



Power Query M Formula Language

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INSTRUCTOR



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POWER QUERY M FORMULA LANGUAGE

- ✓ A core capability of Power Query is to filter and combine, that is, to **mash-up data** from one or more of a rich collection of supported data sources.
- ✓ Any such data mashup is expressed using the ***Power Query M Formula Language***.

WHEN YOU NEED M LANGUAGE

- ✓ Add some additional functionality that is not accessible through the graphical interface
- ✓ Use the advanced editor to modify code
- ✓ Add comments to your data
- ✓ Add programming logic, such as generating sequences of dates or numbers
- ✓ Create your own:
 - Lists, records, or tables
 - Built-in functions

WHAT IS THE M LANGUAGE

- ✓ M is a *functional* language
- ✓ M is the case-sensitive
- ✓ M is strongly typed
- ✓ M is built on keywords, operators, and punctuators

POWER QUERY – POWER QUERY EDITOR

Table1 - Power Query Editor

File Home Transform Add Column View

Close & Load Refresh Preview Manage Query

Properties Advanced Editor

Choose Columns Remove Columns Manage Columns

Keep Rows Remove Rows Reduce Rows

Sort

Split Column Group By Transform

Data Type: Text Use First Row as Headers Replace Values

Merge Queries Append Queries Combine Files Combine

Manage Parameters Parameters

Data source settings Data Sources

New Source Recent Sources New Query

Queries [1] Table1

fx = Table.TransformColumnTypes(Source,{{"Names", type text}, {"Scores", Int64.Type}})

	Names	Scores
1	Darby Mcnutt	30
2	Luke Pedro	32
3	Angele Westgate	60
4	Micheal Marquez	76
5	Milly Shill	32
6	Dona Enders	38
7	Emely Outler	71
8	Sandy Guild	89
9	Yvette Jagers	64
10	Farah Matzke	73
11	Ardella Grasty	37
12	Weston Balli	36
13	Shameka Symonds	69
14	Annalisa Mcgovern	93
15	Classie Font	87
16	Elene Havel	47
17	Nevada Edgley	65
18	Mui Reiss	46
19	Riva Kuhl	58
20	Dione Nordman	59

Query Settings

PROPERTIES Name Table1

APPLIED STEPS Source Changed Type

2 COLUMNS, 50 ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 2:33 PM

1. Ribbon

2. Applied Steps

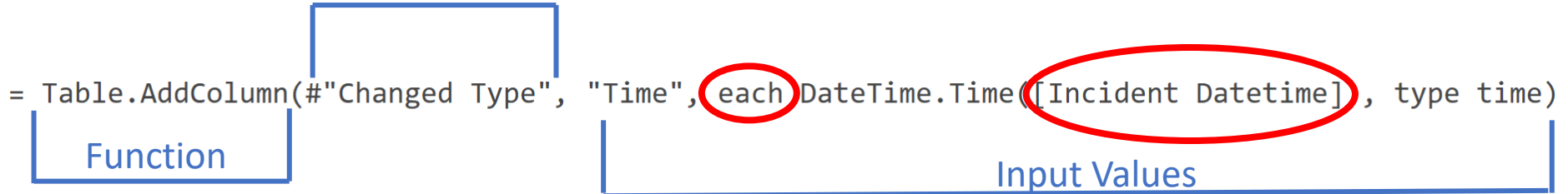
3. Queries

4. Formula Bar

5. Data Preview

M EXPRESSIONS

Source Expression (prior step)



- ✓ It is often best to look at the code for existing steps to understand what the M code for a particular function looks like. This could give you an idea of ways to modify the code
- ✓ Always enclose a column name in square brackets – **[]**
- ✓ **each** is an M convention to indicate that every record in the column will have the formula applied

EXAMPLE 1 - CONCATENATE

File Home Transform Add Column View

Column From Examples Custom Column Invoke Custom Function

Conditional Column Index Column Duplicate Column

Format Extract Parse

Statistics Standard Scientific

Trigonometry Rounding Information

Date Time Duration

Queries [1] RightTable

Police District

1	outhern
2	outhern
3	outhern
4	araval
5	enderloin
6	entrail
7	entrail
8	araval

Custom Column

Add a column that is computed from the other columns.

New column name: Custom

Custom column formula: `= [Report Type Code]&" - "&[Report Type Description]`

Available columns: Incident Number, CAD Number, Report Type Code, Report Type Description, Incident Code

Query Settings

- PROPERTIES: Name: RightTable
- APPLIED STEPS: Source, Changed Type

File Home Transform Add Column View

Column From Examples Custom Column Invoke Custom Function

Conditional Column Index Column Duplicate Column

Format Extract Parse

Statistics Standard Scientific

Trigonometry Rounding Information

Date Time Duration

Queries [1] RightTable

strict Analysis Neighborhood 1.2 Latitude 1.2 Longitude Neighborhoods Custom

1	Mission Bay	37.76669146	-122.3926619	34	null
2	Mission Bay	37.76669146	-122.3926619	34	null
3	Mission Bay	37.77100919	-122.3911993	34	null
4	Lakeshore	37.71574014	-122.4816323	42	II - Initial
5	Tenderloin	37.77999174	-122.4134874	21	II - Initial
6	North Beach	37.80675808	-122.4121414	99	IS - Initial Supplement
7	North Beach	37.80675808	-122.4121414	99	IS - Initial Supplement
8	Inner Sunset	37.76189061	-122.4726595	109	II - Initial
9	Sunset/Parkside	37.73819183	-122.5011416	39	VI - Vehicle Initial
10	Mission	37.76156567	-122.4238007	37	VI - Vehicle Initial
11	Bayview Hunters Point	37.74106594	-122.4039201	82	II - Initial
12	Bayview Hunters Point	37.73678419	-122.3801111	86	VI - Vehicle Initial
13	Tenderloin	37.78144749	-122.4171456	21	II - Initial

Formula Bar: `= Table.AddColumn("#Changed Type", "Custom", each [Report Type Code]&" - "&[Report Type Description])`

Query Settings

- PROPERTIES: Name: RightTable
- APPLIED STEPS: Source, Changed Type, Added Custom

EXAMPLE 2 - CONCATENATE (LIST)

Custom Column

Add a column that is computed from the other columns.

New column name: Custom with null

Custom column formula: `= Text.Combine([Report Type Code], [Report Type Description], " - ")`

Available columns: Report Datetime, Incident ID, Incident Number, CAD Number, Report Type Code

Table Data:

Neighborhood	Latitude	Longitude	Neighborhoods	Custom	Custom with null
	37.76669146	-122.3926619	34		null
	37.76669146	-122.3926619	34		null
	37.77100919	-122.3911993	34		null
	37.71574014	-122.4816323	42	II - Initial	II - Initial
	37.77999174	-122.4134874	21	II - Initial	II - Initial
	37.80675808	-122.4121414	99	IS - Initial Supplement	IS - Initial Supplement
	37.80675808	-122.4121414	99	IS - Initial Supplement	IS - Initial Supplement
	37.76189061	-122.4726595	109	II - Initial	II - Initial
de	37.73819183	-122.5011416	39	VI - Vehicle Initial	VI - Vehicle Initial
	37.76156567	-122.4238007	37	VI - Vehicle Initial	VI - Vehicle Initial
ers Point	37.74106594	-122.4039201	82	II - Initial	II - Initial

Query Settings

PROPERTIES

Name: RightTable

APPLIED STEPS

- Source
- Changed Type
- Added Custom
- Added Custom1

EXAMPLE 3 – CONCATENATE (IF THEN ELSE)

Custom Column

Add a column that is computed from the other columns.

New column name

Custom extra

Custom column formula

```
=if [Report Type Description] = null then [Report Type Code] &" - 000" else [Report Type Code]&" - "&[Report Type Description]
```

Available columns

Incident Datetime
Incident Date
Incident Time
Incident Year

The screenshot shows the Power Query Editor interface. The 'Add Column' tab is active, displaying various options like 'Conditional Column', 'Index Column', 'Duplicate Column', 'Merge Columns', 'Extract', 'Parse', 'Statistics', 'Standard', 'Scientific', 'Trigonometry', 'Rounding', 'Information', 'Date', 'Time', and 'Duration'. Below the ribbon, a data table is visible with the following columns: '1,2 Longitude', '1,3 Neighborhoods', 'ABC 123 Custom', 'ABC 123 Custom with null', and 'ABC 123 Custom with null and subst'. The table contains 12 rows of data. The 'Custom with null and subst' column is highlighted in green, indicating it is the selected column.

	1,2 Longitude	1,3 Neighborhoods	ABC 123 Custom	ABC 123 Custom with null	ABC 123 Custom with null and subst
1	46	-122.3926619	34	null	II - 000
2	46	-122.3926619	34	null	II - 000
3	19	-122.3911993	34	null	II - 000
4	14	-122.4816323	42	II - Initial	II - Initial
5	74	-122.4134874	21	II - Initial	II - Initial
6	08	-122.4121414	99	IS - Initial Supplement	IS - Initial Supplement
7	08	-122.4121414	99	IS - Initial Supplement	IS - Initial Supplement
8	61	-122.4726595	109	II - Initial	II - Initial
9	83	-122.5011416	39	VI - Vehicle Initial	VI - Vehicle Initial
10	67	-122.4238007	37	VI - Vehicle Initial	VI - Vehicle Initial
11	94	-122.4039201	82	II - Initial	II - Initial
12	19	-122.3801111	86	VI - Vehicle Initial	VI - Vehicle Initial

EXAMPLE 4 – CONCATENATE (IF THEN ELSE IF THEN ELSE)

New column name

Custom more extra

Custom column formula

```
= if [Report Type Code]= null and [Report Type Description]= null then "00 - 000" else if [Report Type Description] = null then [Report Type Code]&" - 000" else if [Report Type Code] = null then "00 - "& [Report Type Description] else [Report Type Code]&" - "&[Report Type Description]
```

Available columns

- Incident Datetime
- Incident Date
- Incident Time
- Incident Year
- Incident Day of Week
- Report Datetime
- Incident ID

The screenshot shows the Power Query Editor interface. The formula bar contains the M code: `= Table.AddColumn("#Added Custom3", "Custom more extra", each if [Report Type Code]= null and [Report Type Description]= null then "00 - 000" else if [Report Type Description] = null then [Report Type Code]&" - 000" else if [Report Type Code] = null then "00 - "& [Report Type Description] else [Report Type Code]&" - "&[Report Type Description])`. The ribbon includes options for Transform, Add Column, and View. The data table has columns: Custom, Custom with null, Custom with null and subst, Custom extra, and Custom more extra. The 'Custom more extra' column is highlighted in green. The 'Query Settings' pane on the right shows the 'APPLIED STEPS' list: Source, Changed Type, Added Custom, Added Custom1, Added Custom2, Added Custom3, and Added Custom4 (selected).

EXAMPLE – ADD CALCULATED COLUMN (BETWEEN TWO DATES)

Custom Column

Add a column that is computed from the other columns.

- Duration.Days
- Duration.Hours
- Duration.Minutes
- Duration.Seconds

New column name

Diff in Hours

Custom column formula

= **Duration.Hours** ([Report Datetime] - [Incident Datetime])

Available columns

- Incident Datetime
- Incident Date
- Incident Time

The screenshot shows the Power BI Desktop interface. The 'Add Column' ribbon is active, displaying various options like 'Conditional Column', 'Index Column', 'Duplicate Column', and 'From Text'. The ribbon is divided into sections: 'General', 'From Text', 'From Number', and 'From Date & Time'. The 'From Date & Time' section includes icons for 'Date', 'Time', and 'Duration'. The data table below has 14 rows and 5 columns. The fifth column, 'Diff in Hours', is highlighted in green and contains numerical values. The 'Query Settings' pane on the right shows the 'APPLIED STEPS' list, which includes 'Added Custom5' at the bottom.

	Custom with null	Custom with null and subst	Custom extra	Custom more extra	Diff in Hours
1		II - 000	II - 000	II - 000	0
2		II - 000	II - 000	II - 000	0
3		II - 000	II - 000	II - 000	0
4	nitial	II - Initial	II - Initial	II - Initial	13
5			null	null	00 - 000
6		IS - 000	IS - 000	IS - 000	0
7			null	null	00 - 000
8	nitial	II - Initial	II - Initial	II - Initial	0
9	icle Initial		null	null	00 - Vehicle Initial
10	Vehicle Initial	VI - Vehicle Initial	VI - Vehicle Initial	VI - Vehicle Initial	11
11	nitial	II - Initial	II - Initial	II - Initial	0
12	Vehicle Initial	VI - Vehicle Initial	VI - Vehicle Initial	VI - Vehicle Initial	11
13	nitial	II - Initial	II - Initial	II - Initial	0
14	nitial	II - Initial	II - Initial	II - Initial	13

EXAMPLE – ADD CALCULATED COLUMN (FROM TODAY)

Custom Column

Add a column that is computed from the other columns.

New column name

From today

Custom column formula

```
= Duration.Days(Date.From(DateTime.LocalNow())-Date.From([Incident Datetime]))
```

Available columns

Incident Datetime
Incident Date

The screenshot shows the Power BI Desktop interface. The 'Add Column' ribbon is active, displaying various options like 'Conditional Column', 'Index Column', 'Duplicate Column', 'Merge Columns', 'Extract', 'Parse', 'Statistics', 'Standard', 'Scientific', 'Rounding', 'Information', 'Date', 'Time', and 'Duration'. The formula bar contains the formula: `= Table.AddColumn("#Added Custom5", "From today", each Duration.Days(Date.From(DateTime.LocalNow())-`. The data table below shows 16 rows with columns: 'Custom with null and subst', 'Custom extra', 'Custom more extra', 'Diff in Hours', and 'From today'. The 'From today' column values range from 0 to 298. The 'Query Settings' pane on the right shows the query name 'RightTable' and a list of applied steps, including 'Added Custom5' and 'Added Custom6'.

	Custom with null and subst	Custom extra	Custom more extra	Diff in Hours	From today
1	II - 000	II - 000	II - 000	0	298
2	II - 000	II - 000	II - 000	0	298
3	II - 000	II - 000	II - 000	0	298
4	II - Initial	II - Initial	II - Initial	13	298
5		null	null 00 - 000	0	298
6	IS - 000	IS - 000	IS - 000	0	298
7		null	null 00 - 000	0	298
8	II - Initial	II - Initial	II - Initial	0	298
9		null	null 00 - Vehicle Initial	20	298
10	VI - Vehicle Initial	VI - Vehicle Initial	VI - Vehicle Initial	11	298
11	II - Initial	II - Initial	II - Initial	0	298
12	VI - Vehicle Initial	VI - Vehicle Initial	VI - Vehicle Initial	11	298
13	II - Initial	II - Initial	II - Initial	0	298
14	II - Initial	II - Initial	II - Initial	13	298
15	II - Initial	II - Initial	II - Initial	1	298
16	II - Initial	II - Initial	II - Initial	2	298

END-TO-END EXAMPLE

Query Settings ×

▲ **PROPERTIES**

Name

[All Properties](#)

▲ **APPLIED STEPS**

- Source
- Changed Type
- ✕ Inserted Year ⚙**
- Inserted Month ⚙
- Inserted Month Name ⚙
- Cleaned Text
- Trimmed Text
- Merged Queries ⚙
- Expanded DescTable ⚙

DATABASE SAN FRANCISCO, 2022

data.sfgov.org/Public-Safety/Police-Department-Incident-Reports-2018-to-Present/wg3w-h783

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Police Department Incident Reports: 2018 to Present

Public Safety

A. SUMMARY

Read the [detailed overview of this dataset](#).

This dataset includes incident reports that have been filed as of January 1, 2018. These reports

[More](#)

View Data Visualize Export API

Download Police Department Incident Reports: 2018 to Present

Download Police Department Incident Reports: 2018 to Present for offline use in other applications.

Updated January 24, 2023

Data Provider Police Department

[CSV](#) [KML](#) [Shapefile](#)

Additional Formats

[CSV for Excel](#) [KMZ](#) [TSV for Excel](#)

[CSV for Excel \(Europe\)](#) [RDF](#) [XML](#)

[GEOJSON](#) [RSS](#)

Featured Content Using this Data

<p>Public Map of Police Department Incident Reports: 2018 to Pr...</p> <p>January 24, 2023 36.7K Views</p>	<p>Public SFPD Narcan/ Naloxone Deployment Chart & Table</p> <p>January 24, 2023 209 Views</p>	<p>Public SFPD Narcan Deployment</p> <p>January 24, 2023 175 Views</p>
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data.sfgov.org/opendata

END-TO-END EXAMPLE – DOWNLOAD DATA

The image shows a sequence of steps in Microsoft Power BI Desktop for importing data from an Excel file. The background shows the Power BI ribbon with the 'Data' tab selected, and the 'From File' group containing 'From Excel Workbook' and 'From CSV' options. A tooltip for 'From Excel Workbook' is visible, stating: 'Import data from a Microsoft Excel workbook.'

The 'Import Data' dialog box is open, showing the file path: Desktop > 2_Transforming. The file explorer window displays the contents of the '2_Transforming' folder, including 'Dropbox', 'OneDrive - Personal', and 'This PC'. The file 'Incident_Report.xlsx' is selected, and the 'File name' field is empty.

The 'Navigator' pane is open, showing the contents of the selected Excel file. The 'Data' table is highlighted, and the 'Police_Department_Incident_Repo' table is also visible. The message 'No item selected for preview' is displayed at the bottom of the pane.

At the bottom of the Navigator pane, there are buttons for 'Load', 'Transform Data', and 'Cancel'.

END-TO-END EXAMPLE – CLEAN DATA

File Home Transform **Add Column** View

Column From Examples Custom Column Invoke Custom Function

Conditional Column Index Column Duplicate Column

Format From Text

Merge Columns Extract Parse

Statistics Standard Scientific

Trigonometry Rounding Information

Date

General

Queries [2]

Data DescTable

`= Table.AddColumn("#Inserted Year", "Month"`

1/1/2020 12:00:00 AM	6/23/2021 3:16:00 PM	Year	Year
		Start of Year	Month

File Home Transform **Add Column** View

Column From Examples Custom Column Invoke Custom Function

Conditional Column Index Column Duplicate Column

Format From Text

Merge Columns Extract Parse

Statistics Standard Scientific

Trigonometry Rounding Information

Date Time Duration

Date & Time

General

Queries [2]

Data DescTable

`= Table.AddColumn("#Inserted Year", "Month"`

1/1/2020 12:00:00 AM	6/23/2021 3:16:00 PM	104	Year	211742241	II
1/1/2020 12:00:00 AM	6/23/2021 1:49:00 PM		Month	211741908	II
1/1/2020 12:00:00 AM	3/15/2022 12:50:00 PM		Start of Month	220540832	IS
1/1/2020 12:00:00 AM	12/30/2021 2:00:00 PM		End of Month	213642117	II
1/1/2020 12:00:00 AM	3/23/2022 8:59:00 PM		Days in Month	220540832	IS
1/1/2020 12:00:00 AM	5/16/2022 3:17:00 PM	115	Name of Month	221362002	II
1/1/2020 12:00:00 AM	5/17/2022 9:48:00 AM	115		221370811	II
1/1/2020 12:00:00 AM	4/18/2022 6:00:00 PM	114		221082525	II
1/1/2020 12:00:00 AM	4/22/2022 7:28:00 AM	114		221082525	IS

END-TO-END EXAMPLE – CLEAN DATA

The screenshot shows the Power Query Transform ribbon with the 'Format' dropdown menu open. The 'Trim' option is highlighted in yellow. The background shows a data table with columns 'Category', 'Incident Subcategory', and 'Intersection'. The 'Incident Subcategory' column contains values like 'Burglary - Residential', 'Fraud', and 'Fraud'. The 'Intersection' column contains values like '45TH AVE \ LAWTON ST', '47TH AVE \ WAWONA ST', and 'ANDOVER ST \ BENTON AVE'. The 'Query Settings' pane on the right shows the query name 'Data'.

Category	Incident Subcategory	Intersection
1	Burglary - Residential	45TH AVE \ LAWTON ST
2	Fraud	47TH AVE \ WAWONA ST
3	Fraud	ANDOVER ST \ BENTON AVE

The screenshot shows the Power Query Transform ribbon with the 'Format' dropdown menu open. The 'Clean' option is highlighted in yellow. The background shows the same data table as the first screenshot. The 'Query Settings' pane on the right shows the query name 'Data'.

Category	Incident Subcategory	Intersection
1	Burglary - Residential	45TH AVE \ LAWTON ST
2	Fraud	47TH AVE \ WAWONA ST
3	Fraud	ANDOVER ST \ BENTON AVE

END-TO-END EXAMPLE – MERGE DATA

Merge

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

Data

Category	Incident	Intersection	Police District	Analysis
Residential	Burglary, Residence, Unlawful Entry	45TH AVE \ LAWTON ST	Taraval	Sunset/P
	False Claims, Presenting to Government	47TH AVE \ WAWONA ST	Taraval	Sunset/P
	Access Card, incl. Credit, Phone, ATM, Fraudulent Use of	ANDOVER ST \ BENTON AVE	Mission	Bernal He
Acc	Suspicious Occurrence	04TH ST \ MISSION ROCK ST	Out of SF	Mission E

DescTable

Index	Incident	Incident2
190	<i>null</i>	Burglary, Residence, Unlawful Entry
76	Access Card or Signature, Forgery of	False Claims, Presenting to Government
5	Access Card, incl. Credit, Phone, ATM, Fraudulent Use of	Access Card, incl. Credit, Phone, ATM, Fraudulent Use of
107	Aided Case	Suspicious Occurrence
45	Aided case, Naloxone Deployment	Access Card, incl. Credit, Phone, ATM, Fraudulent Use of

Join Kind

Left Outer (all from first, matching from second)

OK Cancel

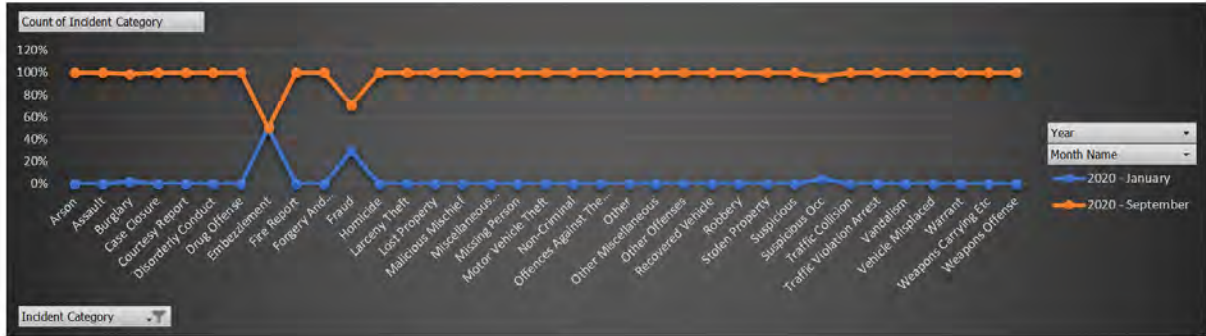
Any Column Text Column Number Column

```
= Table.FuzzyNestedJoin("#Trimmed Text", {"Incident"}, DescTable, {"Incident"}, "DescTable", JoinKind.LeftOuter, [IgnoreCase=true, IgnoreSpace=true, Threshold=0.4])
```

Analysis Neighborhood 1.2 Latitude 1.2 Longitude 1.23 Year 1.23 Month A^BC Month Name

END-TO-END EXAMPLE – REPORT

Incidents	2020		2020 Total
	January	September	
Arson	0%	100%	100%
Assault	0%	100%	100%
Burglary	2%	98%	100%
Case Closure	0%	100%	100%
Courtesy Report	0%	100%	100%
Disorderly Conduct	0%	100%	100%
Drug Offense	0%	100%	100%
Embezzlement	50%	50%	100%
Fire Report	0%	100%	100%
Forgery And Counterfeiting	0%	100%	100%
Fraud	29%	71%	100%
Homicide	0%	100%	100%
Larceny Theft	0%	100%	100%
Lost Property	0%	100%	100%
Malicious Mischief	0%	100%	100%
Miscellaneous Investigation	0%	100%	100%
Missing Person	0%	100%	100%
Motor Vehicle Theft	0%	100%	100%
Non-Criminal	0%	100%	100%
Offences Against The Family And Children	0%	100%	100%
Other	0%	100%	100%
Other Miscellaneous	0%	100%	100%
Other Offenses	0%	100%	100%
Recovered Vehicle	0%	100%	100%
Robbery	0%	100%	100%
Stolen Property	0%	100%	100%
Suspicious	0%	100%	100%
Suspicious Occ	4%	96%	100%
Traffic Collision	0%	100%	100%
Traffic Violation Arrest	0%	100%	100%
Vandalism	0%	100%	100%
Vehicle Misplaced	0%	100%	100%
Warrant	0%	100%	100%
Weapons Carrying Etc	0%	100%	100%
Weapons Offense	0%	100%	100%
Grand Total	1%	99%	100%



END-TO-END EXAMPLE – ADD NEW DATA

Incident Datetime	Report Datetime	Incident ID	Incident Number	CAD Number	Report Type Code	Report Type Description	Filed Online
1/1/2020 0:00	6/23/2021 15:16	1043121	210393732	211742241	II	Initial	
1/1/2020 0:00	6/23/2021 13:49	1042957	210392784	211741908	II	Initial	
1/1/2020 0:00	3/15/2022 12:50	1131074	220122593	220540832	IS	Initial Supplement	
1/1/2020 0:00	12/30/2021 14:00	1107459	210863440	213642117	II	Initial	
1/1/2020 0:00	3/23/2022 8:59	1133319	220122593	220540832	IS	Initial Supplement	
1/1/2020 0:00	5/16/2022 15:17	1150849	220319762	221362002	II	Initial	
1/1/2020 0:00	5/17/2022 9:48	1151149	220321563	221370811	II	Initial	
1/1/2020 0:00	4/18/2022 18:00	1142074	220253665	221082525	II	Initial	
1/1/2020 0:00	4/22/2022 7:28	1143304	220253665	221082525	IS	Initial Supplement	
1/1/2020 0:00	7/25/2022 10:45	1174461	220492192	222061017	II	Initial	
1/1/2020 0:00	7/27/2022 13:20	1177735	220319762	221362002	IS	Initial Supplement	
1/1/2020 0:00	8/3/2022 9:06	1177744	220321563	221370811	IS	Initial Supplement	
1/1/2020 0:00	8/8/2022 14:46	1179354	220528888	2201975	II	Initial	

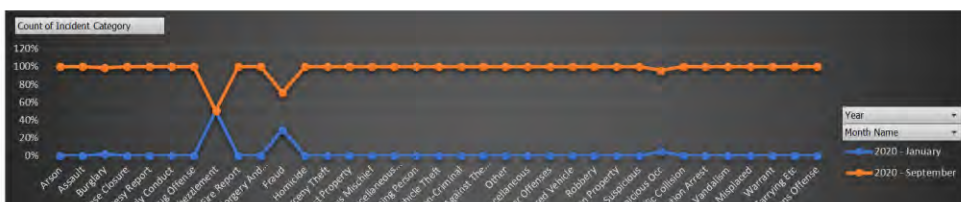
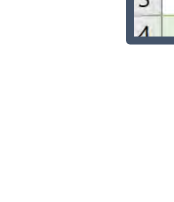
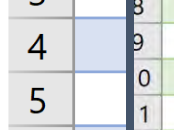
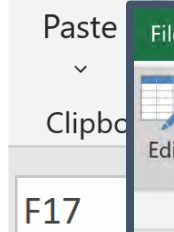


1/1/2020 0:00	6/23/2021 15:16	1043121	2.1E+08	2.12E+08	II	Initial				Burglary, Residence, Unlawful Entry	
1/1/2020 0:00	6/23/2021 13:49	1042957	2.1E+08	2.12E+08	II	Initial		9173	Fraud	Fraud	Presenting to Government
1/1/2020 0:00	3/15/2022 12:50	1131074	2.2E+08	2.21E+08	IS	Initial Supplement		9320	Fraud	Fraud	Access Card, incl. Credit, Phone, ATM, Fraud
1/1/2020 0:00	12/30/2021 14:00	1107459	2.11E+08	2.14E+08	II	Initial		64070	Suspicious	Suspicious	Suspicious Occurrence
1/1/2020 0:00	3/23/2022 8:59	1133319	2.2E+08	2.21E+08	IS	Initial Supplement		9320	Fraud	Fraud	Access Card, incl. Credit, Phone, ATM, Fraud
1/1/2020 0:00	5/16/2022 15:17	1150849	2.2E+08	2.21E+08	II	Initial		9250	Fraud	Fraud	Fraudulent Use Of Automated Teller Card
1/1/2020 0:00	5/17/2022 9:48	1151149	2.2E+08	2.21E+08	II	Initial		9320	Fraud	Fraud	Access Card, incl. Credit, Phone, ATM, Fraud
1/1/2020 0:00	4/18/2022 18:00	1142074	2.2E+08	2.21E+08	II	Initial		9027	Fraud	Fraud	False Personation
1/1/2020 0:00	4/22/2022 7:28	1143304	2.2E+08	2.21E+08	IS	Initial Supplement		9027	Fraud	Fraud	False Personation
1/1/2020 0:00	7/25/2022 10:45	1174461	2.2E+08	2.22E+08	II	Initial		9029	Fraud	Fraud	False Personation to Receive Money or Prop
1/1/2020 0:00	7/27/2022 13:20	1177735	2.2E+08	2.21E+08	IS	Initial Supplement		9250	Fraud	Fraud	Fraudulent Use Of Automated Teller Card
1/1/2020 0:00	8/3/2022 9:06	1177744	2.2E+08	2.21E+08	IS	Initial Supplement		9330	Fraud	Fraud	Access Card Counterfeiting Machinery, Poss
1/1/2020 0:00	8/8/2022 14:46	1179354	2.21E+08	2.22E+08	II	Initial		10045	Embezzler	Embezzler	Embezzlement, Grand Theft By Employee
1/1/2020 0:00	2/1/2021 11:31	1001356	2.1E+08	2.1E+08	II	Initial		68020	Miscellaneous	Miscellaneous	Miscellaneous Investigation
1/1/2020 0:00	3/1/2021 14:23	1009558	2.1E+08	2.11E+08	II	Initial		64070	Suspicious	Suspicious	Suspicious Occurrence

END-TO-END EXAMPLE - REFRESHING

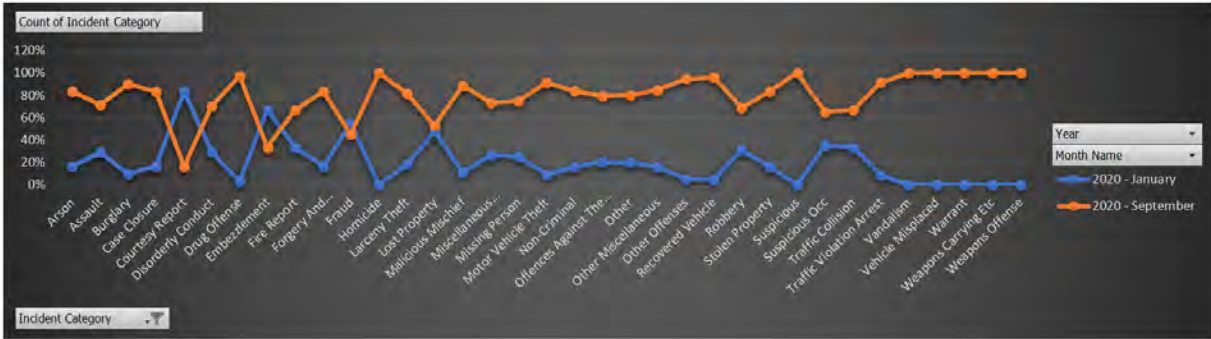
The image shows a Microsoft Excel spreadsheet with the following elements:

- Top Ribbon:** File, Home, Insert, Page Layout, Formulas, Data, Review, View, Add-ins, Help, Table Tools. The 'File' tab is highlighted with a red circle.
- Second Ribbon (Query):** File, Home, Insert, Page Layout, Formulas, Data, Review, View, Add-ins, Help, Table Design, Query. The 'Query' tab is highlighted in yellow, and the 'Refresh' button is highlighted with a yellow box.
- Third Ribbon (PivotTable Analyze):** File, Home, Insert, Page Layout, Formulas, Data, Review, View, Add-ins, Help, PivotTable Analyze, Design. The 'PivotTable Analyze' tab is highlighted in yellow, and the 'Refresh' button is highlighted with a yellow box.
- Worksheet:** A table with columns 'Incident Category', '2020 January', '2020 September', and '2020 Total'. The 'Incident Category' column is highlighted in green. The '2020 Total' column is highlighted in yellow.
- Chart:** A line chart titled 'Count of Incident Category' showing the percentage of incidents for various categories in 2020. The x-axis lists incident categories, and the y-axis shows percentages from 0% to 120%. The chart shows that 'Fire Report' and 'Fraud' have the highest percentages, both around 100%.



END-TO-END EXAMPLE – NEW RESULT

Incidents	2020		2020 Total
	January	September	
Arson	17%	83%	100%
Assault	29%	71%	100%
Burglary	10%	90%	100%
Case Closure	17%	83%	100%
Courtesy Report	83%	17%	100%
Disorderly Conduct	30%	70%	100%
Drug Offense	3%	97%	100%
Embezzlement	67%	33%	100%
Fire Report	33%	67%	100%
Forgery And Counterfeiting	17%	83%	100%
Fraud	55%	45%	100%
Homicide	0%	100%	100%
Larceny Theft	18%	82%	100%
Lost Property	47%	53%	100%
Malicious Mischief	11%	89%	100%
Miscellaneous Investigation	27%	73%	100%
Missing Person	25%	75%	100%
Motor Vehicle Theft	9%	91%	100%
Non-Criminal	16%	84%	100%
Offences Against The Family And Children	21%	79%	100%
Other	20%	80%	100%
Other Miscellaneous	16%	84%	100%
Other Offenses	5%	95%	100%
Recovered Vehicle	4%	96%	100%
Robbery	31%	69%	100%
Stolen Property	17%	83%	100%
Suspicious	0%	100%	100%
Suspicious Occ	35%	65%	100%
Traffic Collision	33%	67%	100%
Traffic Violation Arrest	8%	92%	100%
Vandalism	0%	100%	100%
Vehicle Misplaced	0%	100%	100%
Warrant	0%	100%	100%
Weapons Carrying Etc	0%	100%	100%
Weapons Offense	0%	100%	100%
Grand Total	18%	82%	100%



ADDITIONAL INFORMATION

LINKS

- ✓ Power Query documentation

<https://docs.microsoft.com/en-us/power-query>

- ✓ Power Query M Language documentation

<https://learn.microsoft.com/en-us/powerquery-m/>

BOOKS

- ✓ *M is for (DATA) Monkey (ch. 20)* by Adam Aspin (2022)
- ✓ *Pro Data Mashup for Power BI (ch. 14)* by Ken Puls and Miguel Escobar (2015)

NEXT WEBINAR

Introduction to Power Query M Formula Language

- ✓ *What is Power BI*
- ✓ *Why should we use Power BI*
- ✓ *Examples*
- ✓ *Where to start*

CONCLUSIONS & QUESTIONS

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