merging queri

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



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.



DATA AND
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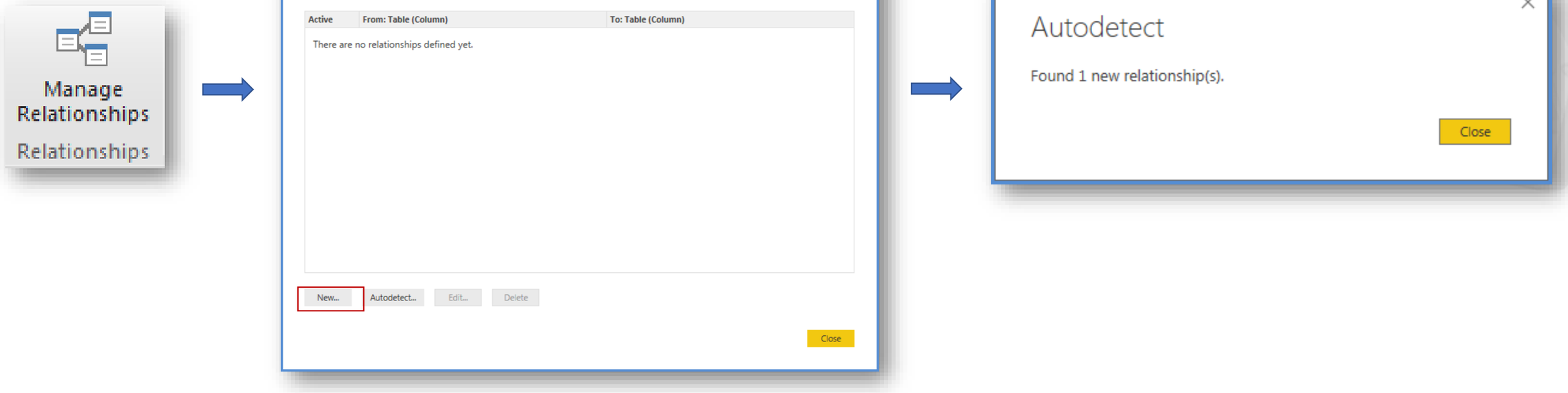
Create and Manage Relationship

Why to Set up Relationships?

- 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

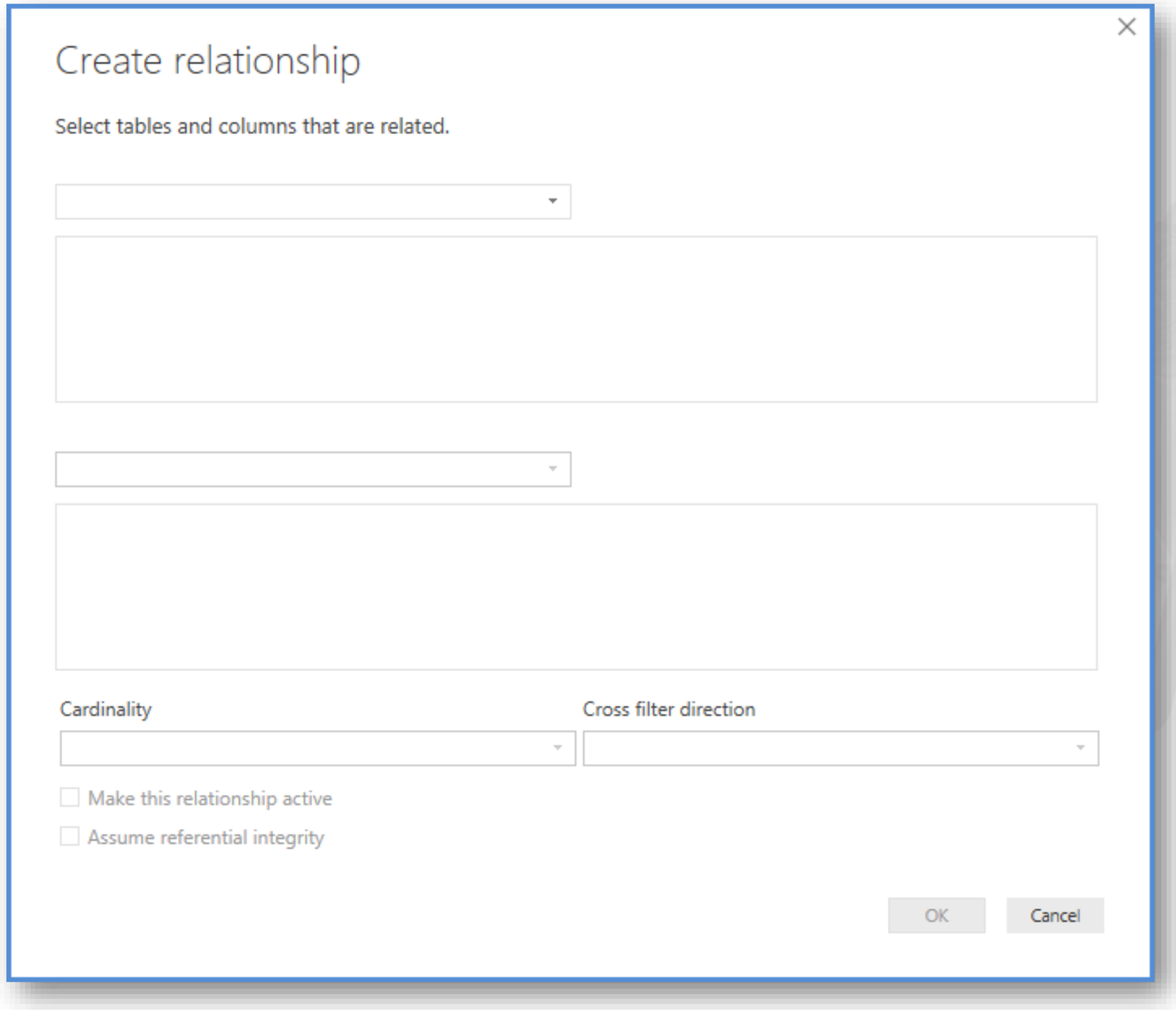
- When you query multiple tables at the same time, Power BI Desktop tries to find and set relationships for you.
- Power BI Desktop looks at column names in the tables you are querying to decide if there are any possible relationships.You use the manage relationship option to auto detect relationships.



Custom Relationship

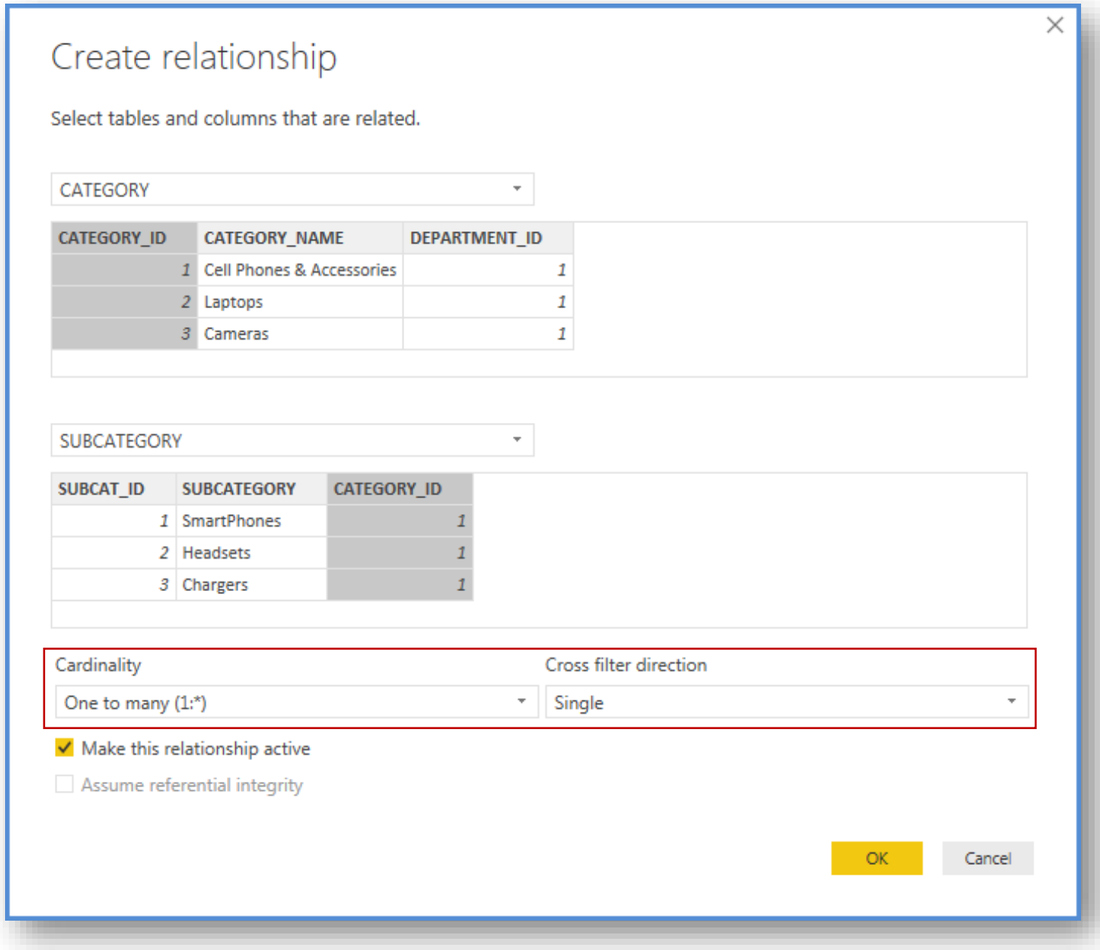
Steps to create a custom relationship are:

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**.



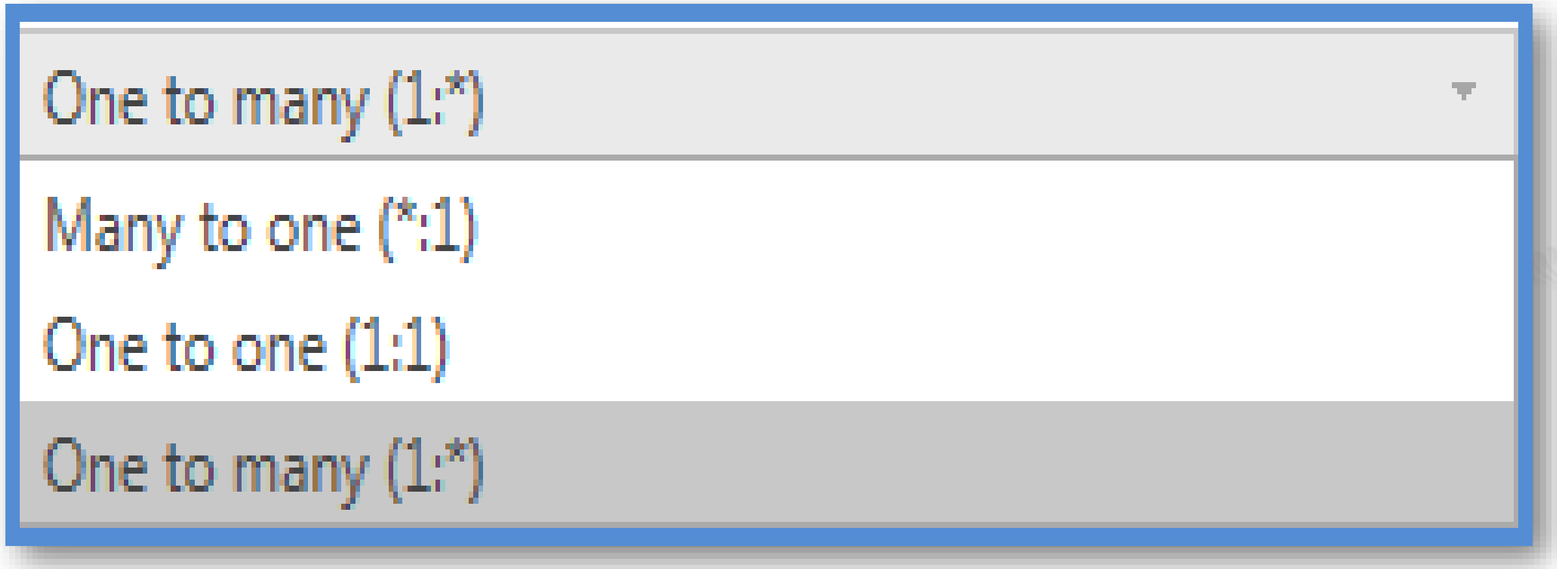
Configuring Custom Relationship

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



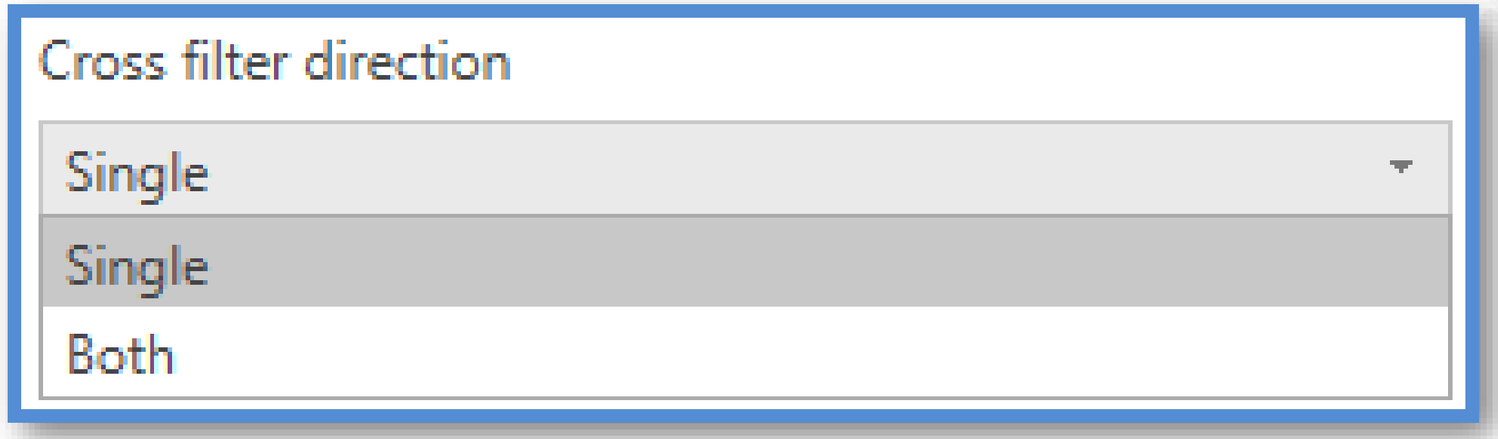
Configuring Custom Relationship : Cardinality

- 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.



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.



Data Merging and Appending

Objective: To merge and append the data.

Access: To execute the practice, follow these steps:
Create the two tables or datasets in the Excel Sheet as shown below. You can use any of the other datasets.

Date	Members	Car Loan Balance
9/17/2019	301	12087
9/16/2019	302	14567
9/15/2019	303	12233
9/14/2019	304	6534
9/13/2019	305	7658

Date	Members	House Loan Balance
9/12/2019	301	445678
9/13/2019	302	456732
9/10/2019	303	65342
9/11/2019	304	87675
9/9/2019	305	87235

ASSISTED PRACTICE

Data Merging and Appending

Objective: To merge and append the data.

Access: To execute the practice, follow these steps:

Step 1: Load two tables or datasets to Power BI. For example, we have used Car Loan and House Loan tables.

Step 2: After importing the datasets, click on the "Edit Queries" tab on the top menu bar.

Step 3: A new window will appear. On the left bar, you will see two table names imported. Select one of them.

Step 4: On the top menu, click on the "Merge Queries" tab. A new window will appear.

Step 5: Select the other table name with which the merge has to be performed and also the column with respect to which the merge will be done and click on "OK".

Step 6: Click on the new column added and select the column name that needs to be added, as shown below and click on "OK".

ASSISTED PRACTICE

Data Merging and Appending

Objective: Performing Append Operation using Power BI.

Access: To execute the practice, follow these steps:

The same datasets are being used for append operations as well. But the last column names of both the tables are the same in this case, as shown below:

Date	Members	Loan Balance
9/17/2019	301	12087
9/16/2019	302	14567
9/15/2019	303	12233
9/14/2019	304	6534
9/13/2019	305	7658

Date	Members	Loan Balance
9/12/2019	301	445678
9/13/2019	302	456732
9/10/2019	303	65342
9/11/2019	304	87675
9/9/2019	305	87235

ASSISTED PRACTICE

Data Merging and Appending

Objective: Performing Append Operation using Power BI.

Access: To execute the practice, follow these steps:

Step 1: Import both the datasets to Power BI

Step 2: After importing the datasets, click on the "Edit Queries" tab on the top menu bar.

Step 3: A new window will appear. On the left bar, you will see two table names imported. Select one of them.

Step 4: On the top menu, click on the "Append Queries" tab. A new window will appear.

Step 5: Select the other table name with which the append operation has to be performed and click on the "OK" button. The appended output will appear.

ASSISTED PRACTICE

Auto Detection and Custom Relations

Objective: To manage relationships using Auto Detect and Custom Relations.

Access: To execute the practice, follow these steps:
Create the two tables or datasets in the Excel Sheet as shown below. You can use any of the other datasets.

Date	Members	Car Loan Balance
9/17/2019	301	12087
9/16/2019	302	14567
9/15/2019	303	12233
9/14/2019	304	6534
9/13/2019	305	7658

Date	Members	House Loan Balance
9/12/2019	301	445678
9/13/2019	302	456732
9/10/2019	303	65342
9/11/2019	304	87675
9/9/2019	305	87235

ASSISTED PRACTICE

Auto Detection and Custom Relations

Objective: To manage relationships using Auto Detect and Custom Relations.

Access: To execute the practice, follow these steps:
Step 1: Load the two tables or datasets to Power BI. For example, in this case, we have used the **Car Loan** and **House Loan** tables.

Step 2: After loading the data, click on the **Manage Relationships** tab on the top menu bar.

Step 3: Click on the **Autodetect** button. It will automatically detect the relations, if any.

Step 4: To view the relation, click on the **model** icon on the left pane.

Step 5: You will now see that the relationship is detected and is being represented.

ASSISTED PRACTICE

Auto Detection and Custom Relations

Objective: Checking Relationships Using Custom Relations.

Access: To execute the practice, follow these steps:

Step 1: Load the two tables or datasets to Power BI. For example in this case, we have used the **Car Loan** and **House Loan** tables.

Step 2: To view the relation, click on the **model** icon on the left pane.

Step 3: After loading the data, click on the **Manage Relationships** tab on the top menu bar.

Step 4: Click on **New**. A **Create Relationship** window will open as shown. Select the table for creating a custom relation and click on **OK**.

Step 5: On the left pane, click on the **model** icon to see the new relationship created.

ASSISTED PRACTICE

Clean, Transform, and Load

Data Shaping

Power BI and Power Query are powerful environments used to clean and prepare data.

Benefits of Data Cleaning

Measures and columns produce more accurate results while performing aggregations and calculations.

Organized structure of the table helps to navigate through data easily.

Columns help in applying filters. Removal of duplicate data makes data navigation simpler.

Complicated columns can be split, and multiple columns can be grouped together.

Codes and integers can be replaced with human-readable values.

DATA AND
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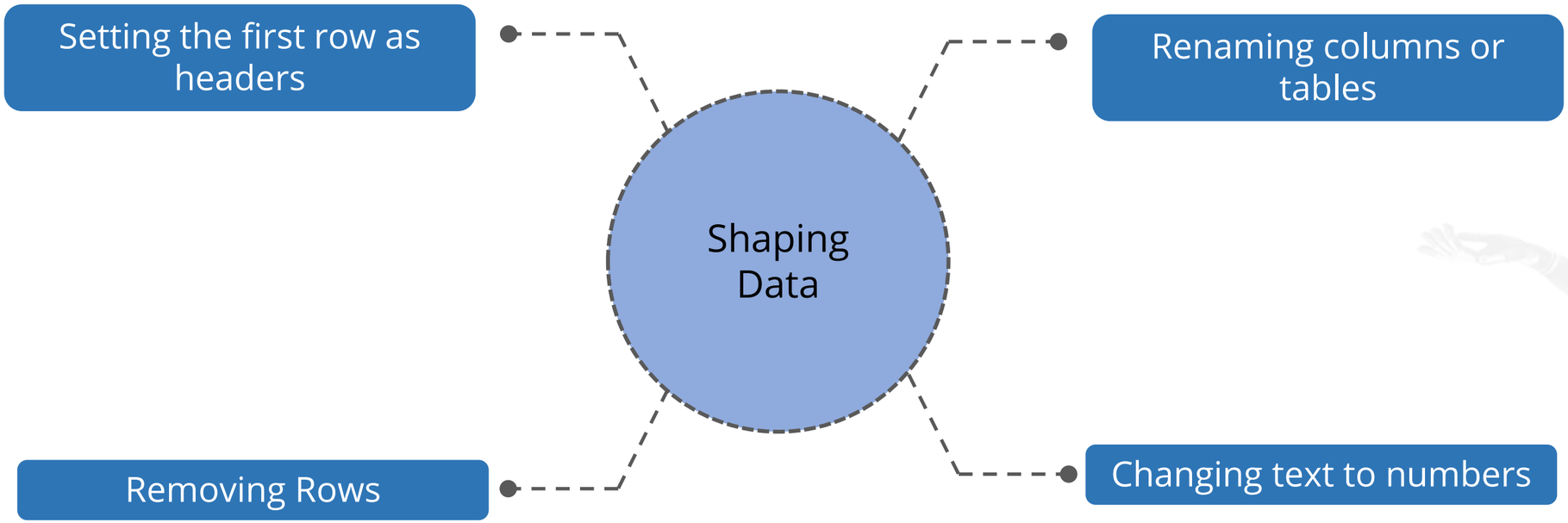
Data Shape Transformation to Table Structures

Shaping Table Structure

Shaping data or table structure refers to transforming the data by:



Promote Headers

When a table is created in Power BI Desktop:

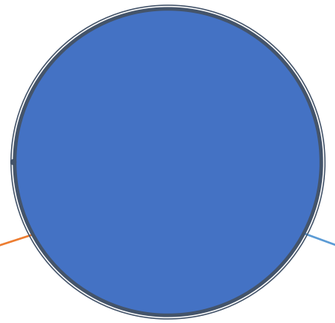
To resolve any inaccuracy, you must promote the first table row as a column header.

Power Query Editor assumes that all the data belongs to table rows.

Data sources can have the first row content as column names.

Promote Headers

There are two ways to promote headers:



1

By using the **Use First Row as Headers** option in the Home tab

2

By selecting the drop-down option next to the column and then selecting the **Use First Row as Headers**

Rename Columns

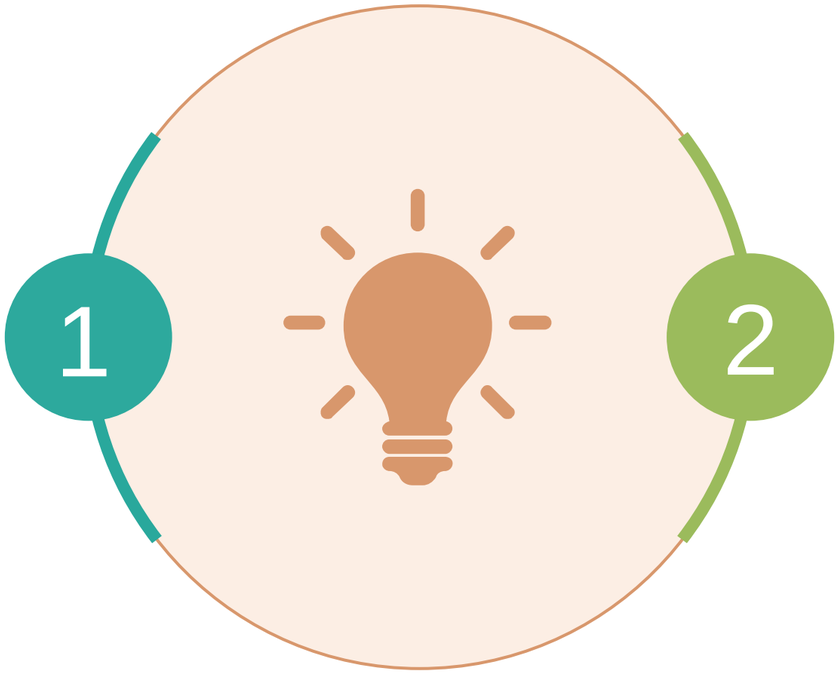
Following are the instances where you need to rename the columns:

- One or more columns have wrong headers
- A header has a spelling error
- The naming convention is inconsistent or user friendly

Rename Columns

There are two ways to rename a column header:

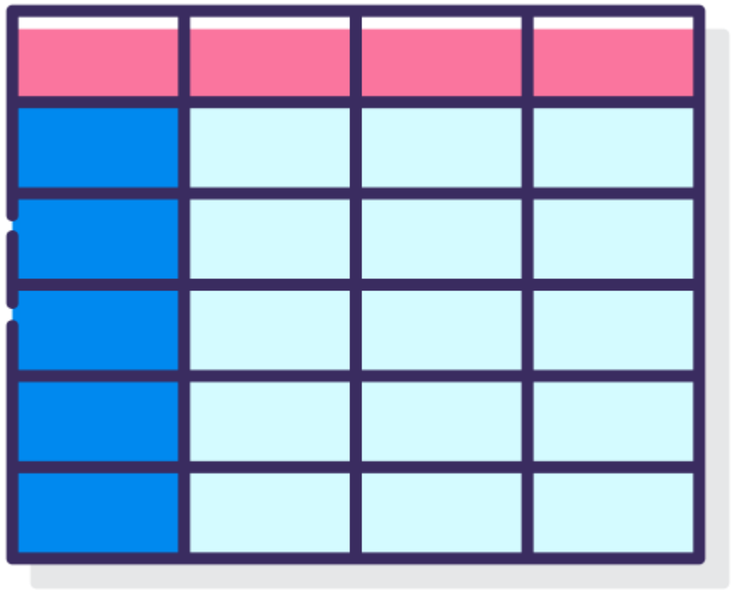
Right click the header, select rename, edit the name, and press enter



Double-click on the column header and overwrite

Rename Top Rows

Following are the instances where you need to remove the top rows:

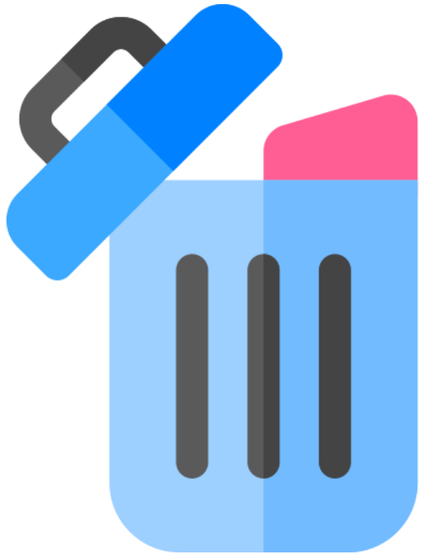


- Presence of blank rows
- Presence of unwanted data

To remove excess rows, select **Remove Rows > Remove Top Rows** in the Home tab.

Remove Columns

The process of removing unnecessary columns is a key step in data shaping.



To remove columns, select the column you want to remove, and then navigate to **Home** tab and select **Remove Columns**.

DATA AND
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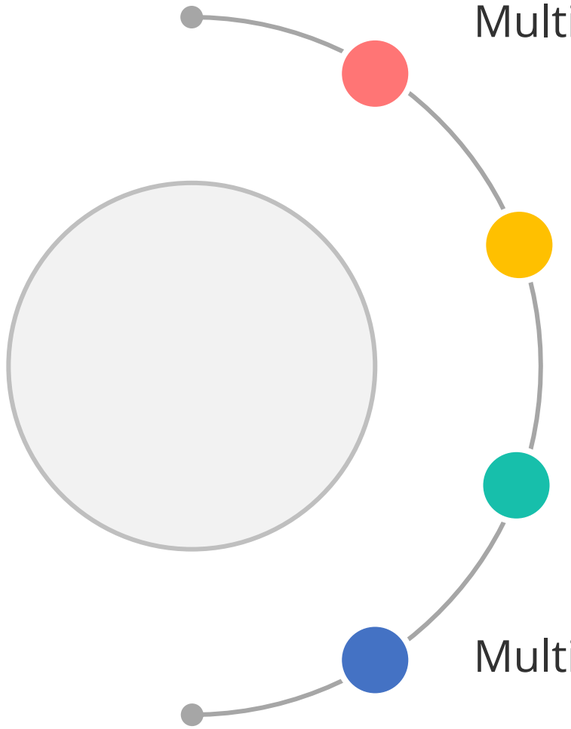
Enhance Data Structure

Combining Multiple Tables into a Single Table

Queries allow to append or merge tables or queries together. Following are the circumstances where multiple tables are combined:



- Multiple tables are present that complicate the data model
- Several tables have similar roles
- A table has only a column or two that can fit into a different table
- Multiple columns must be used from different tables to create a custom table

Combining Multiple Tables into a Single Table

Tables can be combined in the following two ways:

Merging

- When queries are merged, data from multiple tables is combined based on a common column.
- This is like joins in SQL

Appending

- When queries are appended, data rows are added to another table or query.

Using Advanced Editor to Modify M Code

Each time you shape data in Power Query, you create a step in the Power Query process.

The combined steps can be read only using the Power Query Advanced Editor.

The steps can be reordered, deleted, and modified as per requirement.

Though graphical interface is used to create cleaning steps, Power Query uses the M language in the backend.

Using Advanced Editor to Modify M Code

If you need to change the name of the database, you can make changes directly in code and then select Done.

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Knowledge Check

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

1

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

A. Append Queries

B. Merge Queries

The correct answer is **a**

Append Queries are used to club rows coming in from different queries.

Knowledge Check

2

Is it possible to selectively undo an applied transformation?

A. Yes

B. No

Knowledge Check

2

Is it possible to selectively undo an applied transformation?

A. Yes

B. No

The correct answer is **a**

It is possible to selectively undo an applied transformation using UNDO/REDO options within the Report view.

Knowledge Check

3

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

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

The correct answer is **a**

Power BI can be used to auto detect relationships between queries coming in from different data sources: Home tab > click Manage Relationships > AutoDetect.

Knowledge Check 3

Which of the following are the environments used to clean and prepare data?

A. Power BI

B. Power Query

C. Power Text

D. Dashboard

Knowledge Check 3

Which of the following refers to summarizing data and presenting it at a higher level?

A. Power BI

B. Power Query

C. Power Text

D. Dashboard

The correct answer is **A and B**

Power Query and Power BI is used to summarize data and present it in a higher level.

Key Takeaways

- Data View enables you to inspect, explore, and understand the underlying data in the Power BI Desktop.
- Relationship View shows all of the tables, their associated columns, and the relationships in your model.
- Data cleaning helps organize the structure of the table which helps to navigate through data easily.
- The process of removing unnecessary columns is a key step in data shaping.