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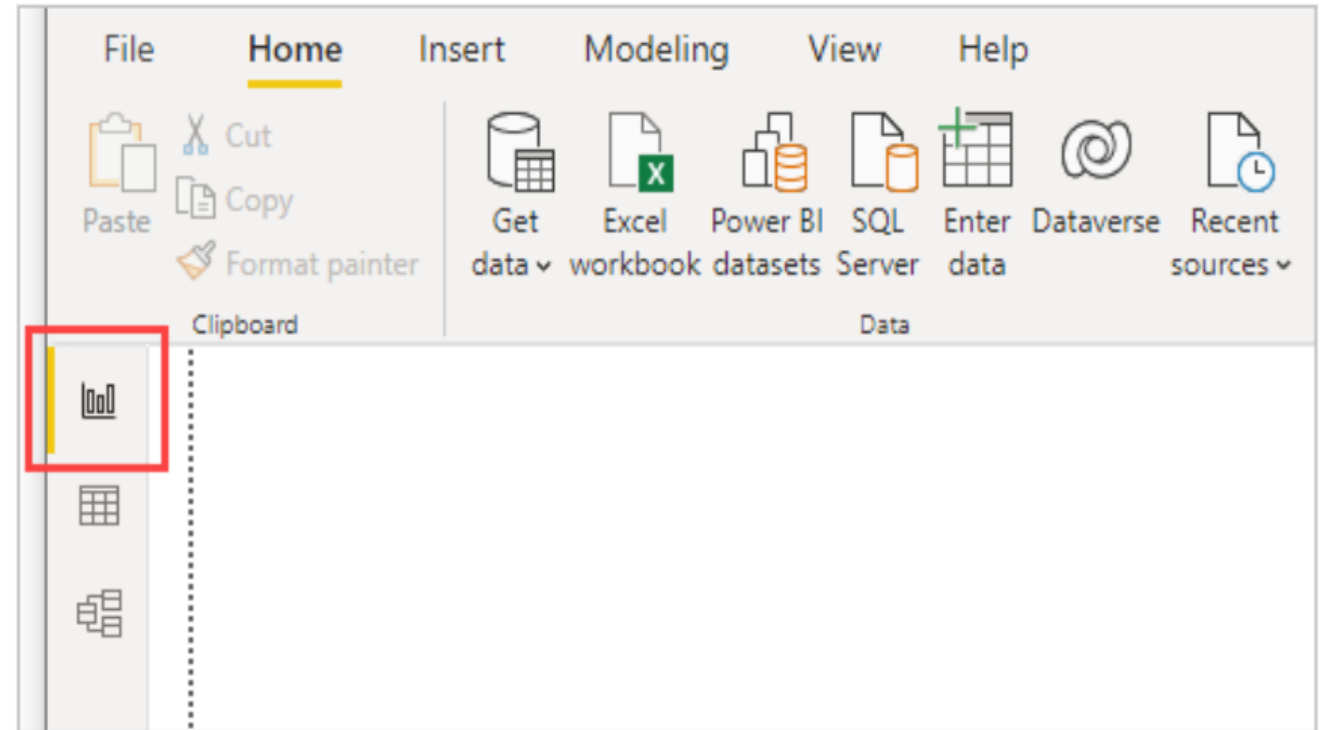


Power Query, Parameters, Templates & Custom Functions

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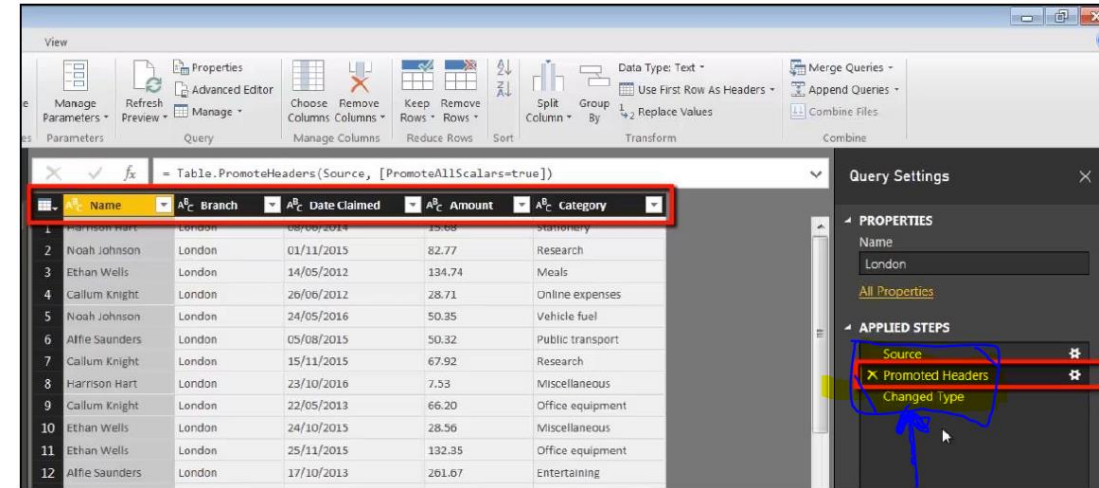
QUERY OVERVIEW IN POWER BI DESKTOP

- With Power BI Desktop you can connect to the world of data, create reports, and share your efforts with others – who can then build on your work, and expand their business intelligence efforts.
- Power BI Desktop has three views:
 1. **Report** view – use queries to build visualizations,
 2. **Data** view – where you see the data in your report in data model format, here you can add measures, create new columns, and manage relationships.
 3. **Model** view – Get a graphical representation of the relationships that are established in your data model, and manage or modify them as needed.
- Power BI Desktop also comes with Power Query Editor. Use for shaping and transform the data to meet your needs, then load that model into Power BI Desktop.



QUERY EDITOR

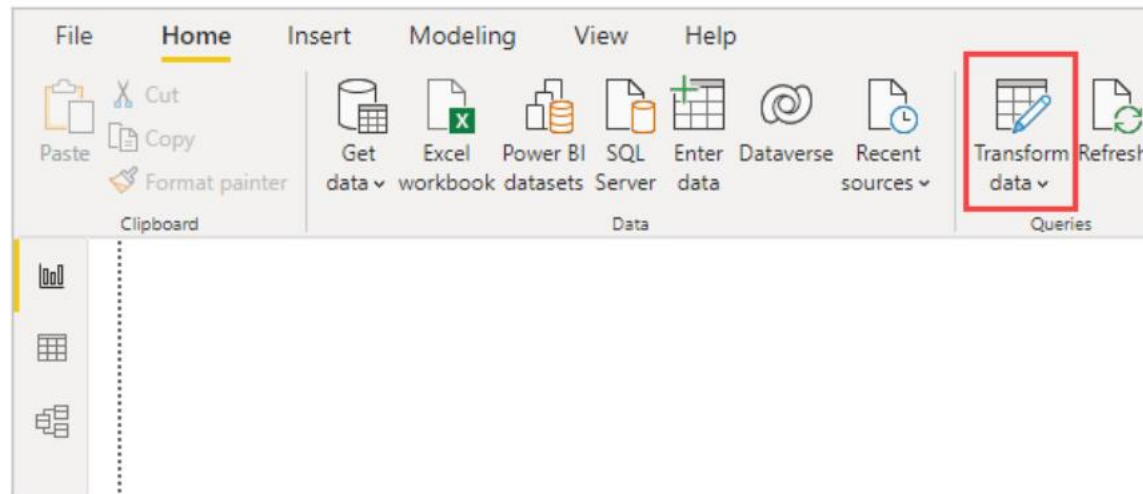
- Query Editor is a separate application which runs inside Power BI Desktop
- Query Editor uses a language called M (M for mashup) to perform transformations on data as it is being imported.
- Commands in the Query Editor's user-friendly interface allow you to create a series of transformational rules which will apply whenever you are connecting to a given data source.
- The Rules are referred to as steps, and are listed in the Query Settings pane, on the right of the Query Editor window.
- Open Connectcsv.Pbix
- Look at the automatically generated three steps: Source, Promoted Headers and Changed Type.
- **Source** is the specification of the physical location of the CSV file
- **Promoted Headers** is the step whereby Power BI deduces that the first row within a dataset constitutes the column headers.
- **Changed Type** step, Power BI examines the data in each of the columns and attempts to change it to the appropriate data type.
- text (indicated by the ABC icon)
- Decimal number (represented by 1.2 3)



POWER QUERY EDITOR

Load the Superstore Dataset and load Orders, People and Returns workbooks

To get to Power Query Editor, select Transform data from the Home tab of Power BI Desktop



TRANSFORMATION TO THE FOLDER DATA

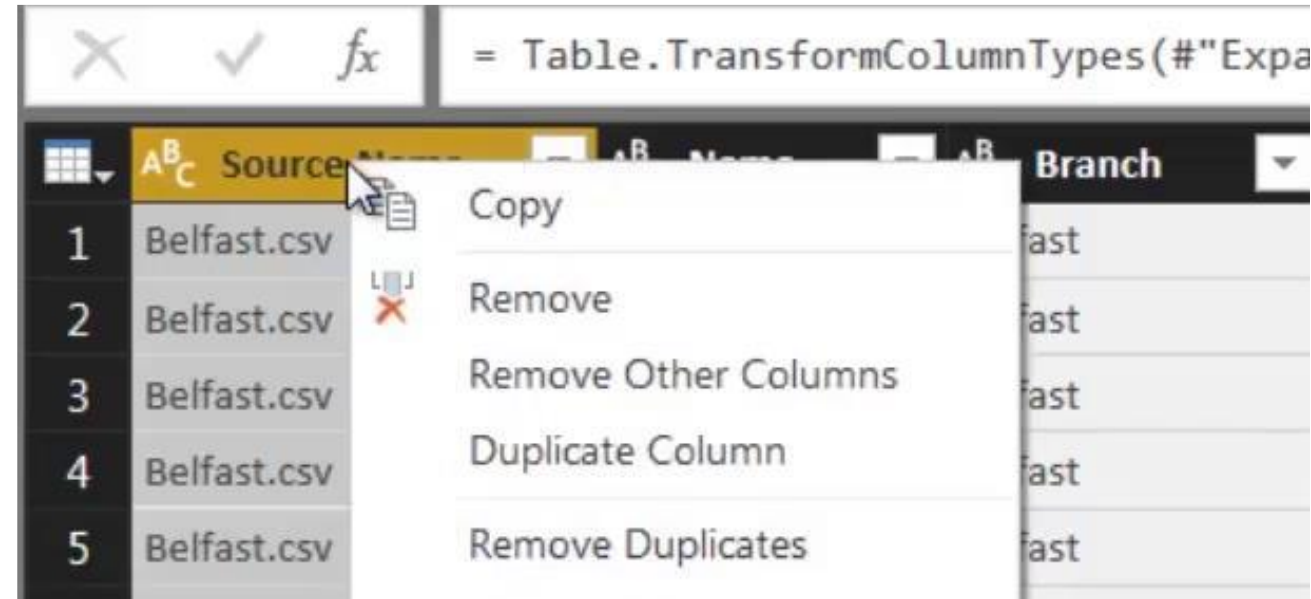
- Open the ForderData.Pbix file.
- Chose Transform to go to Power Query Editor
- The information is intact; and the Date Claimed and Amount columns have automatically been converted into date and decimal number
- use the Change Type step.

The screenshot displays the Power Query Editor interface. On the left, a data table is visible with the following columns: Date Claimed, Amount, and Category. The data rows show various dates, amounts, and categories such as Research, Vehicle mileage, and Vehicle fuel. On the right, the Query Settings pane is open, showing the 'APPLIED STEPS' section. The steps listed are: Source, Invoke Custom Function1, Renamed Columns1, Removed Other Columns1, Expanded Table Column1, and 'Changed Type' (which is currently selected and highlighted). The 'Changed Type' step is indicated by a mouse cursor.

Date Claimed	Amount	Category
24/05/2014	50.06	Research
30/01/2014	27.78	Vehicle mileage
31/03/2013	158.22	Vehicle fuel
04/02/2014	40.52	Meals
13/11/2015	153.81	Entertaining
17/06/2016	244.7	Vehicle fuel
21/04/2013	27.18	Miscellaneous
15/07/2015	164.58	Computer equipment
20/10/2013	144.63	Public transport
24/02/2015	148.14	Entertaining
25/08/2012	63.02	Research
01/10/2012	29.37	Computer equipment

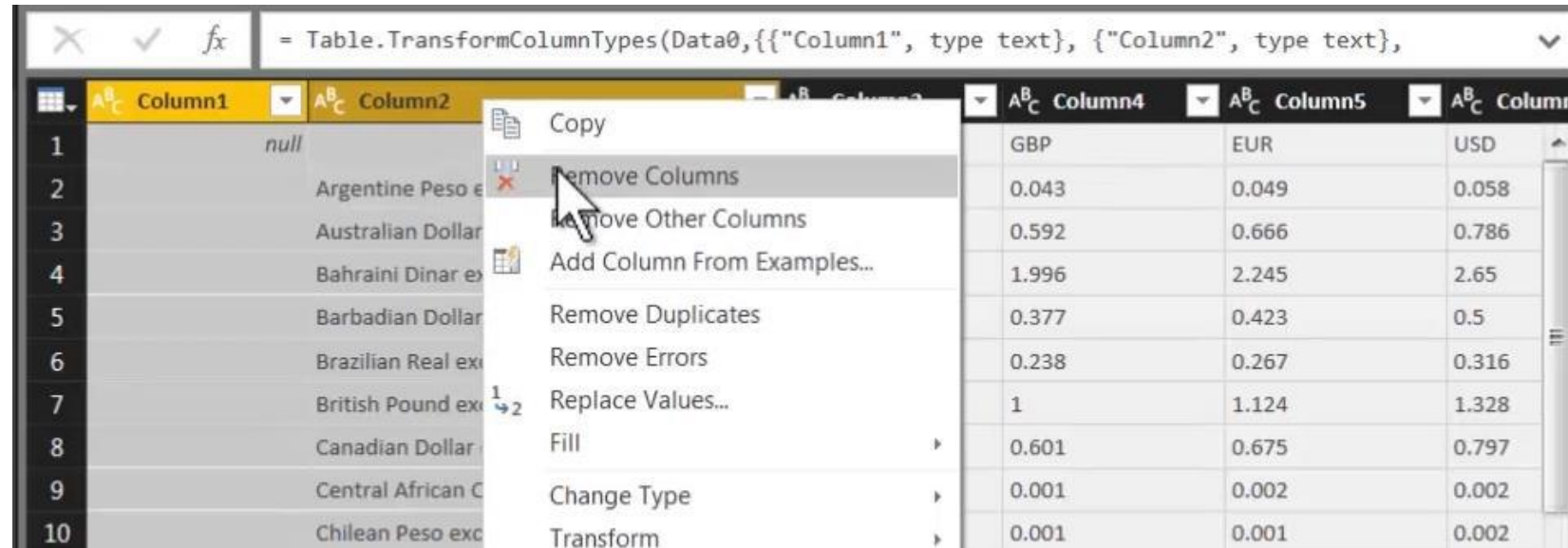
TRANSFORMATION TO THE FOLDER DATA

- The only thing which we do not want is the column which has automatically been created called "Source.Name"
- Simply **right-click** on the column header and choose **Remove**.
- Removing a column implies that, when we connect to this folder, we do not need this particular column.
- choose **File > Close and Apply Save**.



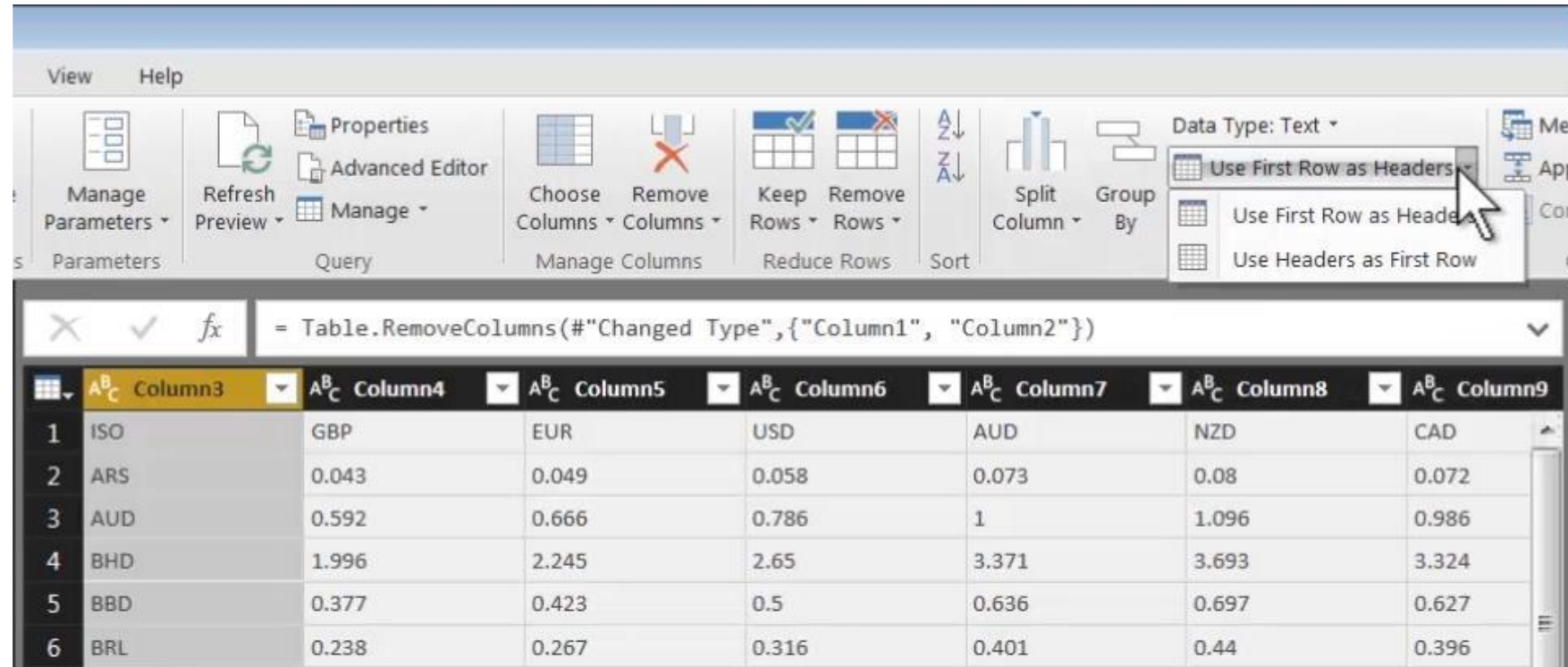
QUERY EDITOR: REMOVE COLUMNS

- Open File
WebData.Pbix
- We will not need the first two columns, we can simply highlight them, using click and then control-click; then right-click on a selected column header and choose remove columns from the context menu.



QUERY EDITOR: USE FIRST ROW AS HEADERS

- Tell power BI that the first row contains the column headings; and we do this by choosing home > use first row as headers. Make sure that we have numeric values in the conversion rate columns; select all the numeric columns by clicking on the first and then shift-clicking on the last.



The screenshot shows the Power BI Query Editor interface. The ribbon is set to 'Home', and the 'Use First Row as Headers' option is selected in the 'Data Type' dropdown menu. The formula bar shows the query: `= Table.RemoveColumns(#"Changed Type",{"Column1", "Column2"})`. The data table below has 9 columns: Column3, Column4, Column5, Column6, Column7, Column8, and Column9. The first row contains currency codes (ISO, GBP, EUR, USD, AUD, NZD, CAD), and the subsequent rows contain numeric conversion rates.

	Column3	Column4	Column5	Column6	Column7	Column8	Column9
1	ISO	GBP	EUR	USD	AUD	NZD	CAD
2	ARS	0.043	0.049	0.058	0.073	0.08	0.072
3	AUD	0.592	0.666	0.786	1	1.096	0.986
4	BHD	1.996	2.245	2.65	3.371	3.693	3.324
5	BBD	0.377	0.423	0.5	0.636	0.697	0.627
6	BRL	0.238	0.267	0.316	0.401	0.44	0.396

QUERY EDITOR:

- Then we Right-click and choose Change Type > Decimal Number and then just click on Replace Current to update the existing Change Type step
- . remove the EUR(Euro) column; because none of the countries in which our fictitious company operates are in the Euro zone.

Change Column Type

The selected column has an existing type conversion. Would you like to replace the existing conversion, or preserve the existing conversion and add the new conversion as a separate step?

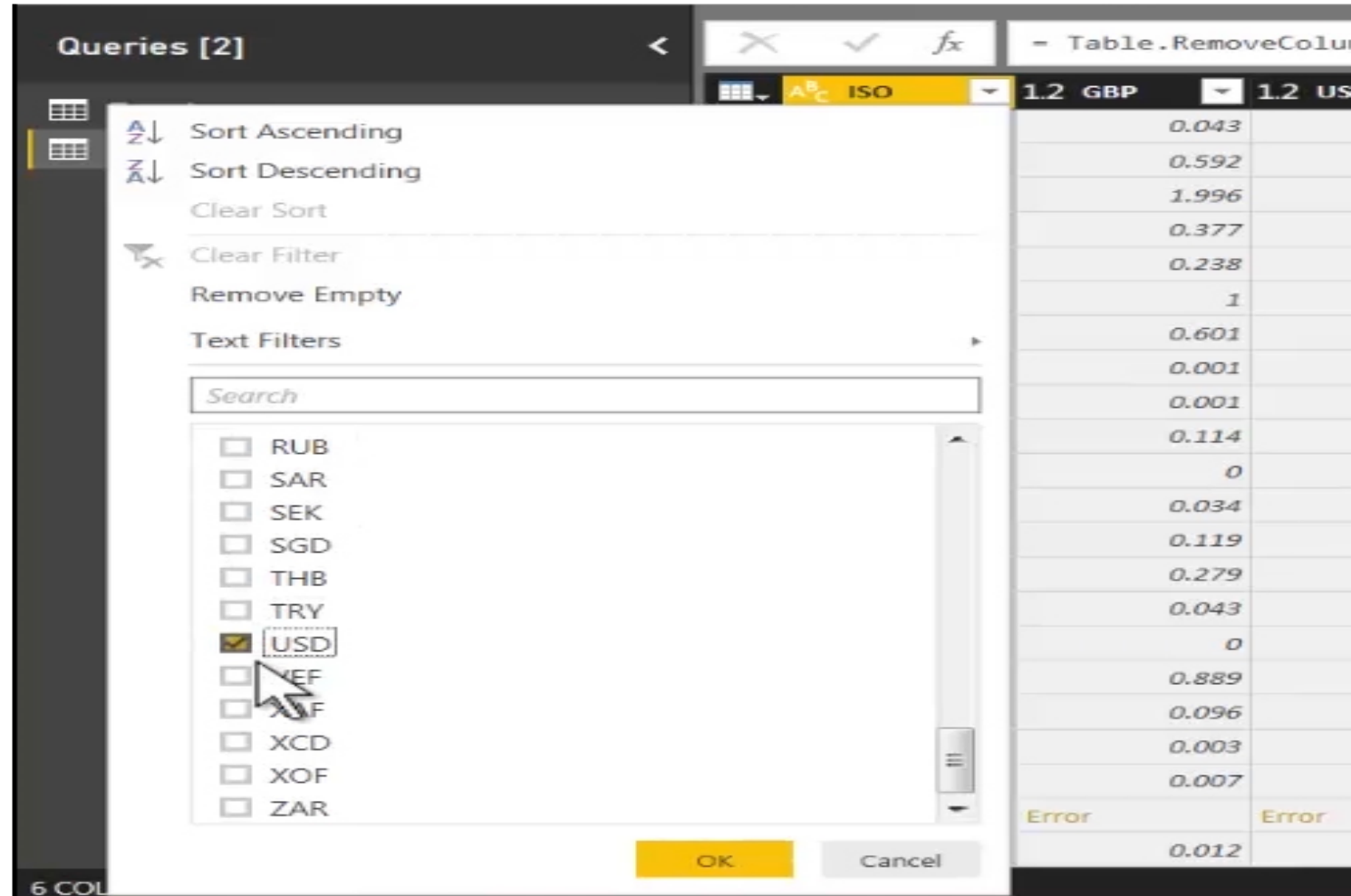
Replace current

Add new step

Cancel

QUERY EDITOR: FILTERING OUT UNWANTED ROWS

- Using the filter arrow on the right of the ISO column heading, we can now filter out all the currencies which are not required. First, we use the Select All toggle, so that nothing is selected; then we activate only USD.
- click OK, only one row is shown in the table; the one which contains the currency rates for converting dollars.



FILTERING OUT UNWANTED ROWS

View Help

Manage Parameters ▾ Refresh Preview ▾ Properties Advanced Editor Manage ▾

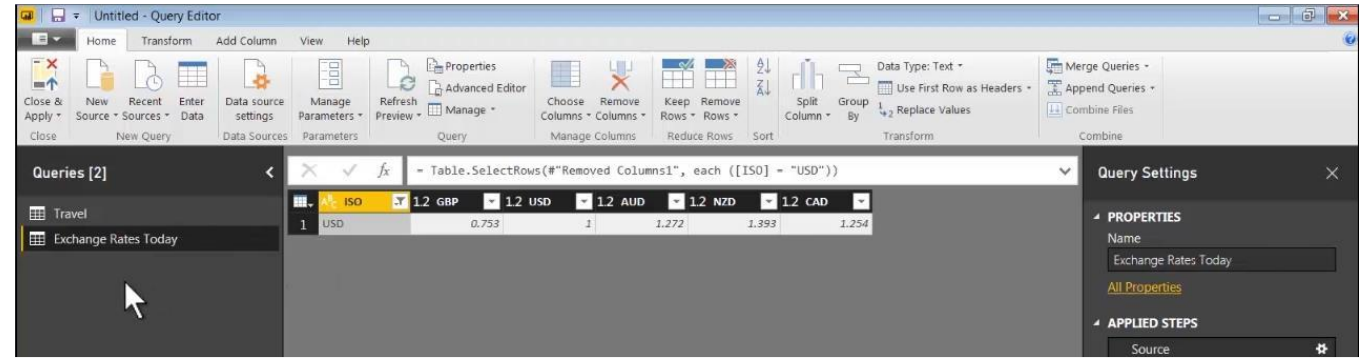
Choose Columns ▾ Remove Columns ▾ Keep Rows ▾ Remove Rows ▾ Sort Split Column ▾ Group By

= Table.SelectRows("#Removed Columns1", each ([ISO] = "USD"))

	ISO	1.2 GBP	1.2 USD	1.2 AUD	1.2 NZD	1.2 CAD
1	USD	0.753	1	1.272	1.393	1.254

QUERY EDITOR: RENAMING A QUERY

- Queries are automatically assigned a name based on the underlying data source;
- double-click on the current name (or select the query and press F2 on the keyboard) and enter a new one.
- call the query: “Exchange Rates Today”.



QUERY EDITOR: CREATING A CUSTOM COLUMN

- clicking on Add Column > General > Custom Column; and let us call the new column “ISO”, to match the column in the other table.
- make sure that the new column has the word “USD” in every row; and we do this by creating a formula which simply consists of that one literal value; which of course, being a string, has to be placed in double quotes.
- click OK,

Custom Column

New column name
ISO

Custom column formula:
= "USD"

Available columns:
Staff ID
Name
Country
Month
Month Num
Month Offset
Budget USD

<< Insert

[Learn about Power BI Desktop formulas](#)

✓ No syntax errors have been detected.

OK Cancel

QUERY EDITOR: CREATING A CUSTOM COLUMN

fx - Table.AddColumn(#"Changed Type", "ISO", each "USD")

	ABC	Country	ABC	Month	123	Month Num	123	Month Offset	123	Budget USD	ABC 123	ISO
1		United States		Nov		11		1		2475		USD
2		United States		Nov		11		1		3400		USD
3		United States		Nov		11		1		6950		USD
4		United States		Nov		11		1		2500		USD
5		United States		Nov		11		1		5125		USD
6		Canada		Nov		11		1		4100		USD
7		United States		Nov		11		1		2875		USD
8		Australia		Nov		11		1		4800		USD
9		United States		Nov		11		1		4825		USD
10		Canada		Nov		11		1		2475		USD
11		United States		Nov		11		1		1200		USD
12		United Kingdom		Nov		11		1		5225		USD
13		United States		Nov		11		1		4325		USD
14		United States		Nov		11		1		1800		USD
15		United States		Nov		11		1		2825		USD
16		United Kingdom		Nov		11		1		1325		USD
17		United States		Nov		11		1		3625		USD
18		United States		Nov		11		1		3700		USD
19		United States		Nov		11		1		2800		USD
20		United States		Nov		11		1		4525		USD
21		United States		Nov		11		1		6825		USD
22												

TRANSFORM DATA

- Change People Table rename from People to managers
- Change column heading (**Use First Row as Headers**)
- Check query settings check applied steps
- Duplicate Or SplitColumn to create an additional column. Rename columns to “FirstName” and “LastName” or “Surname”
- Check your applied Steps

TRANSFORM ORDERS

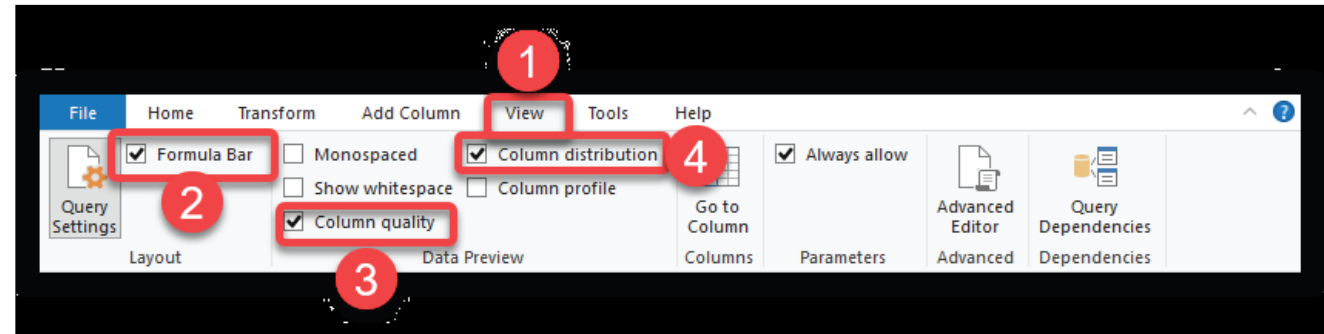
- From Home Tab Click Remove columns or Directly Select and remove the column "Rowid"
- Check your applied steps
- Filter data for states
- Check on filter if all is included chck at bottom (click load more)
- Arizona,Califonia, Florida, newyork, Newjersy,
- Sort in alphabetic ascending order
- Close and apply to go back desktop, **Save**
- Merge Returns and Orders Tables on your own and Name the merged Query **"ReturnedOrders"**

CREATE AND ENHANCE DATA MODEL

- Create Model . Link the two tables(Orders and Managers) in Query Editor
- Use Merge queries as new
- .Merge based on the common Field “Region”
- Join Kinds:Left Outer,Right Outer,Inner join,Left Anti,Right Anti(**Use Right Outer**)
- Populated as Table click on right of Manager to expand to see additional columns
- Sort and Filter out null records
- Sort On Region ascending order.
- Rename query from query settings To
- Close and apply .Save

DATA PROFILING

- Explore the power query interface
- The Application Ribbon contains all options and settings. Complete the steps:
- Click the View tab from the ribbon. Make sure the following are ticked:
 - 2. **Formula Bar**
 - 3. **Column quality**
 - 4. **Column distribution**



DATA PROFILING

1- Ribbon bar

2- Queries

3- Column headers

4- Column quality bar

5- Column distribution

6- Data

7- Data transformation steps

8- Status bar

ProductKey	ProductName	Color	SafetyStockLevel	ReorderPoint	ListPrice
1	Adjustable Race	NA	1000		750
2	Bearing Ball	NA	1000		750
3	BB Ball Bearing	NA	800		600
4	Headset Ball Bearings	NA	800		600
5	Blade	NA	800		600
6	LL Crankarm	Black	500		375
7	ML Crankarm	Black	500		375
8	HL Crankarm	Black	500		375
9	Chainring Bolts	Silver	1000		750
10	Chainring Nut	Silver	1000		750
11	Chainring	Black	1000		750
12	Crown Race	NA	1000		750
13	Chain Stays	NA	1000		750
14	Decal 1	NA	1000		750
15	Decal 2	NA	1000		750
16	Down Tube	NA	800		600
17	Mountain End Caps	NA	1000		750
18	Road End Caps	NA	1000		750
19	Touring End Caps	NA	1000		750

9 COLUMNS, 606 ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 11:34 AM

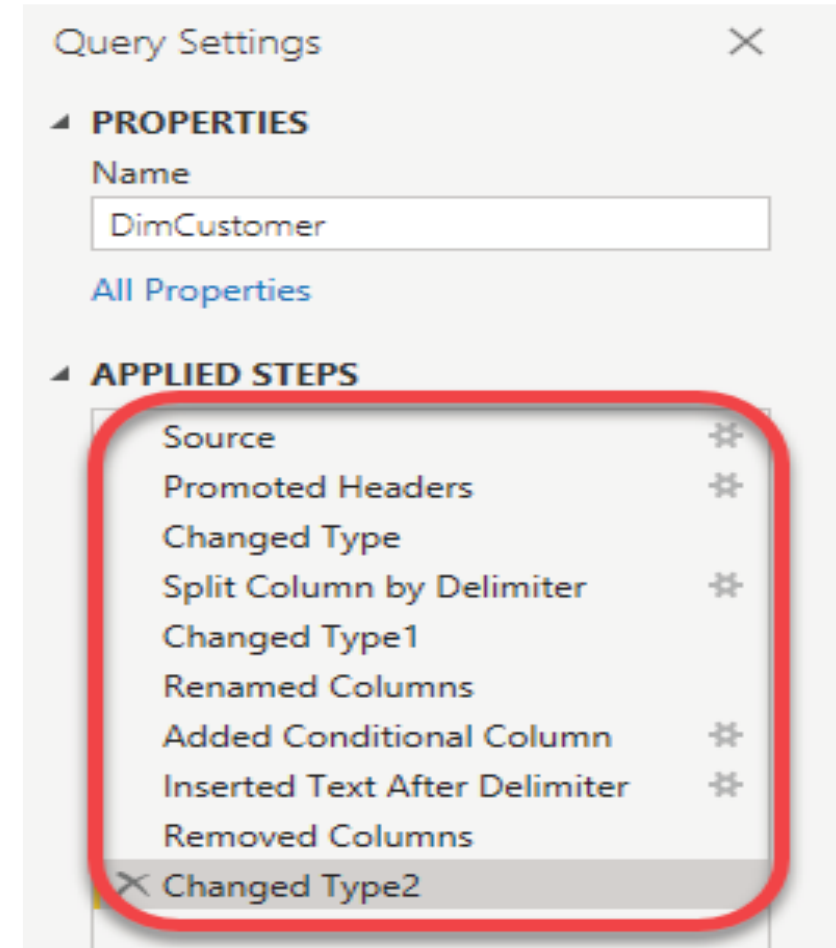
The **Column quality bar** shows details on the number of valid, empty and error records in the data.

The **Column distribution bar** provides counts of distinct and unique values.

The **Data** displays the view of the data based on the data transformation step that has been selected.

OTHER TRANSFORMATIONS

- Splitting Columns
- Renaming Columns
- Adding Columns
- Removing Columns
- Changing Data Types
- Add a step between applied steps
- Reorder applied steps
- **All transformations are applied as a series of steps shown in the **Query Settings** pane**



QUERY EDITOR

- When you are connecting to data, it is almost always the case that you need to make modifications to the data as it comes in and this is where the **Query Editor** becomes very useful.
- In Power BI Desktop, let us Home > Get Data > Text/CSV. In sub-folder “02-Trim Clean and Case”, bring in the file **Trim-and-clean.csv**. Then, to work in the Query Editor, **click on Edit**.

Trim and Clean.csv

File Origin: 1252: Western European (Windows) | Delimiter: Comma | Data Type Detection: Based on first 200 rows

Username	Name	Gender	DOB	Occupation	Subscribed	Total Spend
Neaudde1978	Mr Bailey Glover	male	01/12/1979	Support staff clerk	01/10/2015	1257.45
Yaress39	Mrs Isabella Fowler	female	04/08/1960	Sales worker supervisor	24/03/2016	771.99
Behonell	Mrs Chloe Kirby	female	28/06/1949	Employee benefits specialist	07/06/2016	1021.77
Shimpay	Mrs Louise Clark	female	07/01/1995	Clinical social worker	03/11/2016	234.76
Sial1985	Mr Harrison Bowen	female	04/04/1987	Semiconductor processor	25/03/2016	628.07
Phey1965	Mrs Georgina Banks	female	04/03/1967	Amusement and recreation attendant	20/05/2014	1294.51
Shearompal	Ms Ellie Hudson	male	10/05/1956	Construction millwright	08/06/2014	2181.81
Chaptes77	Mrs Caitlin Harris	male	04/06/1978	Microbiology technologist	12/09/2015	1142.29
Lairieve1993	Mr Zak Potter	female	11/06/1994	Engine and other machine assembler	18/09/2016	453.67
Ricul29	Mr Jordan Andrews	female	30/08/1950	Telecommunications specialist	30/08/2014	1107.94
Aphis1966	Mrs Katie Reynolds	female	12/08/1967	Industrial maintenance worker	15/09/2014	2867.68
Neave1959	Mrs Anna Sharp	female	02/02/1960	Television camera operator	18/09/2016	140.04
Nicterims1993	Mrs Daisy Anderson	male	05/07/1995	Automation and control technician	29/01/2015	2417.81
Ambieverce	Mr Declan Hancock	female	28/09/1966	Automated teller machine technician	11/03/2016	40.31
Awyear	Mr Spencer Vincent	female	11/06/1980	Medical translator	03/07/2015	643.68
Entioncesay	Mr Evan Dickinson	female	03/03/1971	Gaming machine repairer	06/06/2016	253.85
Onall1971	Ms Summer Vincent	female	11/06/1973	Industrial hygienist	16/06/2016	108.81
Thearthe	Mrs Kate Birch	male	29/04/1958	Apartment leasing agent	27/07/2015	421.19
Flipptatheaus1934	Mr Josh Porter	male	30/09/1955	ESL teacher	07/10/2016	551.88
Tractinglery	Mr Gabriel Gough	female	05/01/1953	Chief engineer	10/01/2016	47.29

The data in the preview has been truncated due to size limits.

☐ Skip files with errors

Load Edit Cancel

QUERY EDITOR

- If you look at the **Name** column, in the imported query, you can see that we have a problem with spaces.
- We can see that there are spaces preceding some entries;
- Assume that there will be spaces following entries on certain rows; and also have some extra spaces between words.

Untitled - Query Editor

Home Transform Add Column View

Close & Apply New Source Recent Sources Enter Data Data source settings Manage Parameters Refresh Preview Properties Advanced Editor Manage Choose Remove Keep Remove Split Group Data Type: Text Use First Replace

Close New Query Data Sources Parameters Query Manage Columns Reduce Rows Sort Transform

Queries [1] Trim and Clean

= Table.TransformColumnTypes("#Promoted Headers",{{"Username", type text},

	Username	Name	Gender	DOB	Occupation
1	Neaude1978	Mr Bailey Glover	male	01/12/1979	Support staff clerk
2	Yaress39	Mrs Isabella Fowler	female	04/08/1960	Sales worker supervisor
3	Behonell	Mrs Chloe Kirby	female	28/06/1949	Employee benefits specia
4	Shimpay	Mrs Louise Clark	female	07/01/1995	Clinical social worker
5	Siall1985	Mr Harrison Bowen	female	04/04/1987	Semiconductor process
6	Phey1965	Mrs Georgina Banks	female	04/03/1967	Amusement and recreati
7	Shearompal	Ms Ellie Hudson	male	10/05/1956	Construction millwright
8	Chapt77	Mrs Caitlin Harris	male	04/06/1978	Microbiology technologis
9	Lairieve1993	Mr Zak Potter	female	11/06/1994	Engine and other machin
10	Ricul29	Mr Jordan Andrews	female	30/08/1950	Telecommunications spe
11	Aphis1966	Mrs Katie Reynolds	female	12/08/1967	Industrial maintenance v
12	Neave1959	Mrs Anna Sharp	female	02/02/1960	Television camera operat
13	Nicterims1993	Mrs Daisy Anderson	male	05/07/1995	Automation and control
14	Ambleverce	Mr Declan Hancock	female	28/09/1966	Automated teller machin

- The screenshot shows the Microsoft Word 2013 interface. The ribbon is set to 'Home' with the 'Font' and 'Paragraph' groups visible. The document text is as follows:

Address	First name	Last name	Sex	Date of birth	Profession	Age									
operator	→	29/05/2014	→	1308.49											
Putone	"Mr Jonathan"	Waters	→	female	05/08/1971	→ Interpreter	→	19/08/2015	→	1772.25					
Feackle33	→	"Mr Bradley"	→	Randall	→	female	27/12/1954	→	Geographic information	→	specialist	→	06/08/2014	→	1556.3
Comens1945	→	"Ms Nicole"	→	Giles	→	male	07/04/1967	→	Music director	→	13/01/2017	→	47.61		
Washate	→	"Ms Eve"	→	Ward	→	female	03/01/1963	→	Ambulance driver	→	25/02/2017	→	53.44		

USING THE TRIM FUNCTION

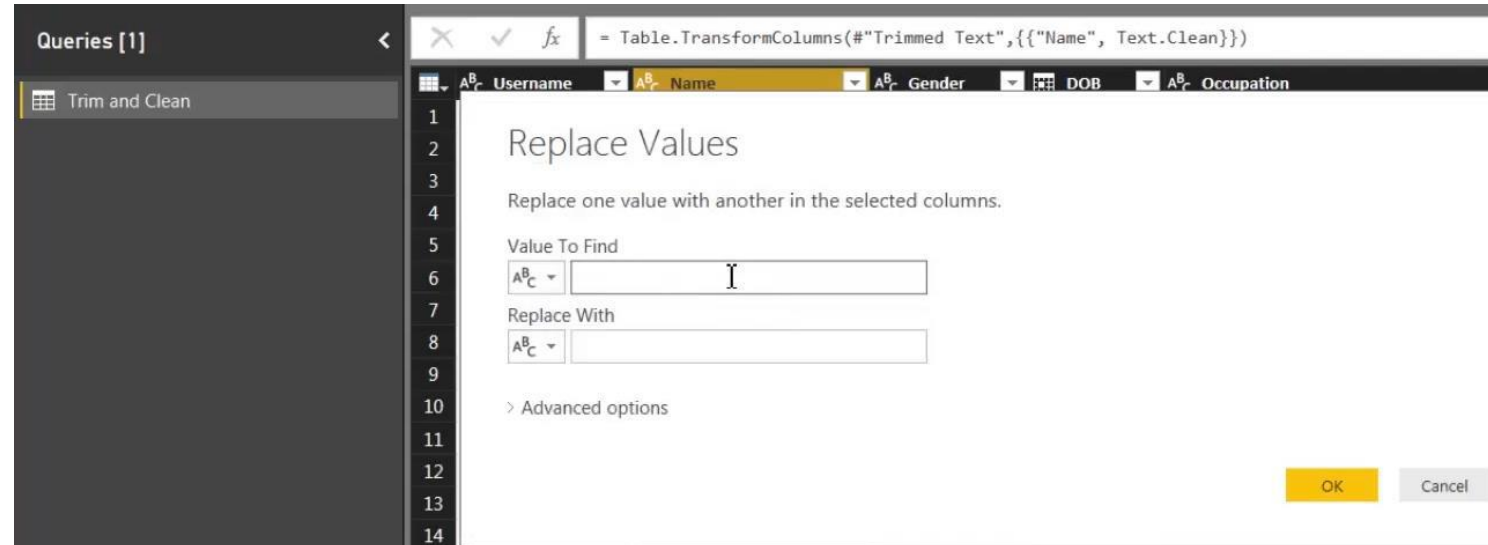
- find the **Format drop-down** and **click on Trim** to remove the leading and trialling spaces
- In Microsoft Word, you may have spotted a tab between some of the first name and last name combinations.
- To remove characters like tabs and returns from text entries, in
- **Transform > Format**, you chose **Clean**.
- This operation has removed a lot of extra spacing; and you can now assume that any remaining extra spaces are simply multiple occurrences of the space character.

✕ ✓ fx = Table.TransformColumns("#Trimmed

	AB_C Username	AB_C Name
1	Neaudde1978	Mr Bailey Glover
2	Yaress39	Mrs Isabella Fowler
3	Behonell	Mrs Chloe Kirby
4	Shimpay	Mrs Louise Clark
5	Siall1985	Mr Harrison Bowen
6	Phey1965	Mrs Georgina Banks
7	Shearompal	Ms Ellie Hudson
8	Chaptres77	Mrs Caitlin Harris
9	Lairieve1993	Mr Zak Potter
10	Riculld29	Mr Jordan Andrews
11	Aphis1966	Mrs Katie Reynolds
12	Neave1959	Mrs Anna Sharp
13	Nicterims1993	Mrs Daisy Anderson
14	Ambleverce	Mr Declan Hancock
15	Awyear	Mr Spencer Vincent
16	Entioncesay	Mr Evan Dickinson
17	Onall1971	Ms Summer Vincent
18	Thearthe	Mrs Kate Birch

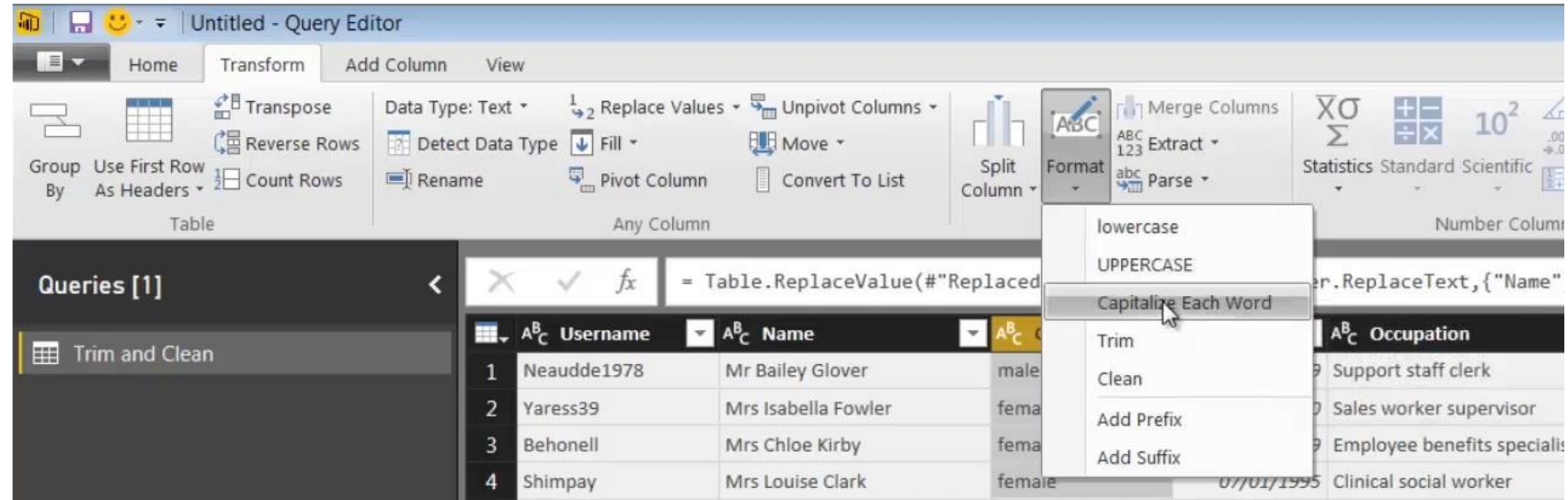
USING THE REPLACE VALUES COMMAND

- Use the **Transform > Replace Values** command to remove any remaining characters.
- look at the steps you have performed, as shown in the Applied Steps pane;



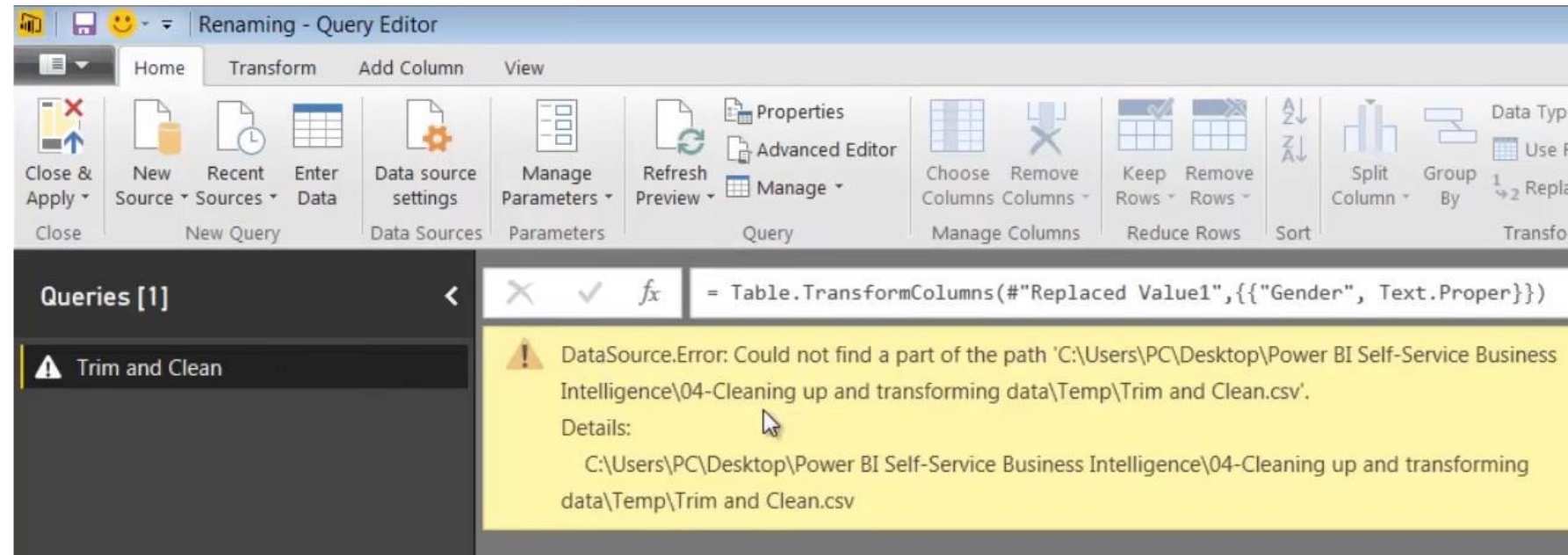
USING THE CAPITALIZE EACH WORD COMMAND

- Modifying the gender column.
- Say you do not like lower case for this column and would prefer title case; with the first letter capitalised.
- **Transform > format**, find the options for changing case; **lowercase** and **uppercase**; and title case is obtained with the option **capitalise each word**.



HOUSE KEEPING AND META DATA

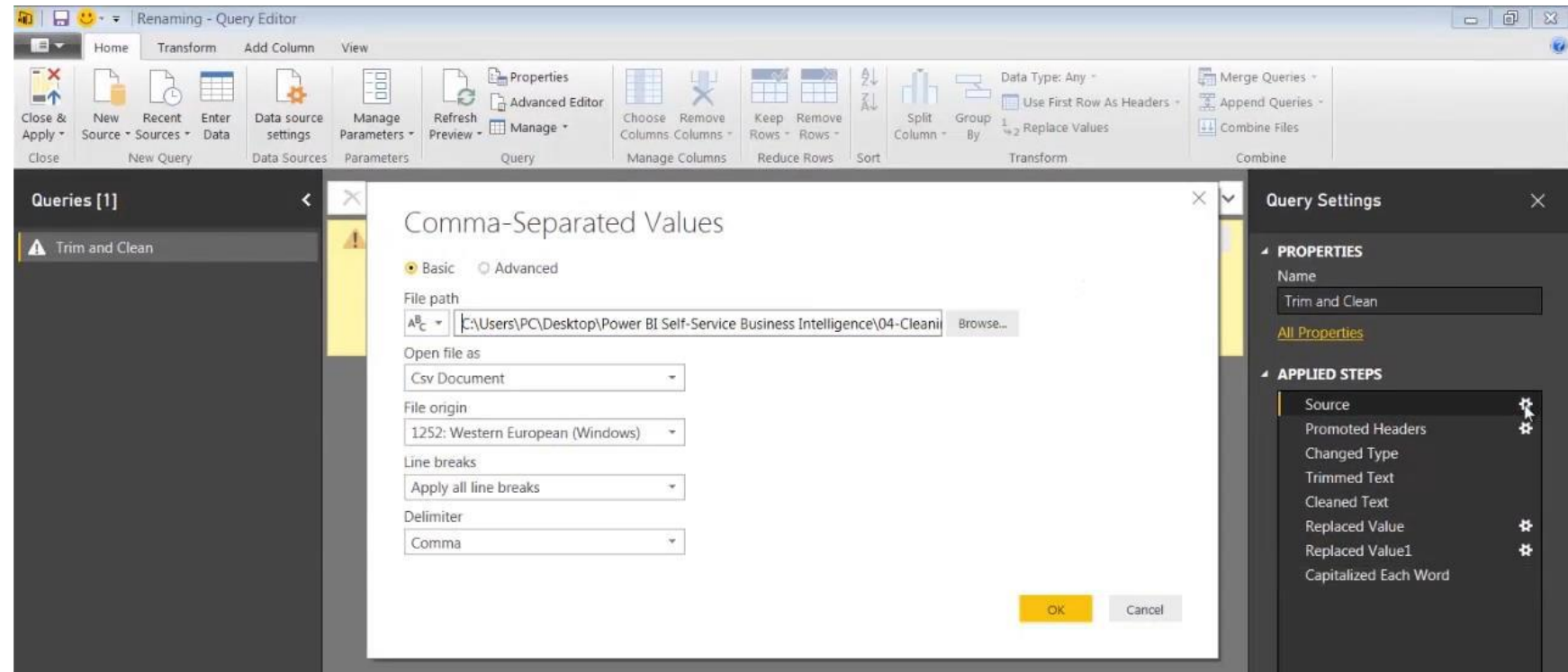
- Important Housekeeping Features:
- open the folder “03-Renaming and adding metadata”.
- find a single PBIX file: “Renaming.pbix”.
- Double-click to open
- click on **Transform** and chose **Transform Data** from the drop down.



This is simply an indication that, when the file was created, a text file was imported from a specific path; and, on the current system, the file is no longer available at this same specified path.

HOUSE KEEPING AND META DATA

- To cure this, go back to the source step and click on the settings icon (the cog).
- Replace with the correct path of the source file



RENAMING ITEMS

- To rename the query itself, **Right-click and choose Rename**.
- Rename the query “**Subscribers**” and press enter
- To rename a column **double-click** on the existing column name and type a new one
- Renaming Query Steps → **Right-click** and choose **Rename**
- rename the “**Trimmed Text**” step “**Transform/Format/Trim**”;
- Change “**Cleaned Text**” to “**Transform/Format/Clean**”
- change “**Replace Value**” to “**3 spaces -> 1**” and “**Replace Value1**” to “**2 spaces -> 1**”.

The screenshot shows a data table with columns 'Subscribed' and '1.2 Total Spend'. The 'Subscribed' column contains dates, and the '1.2 Total Spend' column contains numerical values. To the right, the 'Query Settings' panel is open, showing the 'APPLIED STEPS' section. The 'Transform/Format/Trim' step is selected, and its name is being edited in the text input field.

Subscribed	1.2 Total Spend
01/10/2015	1257.
24/03/2016	771.
07/06/2016	1021.
03/11/2016	234.
25/03/2016	628.
20/05/2014	1294.
08/06/2014	2181.
12/09/2015	1142.
18/09/2016	453.
30/08/2014	1107.
15/09/2014	2867.
18/09/2016	140.
29/01/2015	2417.
11/03/2016	40.
03/07/2015	643.

Query Settings

PROPERTIES

Name
Subscribers

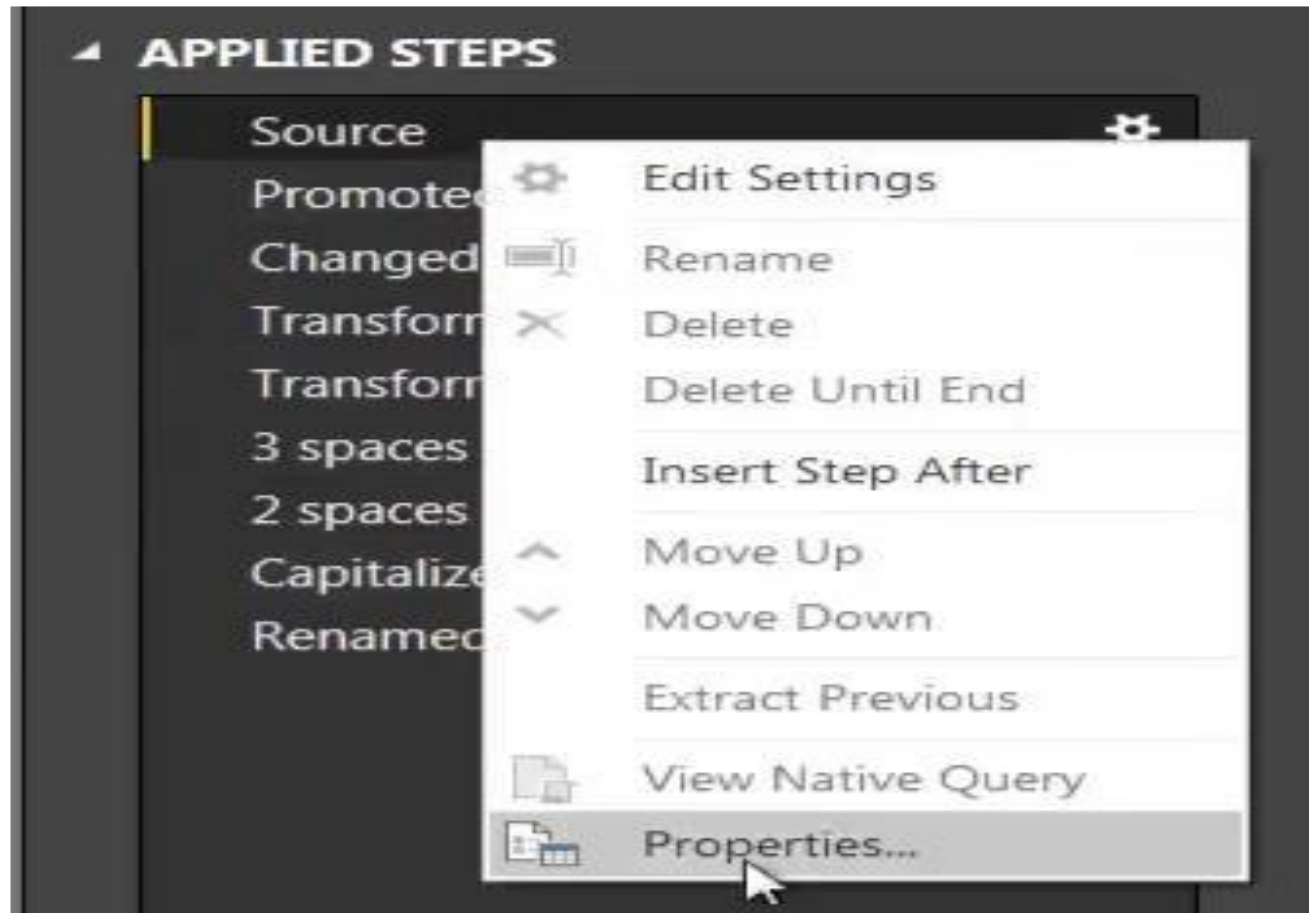
[All Properties](#)

APPLIED STEPS

- Source
- Promoted Headers
- Changed Type
- Transform/Format/Trim**
- Cleaned Text
- Replaced Value
- Replaced Value1
- Capitalized Each Word
- Renamed Columns

ADDING DESCRIPTIONS TO YOUR STEPS

- You can also associate a description with each of the steps.
- To add a description, **Right-click** on the step and select **Properties**.



THE SPLIT COLUMNS COMMAND

- We start by choosing Home > Get Data > Text/CSV. The file we need is open it in the Clients.txt; from Query Editor, click on the Edit button.

TIDYING UP THE DATA

- Promote the header use first row as headers.
- Examine the **customer code**, you can see it consists of three parts:
 - five characters**; then we have a
 - two-letter country code**; and, finally, a
 - four-character business sector code**

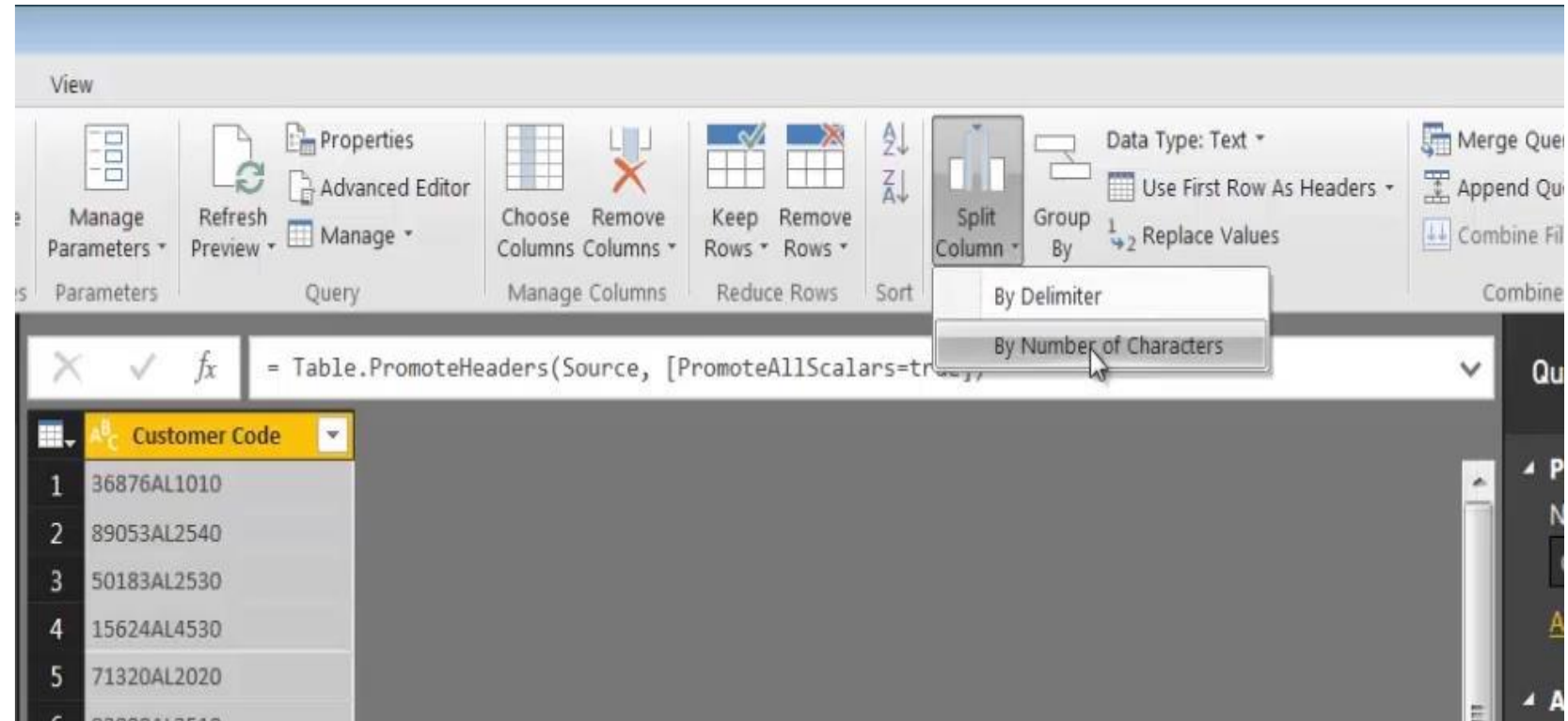
To split the column, **Right-click** on the column heading and chose to Split; or

Home Tab or the Ribbon, we will also find **Split Column > by**

Delimiter and **Split Column > by Number of Characters**.

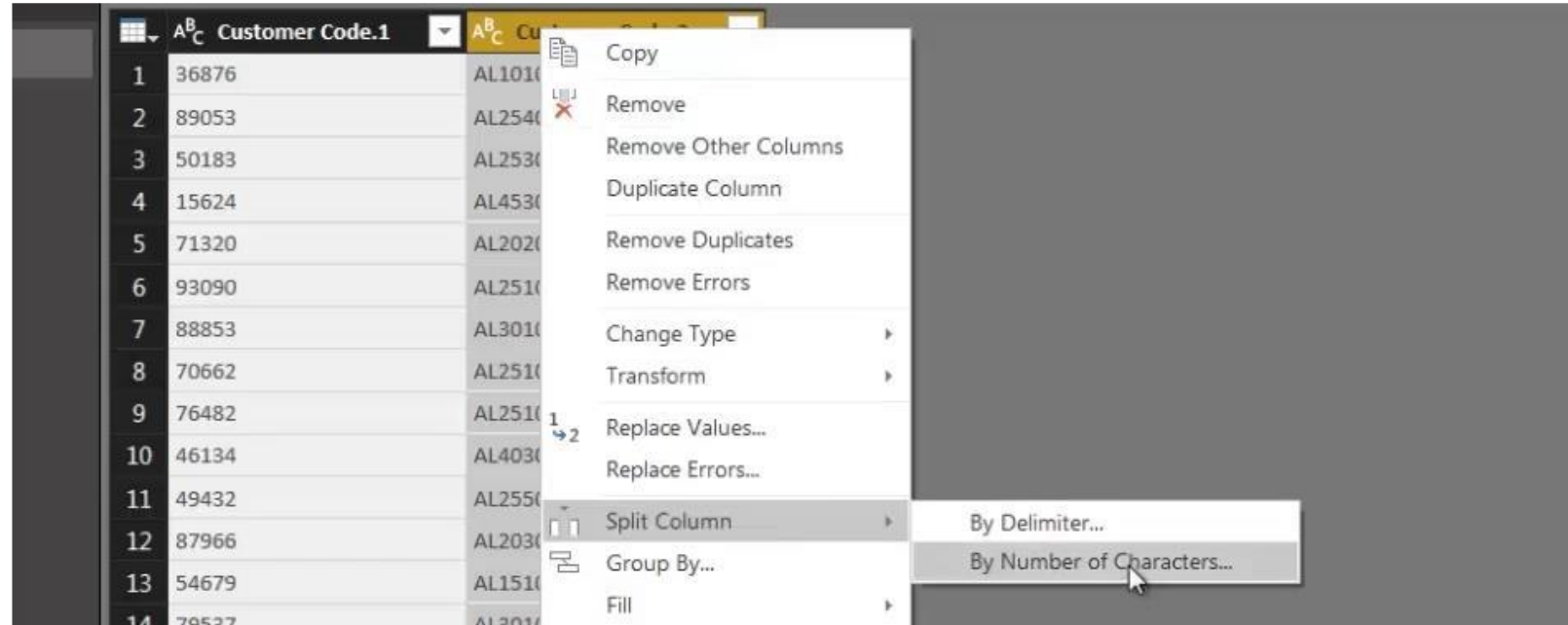
Split by a set number of characters, once as far left as possible, and the number of characters we want is five.

Delete "Changed Type" step



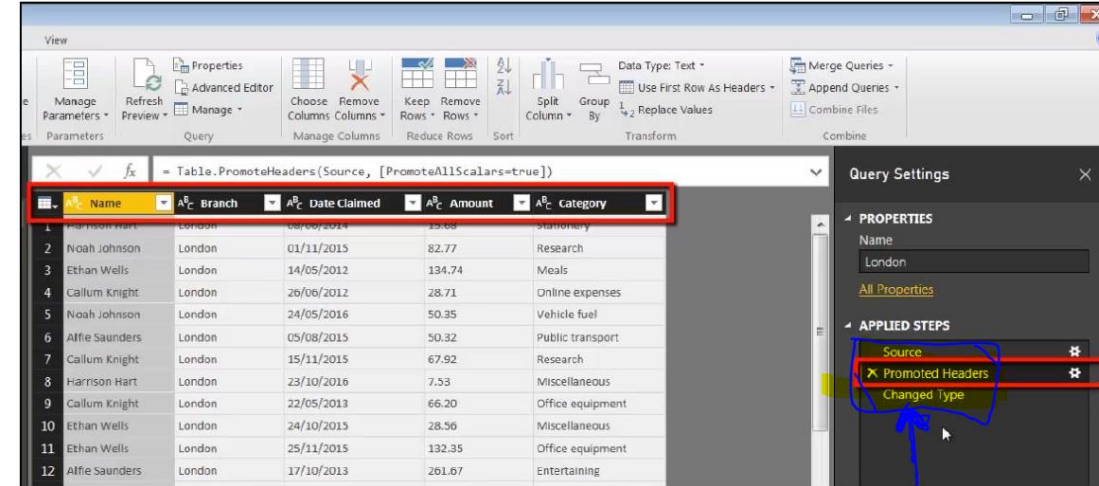
TIDYING UP THE DATA

- do a further **split on Customer Code.2** column.
- first two characters of the new column to become the country code column.
- **Right-click** on the column heading and choose **Split Column > by Number of Characters**.



QUERY EDITOR

- Query Editor is a separate application which runs inside Power BI Desktop
- Query Editor uses a language called M (M for mashup) to perform transformations on data as it is being imported.
- Commands in the Query Editor's user-friendly interface allow you to create a series of transformational rules which will apply whenever you are connecting to a given data source.
- The Rules are referred to as steps, and are listed in the Query Settings pane, on the right of the Query Editor window.
- Look at the automatically generated three steps: Source, Promoted Headers and Changed Type.
- **Source** is the specification of the physical location of the CSV file
- **Promoted Headers** is the step whereby Power BI deduces that the first row within a dataset constitutes the column headers.
- **Changed Type** step, Power BI examines the data in each of the columns and attempts to change it to the appropriate data type.
- text (indicated by the ABC icon)
- Decimal number (represented by 1.2 3)

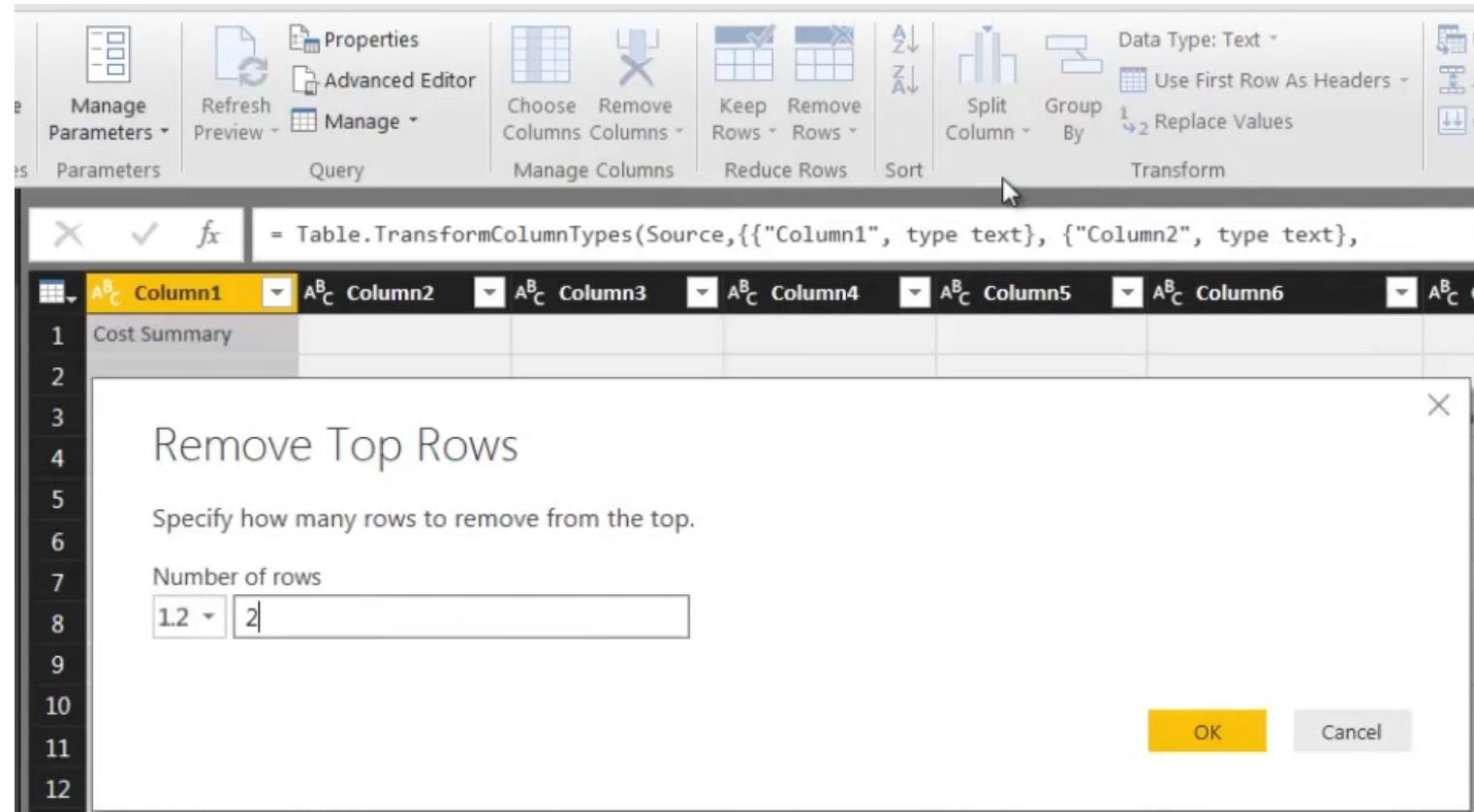


REMOVING UNWANTED ROWS

- The Remove Rows command can be used to suppress some title information or some metadata that yo do not want.

REMOVING HEADER ROWS

- Load up the CSV file in the sub-folder “Removing rows”. The file is called “Costs.csv”
- enter the Query Editor; and use the Remove Rows command in the Home Tab of the Ribbon to suppress the first two rows.
- Remove the top two rows.
- promote our headers;



REMOVING AN EXCEL TABLE TOTAL ROW

- Another common example of where it becomes necessary to remove rows is when you import an Excel table which uses the Total Row feature.
- In the folder “Removing rows”, open the file Costs.xlsx, in Excel.
- You will see that it contains an Excel table.
- If we move down to the bottom of the Table, you will notice there is a Total Row. Deactivate in **Table Tools > Design**

98	18/03/2017	BX103	GF54286	68.93	35.84	3	2
99	17/03/2017	AX102	GF54268	51.28	26.15	17	1
100	24/03/2017	AX101	GF54553	68.71	32.30	40	2
101	27/03/2017	AX103	GF54373	53.50	28.36	27	1
102	03/03/2017	BX103	GF54602	68.93	35.16	17	1
103	23/03/2017	DX101	GF54599	17.62	8.64	33	10
104	10/03/2017	BX103	GF54456	68.93	37.22	0	1
105	27/03/2017	AX102	GF54322	51.28	24.62	28	1
106	29/03/2017	DX102	GF54356	62.46	32.48	30	1
107	21/03/2017	AX102	GF54301	51.28	25.64	15	1
108	Total			5,352.20	2,679.82		
109							

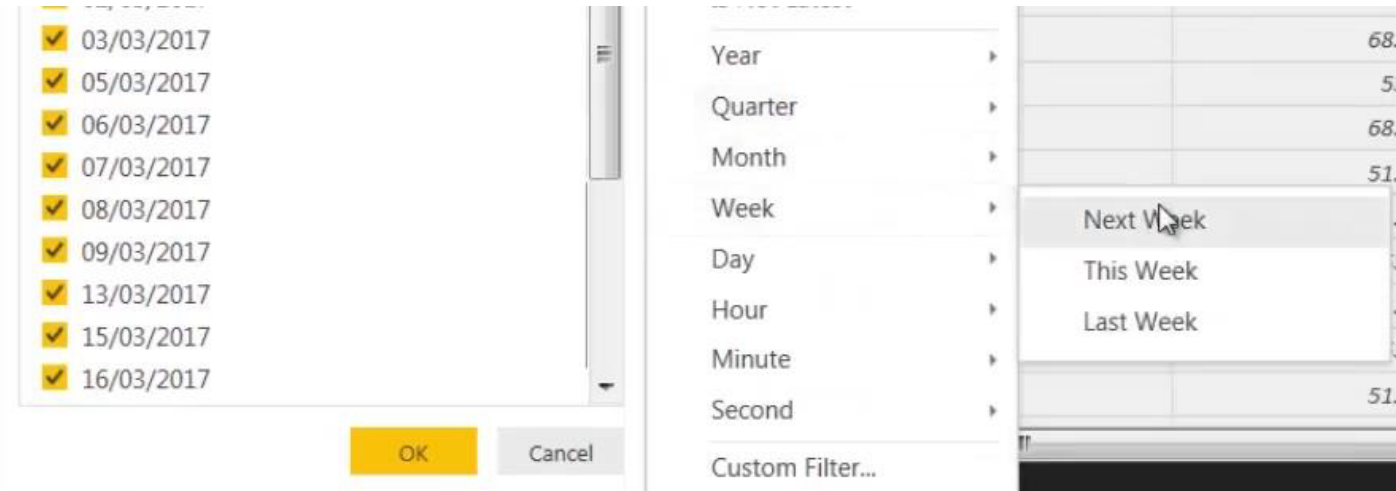
REMOVING AN EXCEL TABLE TOTAL ROW

- Get Data > Excel; and, in the folder And import the Excel file “Costs.xlsx”. in the Preview window,
- select Cost_Table and then click on Transform Data and and filter out the data which you want to remove .
- check in the date column for the word “**Total**”, then click in the check box to deactivate it,



DATE FILTERS

- Date filters provide several options which are volatile, in that they are based on the current date. For example, you can choose Week > Last Week to display all dates which fall within a week of the current date.



REPLACE VALUE AND FILL DOWN

- **Get Data > Text/CSV** and import the only text file inside the “06 Replace Values” folder, **“London expenses 2016”**. To
- open the data in the Transform Data,
- Remove two unwanted rows: **Two Top Rows**
- **Use First Row as Headers**

THE REPLACE VALUES COMMAND

- Replace Values by
Right-clicking on the
column heading
- Replace the Pound
sign followed by a
space; with nothing.

Replace Values

Replace one value with another in the selected columns.

Value To Find

ABC £ |

Replace With

ABC |

> Advanced options

OK Cancel

REMOVE ERRORS AND REPLACE ERRORS

- convert the data type of the Amount column to currency (fixed decimal number), knowing that any text values will generate an error.
- use the Remove Errors step to remove these rows
- Replace Errors is more flexible.

fx = Table.ReplaceValue("#Promoted Headers","E ","",,Re)

	ABC Category	ABC Date Claimed	ABC Amount
1	Accommodation	12/04/2016	1.2 Decimal Number
2		01/02/2016	\$ Fixed decimal number
3		08/07/2016	123 Whole Number
4		28/01/2016	% Percentage
5		07/02/2016	Date/Time
6		08/11/2016	Date
7		01/12/2016	Time
8	Bank charges	01/09/2016	Date/Time/Timezone
9		09/01/2016	Duration

REMOVE ERRORS AND REPLACE ERRORS

- perform one more **Replace Values** operation.
- Click the filter drop down on the right of the Category column heading.
- the word miscellaneous is abbreviated,
- perform, a straightforward Replace Values
- step, using “**Misc.**” as the Value to find, and “**Miscellaneous**” as the Replace with
- value.

Replace Values

Replace one value with another in the selected columns.

Value To Find

A^BC ▾ Misc.

Replace With

A^BC ▾ Miscellaneous

> Advanced options

OK Cancel

THE FILL DOWN COMMAND

- Fill Down; is a command designed to correct a problem encountered when connecting to data which is, in reality, a report generated by another system.
- Fill Down is more commonly used than Fill Up; but once you have used Fill Down, you can see exactly how Fill Up would work
- Fill Down each of thesesub headings and copy it down into the blank rows below; without overwrite any entry
- Before the Fill Down command can be used, first replace these blanks with nulls.
- After perform the **Fill Down step**

	ABC Category	ABC Date Claimed	ABC Amount
112	Public transport	12/03/2016	£ 289.22
113	Public transport	18/01/2016	£ 526.76
114	Public transport	01/07/2016	£ 513.50
115	Public transport	21/10/2016	£ 42.34
116	Public transport	28/07/2016	£ 515.27
117	Research	27/03/2016	£ 88.88
118	Research	05/12/2016	£ 44.59
119	Research	26/09/2016	£ 80.19

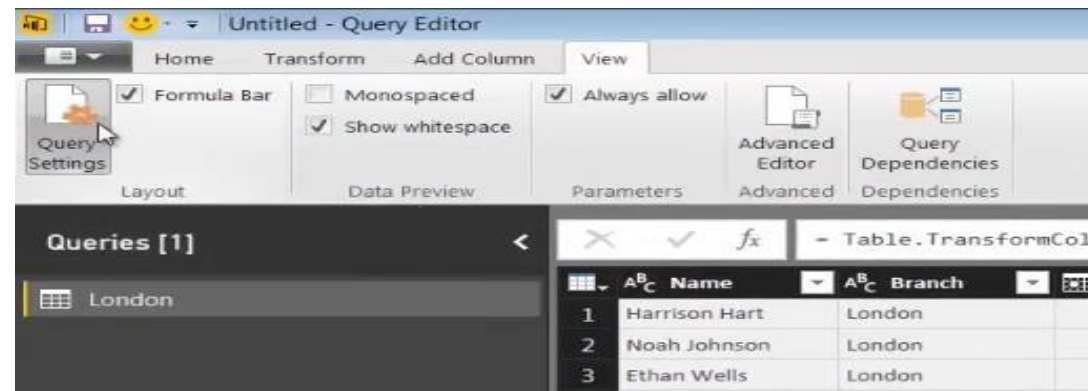
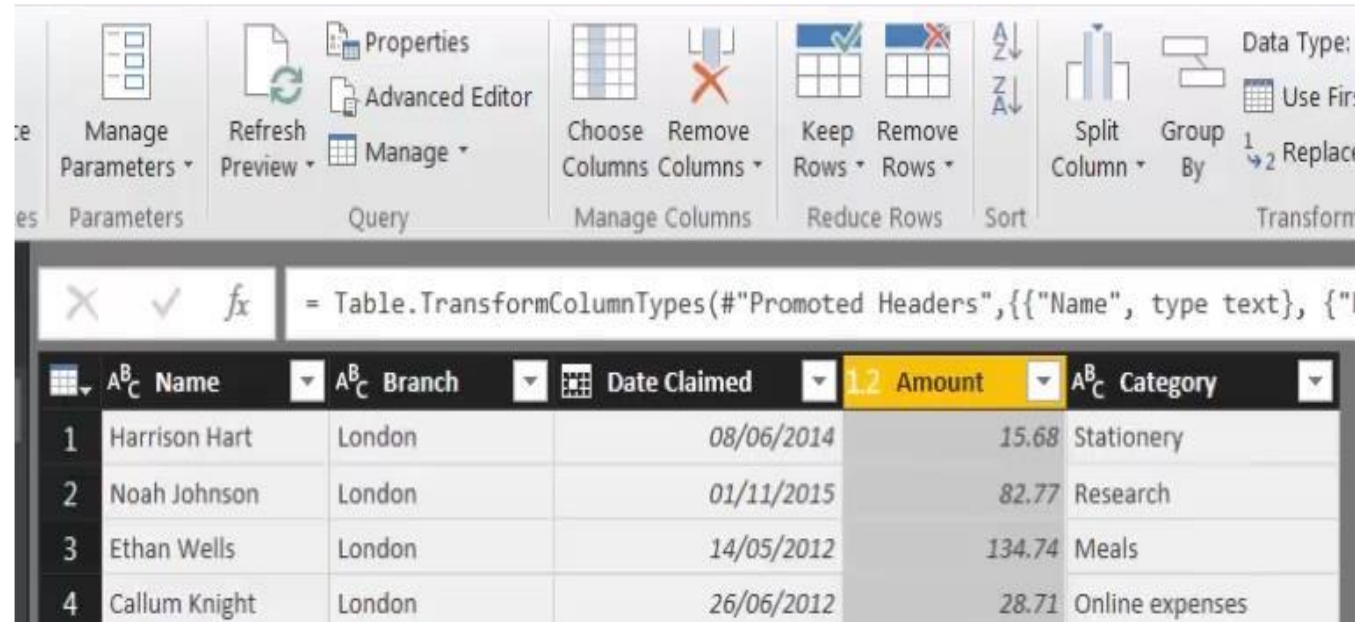
REMOVE ERRORS AND REPLACE ERRORS

- To finish, let us change the data type of the date claimed column to date.

	ABC Category	ABC Date Claimed	\$ Amount
1	Accommodation	1.2 Decimal Number	247.2
2	Accommodation	\$ Fixed decimal number	34.62
3	Accommodation	1 ² / ₃ Whole Number	367.89
4	Accommodation	% Percentage	79.76
5	Accommodation	Date/Time	263.57
6	Accommodation	Date	4.75
7	Accommodation	Time	150.26
8	Book charges		27

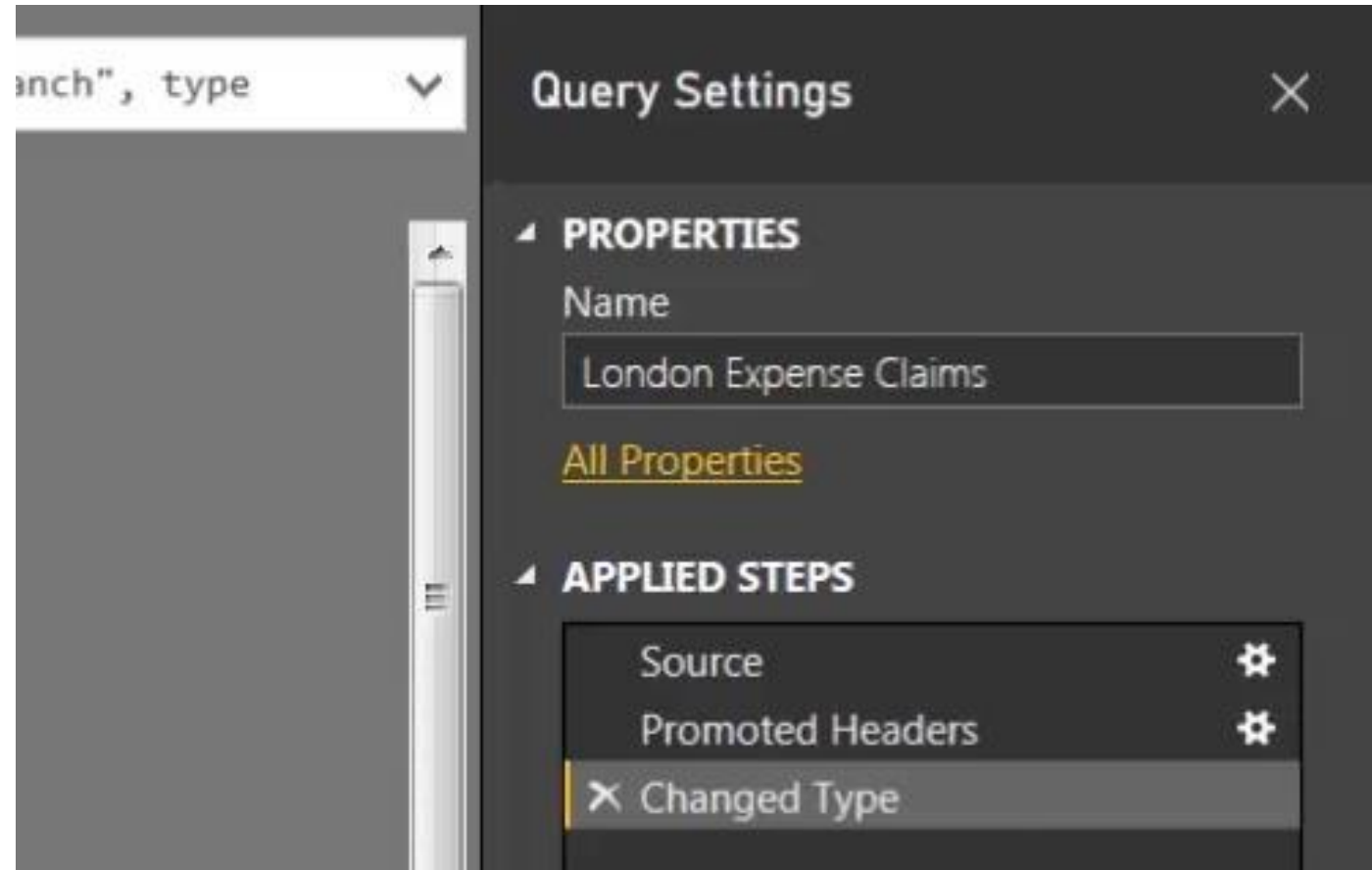
CLOSING AND REOPENING THE QUERY SETTINGS PANE

- Query Settings is a pane or floating window; and you can close it at any time to give yourself a bit more room for your data transformation operations.
- To make the Query Settings pane visible once more
- Click on View > Query Settings



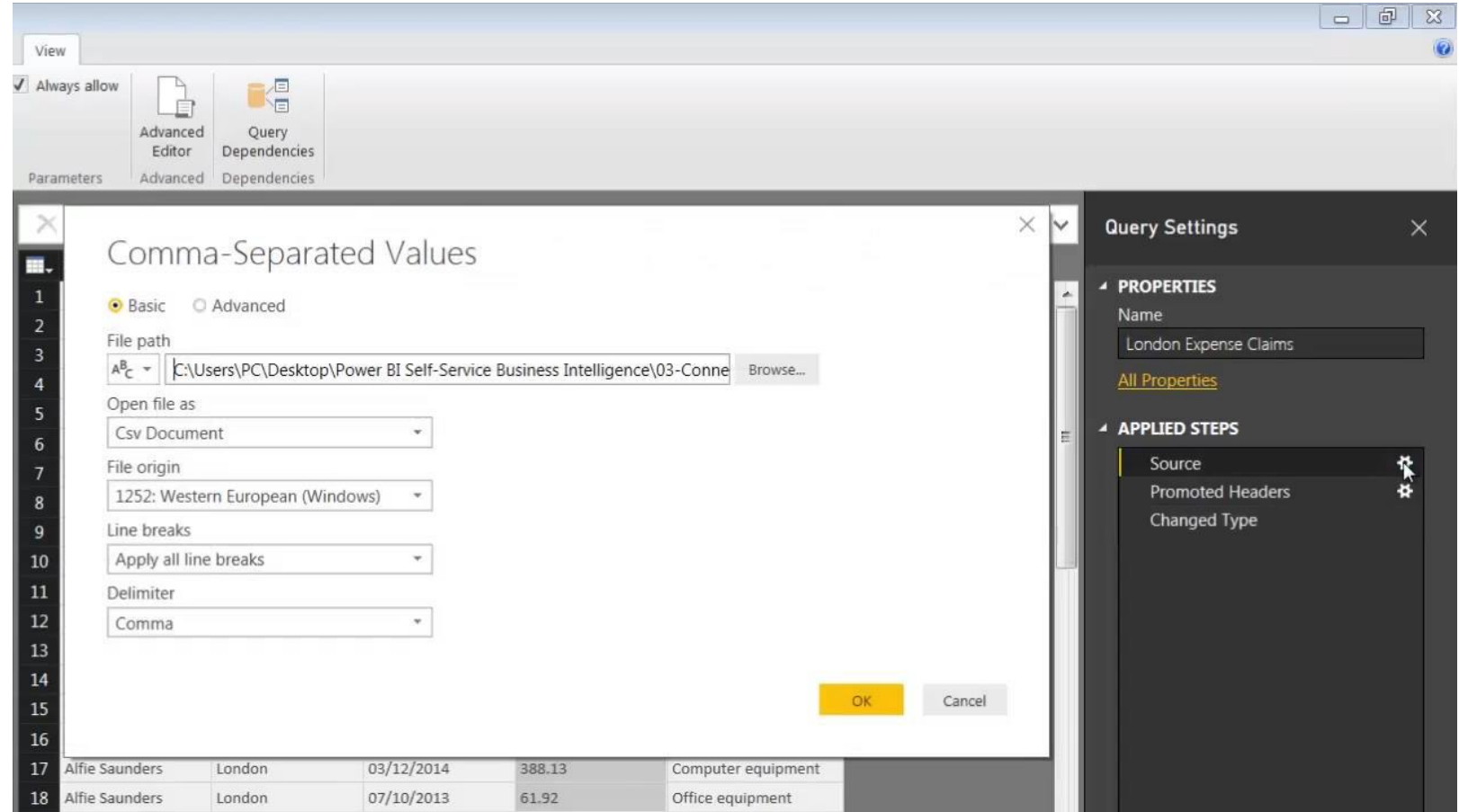
RENAMING A QUERY

- Renaming a Query can be done either in the Navigation pane or the Query Settings pane.
- Simply double-click on the existing name, type a new one and press Enter.
- (Right-click > Rename, or pressing F2 once the query is highlighted, can also be used.)



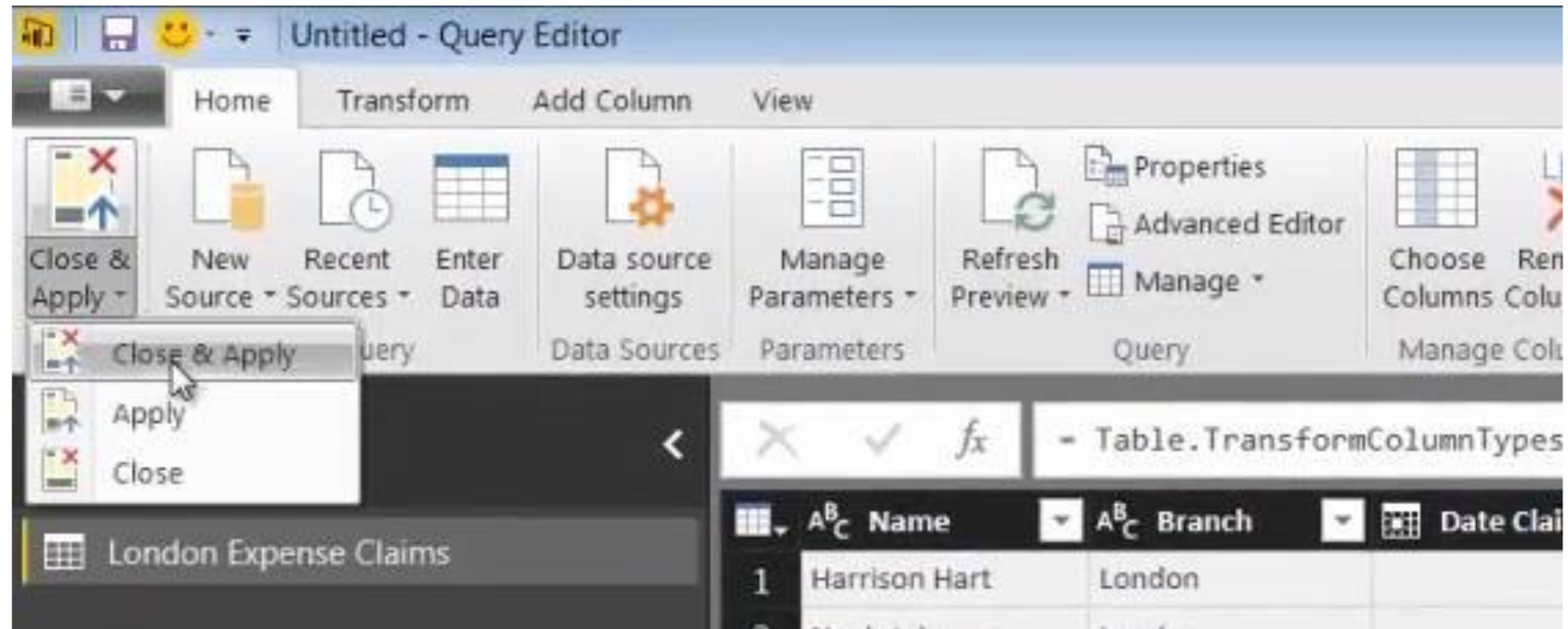
USING THE QUERY SETTINGS BUTTONS

- The settings buttons (the cog icons) next to some of the steps.
- if you click on one of these cogs, you can modify the settings associated with that step.
- Eg clicking on the cog icon next to the Source step displays a dialog allowing us to change the source file associated with the query.



APPLYING CHANGES MADE IN THE QUERY EDITOR

- To update Power BI Desktop and apply the changes made in the Query Editor, you can either click on Apply Changes; or, you can return to the Query Editor and click on File > Close & Apply.



THE UNPIVOT COLUMNS COMMAND

- What is Pivoted Data?
- Power BI allows you to connect to lots of different data sources;
- and it is inevitable that, from time to time, the data source to which you are connecting is going to be a report generated by another system.
- One of the attributes that reports sometimes contain is pivoting, which is where the members of a category have been separated out into columns

	A	B	C	D	E	F	G	H	I
	Name	Branch	Month	Date Claimed	Amount Claimed	Amount Reimbursed	Percentage Reimbursed	Date Reimbursed	Category
1	Aaron Brown	Birmingham	Jan	07/01/2012	490.04	406.73	83%	10/01/2012	Accommodation
2	Aaron Brown	Birmingham	Jan	06/01/2012	51.69	51.69	100%	10/02/2012	Public transport
3	Aaron Brown	Birmingham	Jan	04/01/2012	147.80	147.80	100%	20/01/2012	Vehicle maintenance
4	Aaron Brown	Birmingham	Feb	29/02/2012	107.44	107.44	100%	08/03/2012	Postage
5	Aaron Brown	Birmingham	Feb	23/02/2012	116.66	116.66	100%	28/02/2012	Stationery
6	Aaron Brown	Birmingham	Feb	13/02/2012	310.71	310.71	100%	17/03/2012	Computer equipment
7	Aaron Brown	Birmingham	Mar	31/03/2012	481.92	481.92	100%	05/05/2012	Travel
8	Aaron Brown	Birmingham	Mar	01/03/2012	345.13	345.13	100%	22/03/2012	Travel
9	Aaron Brown	Birmingham	Mar	14/03/2012	15.96	15.96	100%	08/04/2012	Research
10	Aaron Brown	Birmingham	Apr	08/04/2012	441.88	278.38	63%	10/04/2012	Accommodation
11	Aaron Brown	Birmingham	Apr	29/04/2012	72.35	72.35	100%	27/05/2012	Bank charges
12	Aaron Brown	Birmingham	Apr	16/04/2012	150.22	150.22	100%	30/04/2012	Bank charges
13	Aaron Brown	Birmingham	Apr	08/04/2012	46.09	46.09	100%	25/04/2012	Entertaining
14	Aaron Brown	Birmingham	Apr	04/04/2012	396.72	396.72	100%	18/04/2012	Vehicle fuel
15	Aaron Brown	Birmingham	May	02/05/2012	264.11	264.11	100%	08/05/2012	Vehicle fuel
16	Aaron Brown	Birmingham	May	02/05/2012	80.34	80.34	100%	09/05/2012	Research
17	Aaron Brown	Birmingham	Jun	29/06/2012	58.12	58.12	100%	12/07/2012	Research
18	Aaron Brown	Birmingham	Jun	09/06/2012	553.92	553.92	100%	02/07/2012	Travel
19	Aaron Brown	Birmingham	Jun	09/06/2012	553.92	553.92	100%	02/07/2012	Travel

example using Excel data

THE UNPIVOT COLUMNS COMMAND

- Pivot Table based on that source data contains Category arranged in rows; Month arranged in columns and the value which we are analysing is Amount Reimbursed.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2													
3	Amount Reimbursed												
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	Accommodation	8,966.65	11,003.88	12,537.22	13,217.73	10,530.47	7,797.11	11,254.47	9,968.92	9,676.11	14,649.22	12,308.00	9,708.60
6	Bank charges	1,342.95	1,782.63	1,440.90	1,862.23	2,492.02	1,421.48	2,300.88	2,164.75	2,400.23	1,930.19	2,275.72	1,506.15
7	Computer equipment	8,414.14	13,302.24	9,862.56	7,809.88	12,077.41	9,518.61	10,828.95	10,541.21	7,346.99	11,033.37	11,819.12	6,339.26
8	Entertaining	9,792.66	11,048.73	11,762.52	6,309.09	10,532.48	7,438.04	12,684.76	8,822.85	8,496.43	7,754.07	8,799.23	7,750.94
9	Meals	2,555.02	3,023.56	2,315.44	1,588.20	1,948.99	3,661.42	1,709.44	1,826.52	1,732.98	2,098.28	2,108.95	1,271.53
10	Miscellaneous	11,207.17	10,880.31	13,976.15	13,170.44	9,286.46	11,232.34	9,985.86	9,113.81	12,649.13	9,689.24	11,504.88	6,257.53
11	Office equipment	1,926.56	1,356.84	3,003.92	2,408.98	3,173.49	2,032.76	2,295.20	2,509.32	1,928.48	1,853.20	2,733.66	1,259.18
12	Online expenses	1,218.57	1,242.83	1,551.67	1,445.55	2,361.78	2,109.44	2,876.26	1,468.07	1,725.88	2,231.27	1,791.60	2,123.09
13	Phone	1,800.95	2,305.83	2,024.89	1,747.24	1,923.18	2,060.68	2,025.72	1,974.82	2,226.73	2,303.13	1,831.81	1,416.03
14	Postage	1,987.94	1,682.47	1,994.48	1,924.43	2,153.88	1,606.92	2,224.66	2,842.74	2,062.13	1,974.45	1,812.85	1,252.95
15	Public transport	9,614.36	7,256.06	8,839.30	12,603.85	10,847.82	15,334.30	8,321.51	11,082.83	12,522.82	10,826.97	13,253.05	3,647.82
16	Research	2,232.58	2,431.49	2,099.35	2,456.49	2,059.30	3,009.76	2,552.63	1,947.37	2,607.23	2,112.81	1,959.11	881.61
17	Stationery	2,349.22	2,823.53	1,760.04	2,314.57	2,581.93	1,772.80	1,626.36	2,500.49	2,984.97	2,345.87	1,279.22	1,246.20
18	Travel	10,361.62	9,072.99	13,792.12	9,931.94	9,745.31	11,089.25	9,907.72	12,384.85	11,418.96	13,522.68	13,777.82	6,771.01
19	Vehicle fuel	10,741.74	12,795.91	13,022.22	9,213.21	8,905.84	10,179.82	9,789.30	12,239.98	10,497.22	11,801.18	7,235.64	7,247.60
20	Vehicle maintenance	2,035.41	2,471.11	2,664.00	3,058.19	2,794.19	1,868.16	2,361.28	2,379.87	1,912.94	2,456.12	1,937.17	1,142.94

PivotTable Fields
Drag fields between areas below:

Filters

Columns
Month

Rows
Category

Values
Amount Reimbursed

☐ Defer Layout Update
Update

THE UNPIVOT COLUMNS COMMAND

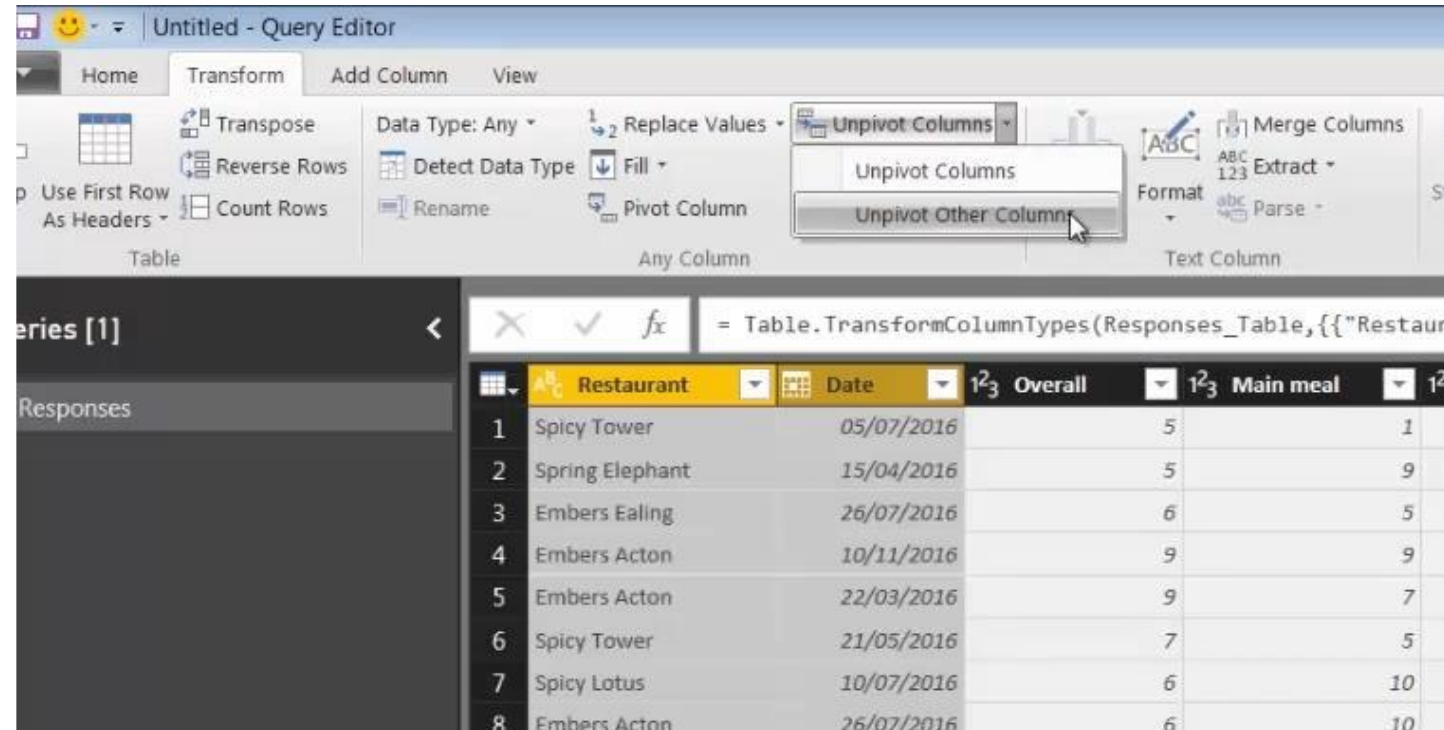
- Import the raw data into Power BI, since this will give us the maximum amount of flexibility.
- You cannot import data directly from an Excel pivot table into Power BI.
- Whenever you connect to a report with this feature, Power BI's Unpivot command will reverse the pivoting and reduce the separate columns down to two columns: one, containing a description; and, the other, a value.
- The entries which were headings in the report will become entries within the description column and as many extra rows as necessary will be generated.

IMPORTING THE DATA

- go into Power BI and look at an example.
- Get Data from an Excel file; so, in folder “Unpivot Columns”, **Unpivot.xlsx**.
- The file contains a Table; as well as the worksheet which houses the Table,
- open the Transform data
- we have a list of restaurants with the ratings assigned to them by our clients
- The ratings are arranged into categories; however, these categories have been split into separate columns.

USING UNPIVOT OTHER COLUMNS

- Select the columns you want to unpivot, or, if the columns you wish to unpivot are in the minority, it may be quicker to select the other columns;
- “Restaurant” and “Date” are the only two columns which we do not want to unpivot;
- , all the other columns relate to the appraisal.
- We can find unpivot by Right-clicking or going into the Transform Tab, where we have the two features
- Unpivot Columns and Unpivot other Columns, which is what we need on this occasion.



USING UNPIVOT OTHER COLUMNS

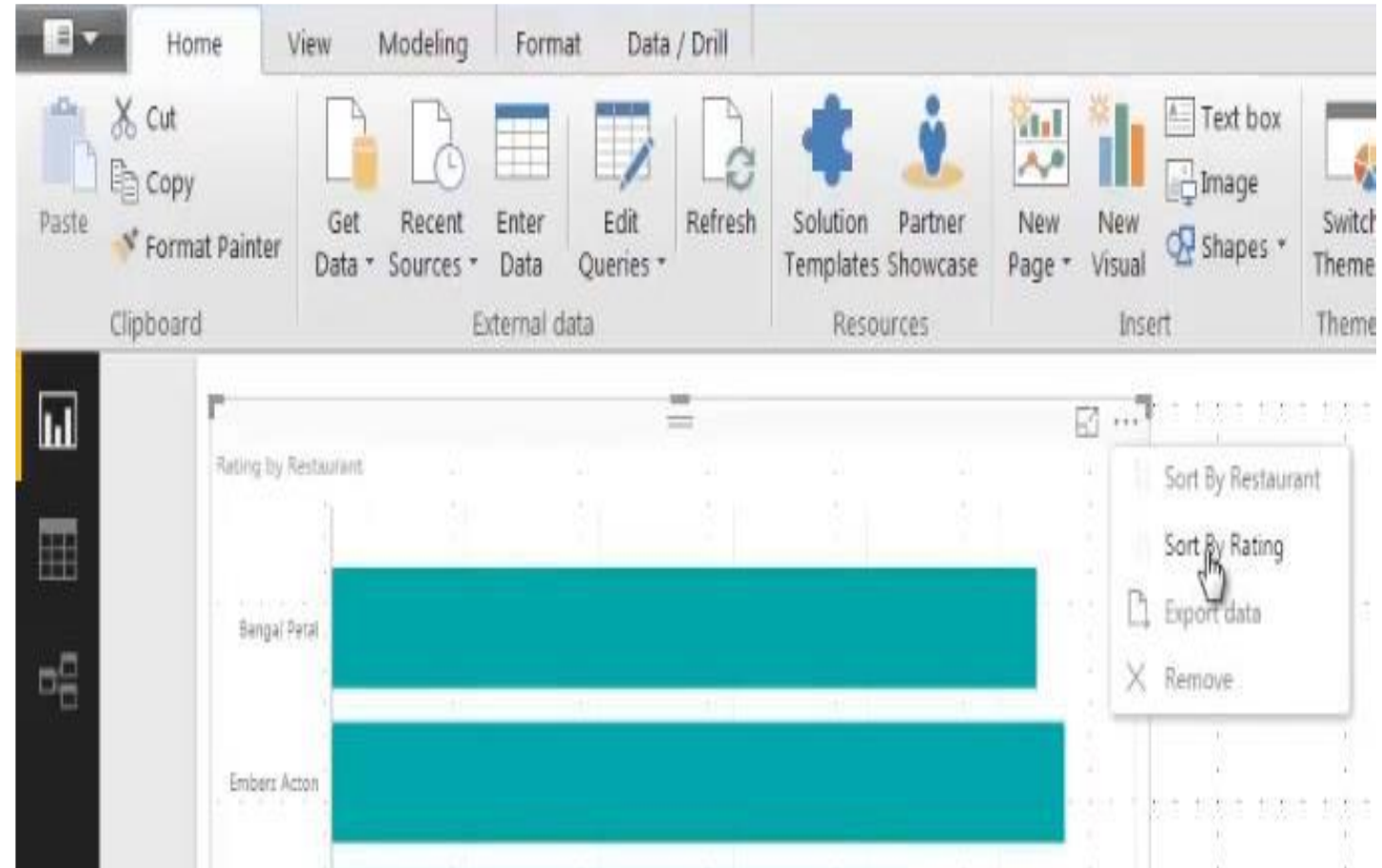
- When you unpivot columns, you end up with two columns, named “**Attributes**” and “**Values**”.
- The “**Attribute**” column contains the original column headings, while the “**Values**” column contains the entries which were underneath each of those headings.
- The Query Editor automatically marries everything up for you, creating as many extra rows as necessary.
- Final step is to rename these two resulting columns; so, replace
- “**Attribute**” with “**Category**” and “**Values**” with “**Rating**”.
- Perform one final check by ensuring that the change type step has done a good job.
- click Close & Apply.

fx = Table.RenameColumns(#"Unpivoted Other Columns",{{"Att

	ABC Restaurant	Date	ABC Category	1.2 Rating
1	Spicy Tower	05/07/2016	Overall	5
2	Spicy Tower	05/07/2016	Main meal	1
3	Spicy Tower	05/07/2016	Starters	10
4	Spicy Tower	05/07/2016	Desserts	10
5	Spicy Tower	05/07/2016	Staff	6

CREATING A BAR CHART VISUAL

- Create a visual to highlight the popularity of our individual restaurants.
- Bar charts are good for these comparisons;
- Activate the restaurant (axis) and the rating (value) columns.
- Highlight the popularity, we can sort by rating by clicking on the three dots in the top right of the visual.



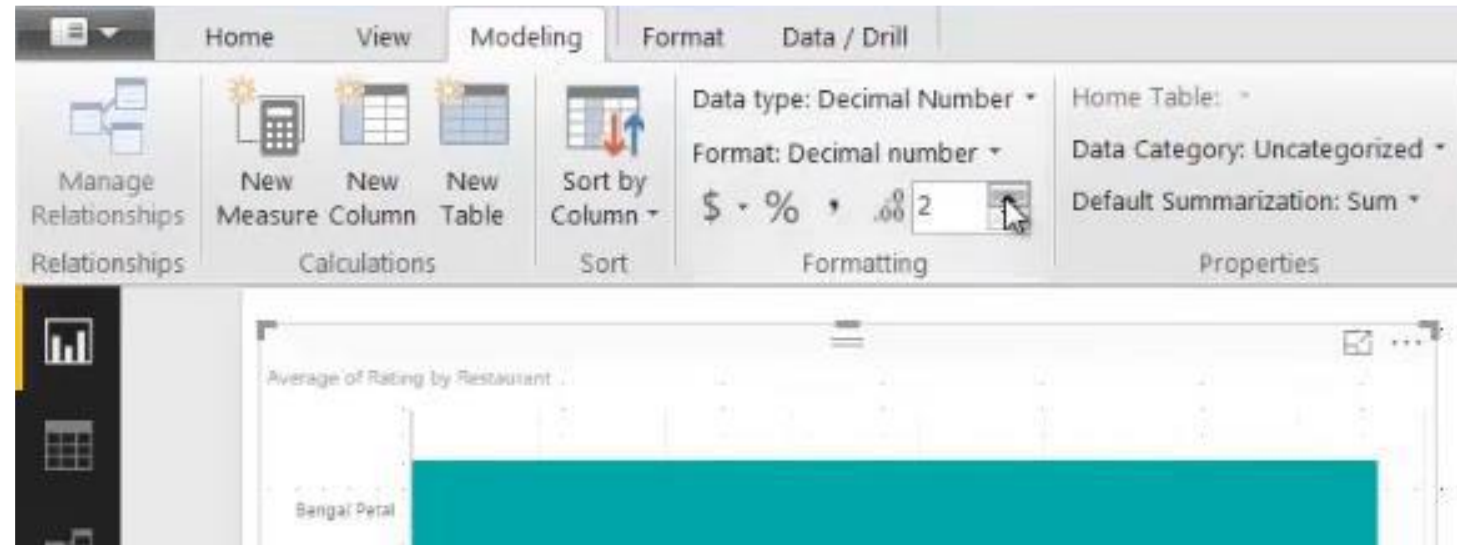
CREATING A BAR CHART VISUAL

- aggregation for any numeric field is always Sum; but, here, change it to Average by clicking



CREATING A BAR CHART VISUAL

- Tidy up. by Highlight the field rating, then, in **Modelling Tab**, the data type is already a decimal number; so, we can simply change the number of decimal places to two.
- Increase the text size on the two axes and on the title.
- Change the title to “restaurant popularity”.
- Create a category slicer
- Increase the size of the text in the slicer

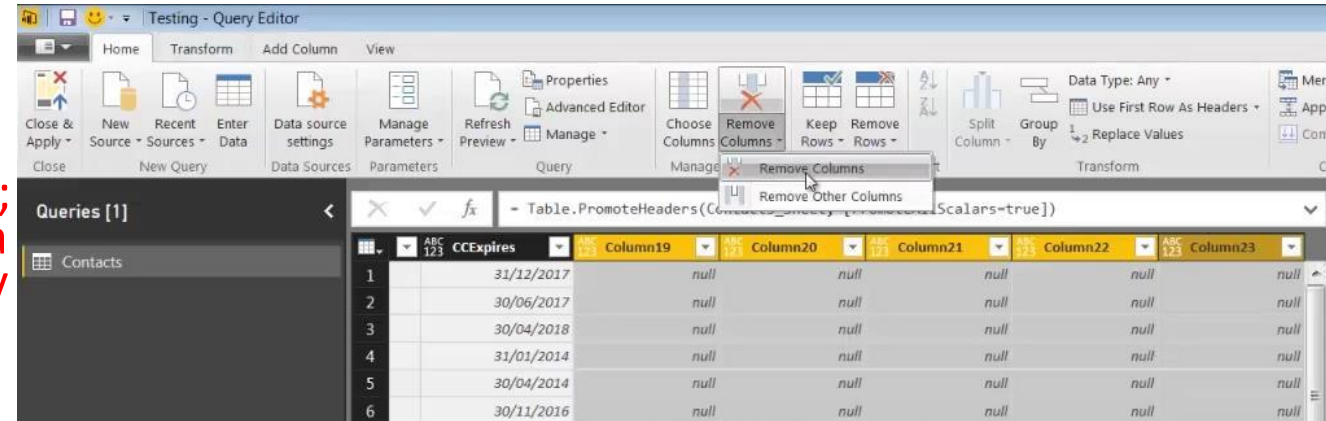


REORDERING COLUMNS

- When connecting to data sources, reordering columns can be a useful way of improving your productivity.
- You may want to put the most important columns on the left; or, you may want to group related or important columns together.
- Load “All Patient Data.xlsx”.
- This file contains a single Excel worksheet, not a Table; and one possible consequence of bringing in data from an Excel worksheet, rather than from a table, is that you often find extra blank columns are imported as part of the dataset.
- remove some columns
- Transform the data

REORDERING COLUMNS

- If you want to stop the editor from automatically inserting the **Changed Type steps**,
- go into **File > Options > Options and Settings**; then, in the **CURRENT FILE** section, click **Data Load** and switch off the option **Automatically detect column types and headers for unstructured sources**.
- Begin with column removal.
- Scroll across to the right to the extra, unwanted columns which have been imported.
- **Click and Shift-click** on the first and last column headers, respectively; then, you can either Right-click, or, in the Home Tab, choose
- Remove Columns.



MOVING COLUMNS BY DRAGGING

- two main techniques for reordering columns available,
- the first is to move one or more selected columns to a specific position, this is done simply by dragging left or right. Thus, if we want to move the Blood Type column after the Weight and Height columns, we simply select that column, click on the heading and drag left or right.
- A bold vertical bar will indicate the new position of the column as you drag.

MOVING COLUMNS RELATIVE TO OTHER COLUMNS

- The second technique is to move one or more columns relative to the other columns.
- if we want to treat Email as the key column and, therefore, to be the first column, we can simply highlight the column; and then, either Right-click and select Move, and choose one of the options for moving the column.
- We can either move it one place to the **left**, one place to the **right**, to the very **beginning**, or to the very end.



CREATING CUSTOM COLUMNS

- when working with tables that have a lot of columns, you can always close the navigation pane by clicking on its minimize button.

TIDYING UP THE DATA

- import data while working in the Query Editor, we choose Home > New Source > Text/CSV and import the file "Countries.csv".
- Promote Headers
- import the sector information: "Sectors.txt".
- choose Close & Apply
- link the tables together;
- rename the columns,
- create the relationships manually; (Clients > Country Code to Countries > Code; and from Clients > Sector Code to Sectors > Code.)

