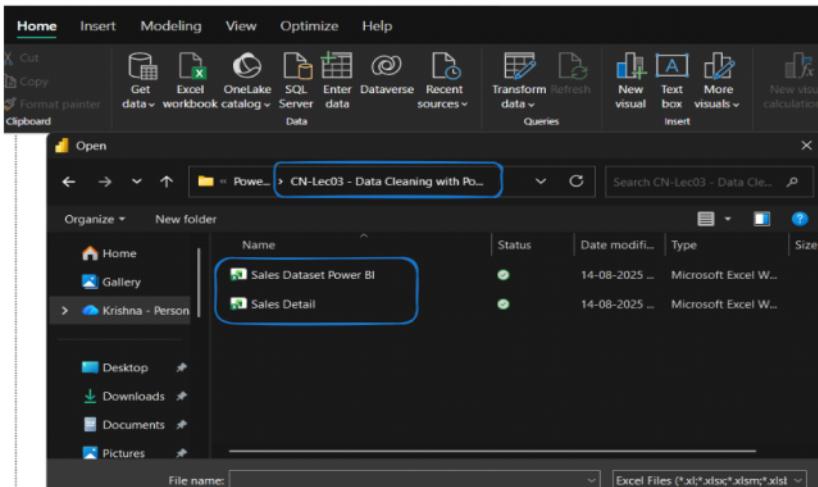
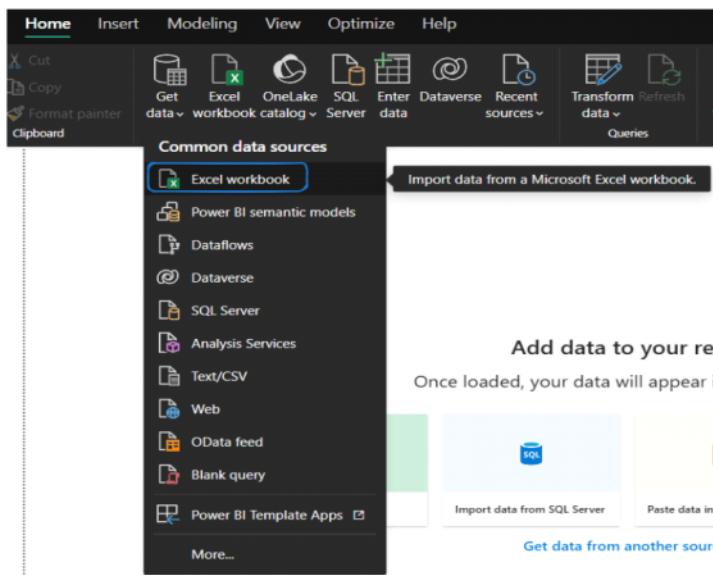


# CN-PowerBI-Lec03-Data Cleaning with Power BI

## Data Cleaning with Power BI



The screenshot shows the Power BI Navigator interface. On the left, there is a 'Display Options' section and a tree view of datasets: 'Sales Dataset Power BI.xlsx [2]', 'Customers', and 'Sales'. The 'Sales' node is expanded. On the right, there is a 'Sales' table preview with the following data:

Customer ID	Customer Region	Customer Age	Sales
1	North	49	309.38
2		10	57.71
3	North	47	686.95
4	South	11	1619.19
5	East	17	1005.9
6	null	23	174.65
7	null	21	825
8		27	250
9		44	9.03
10	null	10	255.84
11	North	abc	151.24
12	South		251.72
13	South	42	1139.43
14	North	12	575.36
15	null	45	18.06
16	null	30	299.85
17	null	35	54.89
18	West	50	479.04
19	null	42	1879.05
20		44	86.43

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

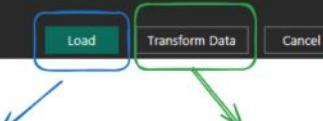
**Navigator**

Display Options

- Sales Dataset Power BI.xlsx [2]
  - Customers
  - Sales

**Sales**

Customer ID	Customer Region	Customer Age	Sales
1	North	49	309.38
2		10	57.71
3	North	47	686.95
4	South	11	1619.19
5	East	17	1005.9
6	null	23	174.65
7	null	21	825
8		27	250
9		44	9.03
10	null	10	255.84
11	North	abc	151.24
12	South	29	251.72
13	South	42	1139.43
14	North	12	575.36
15	null	45	18.06
16	null	30	299.85
17	null	35	54.89
18	West	50	479.04
19	null	42	1879.06
20		44	86.43



Untitled - Power Query Editor

Home Transform Add Column View Tools Help

Queries [2]

- Customers
- Sales

M-Code

```
= Table.TransformColumnTypes(#"Promoted Headers",{{"Customer ID", Int64.Type}, {"Customer Region", type text}, {"Customer Age", type any}, {"Sales", type any}})
```

Customer ID	Customer Region	Customer Age	Sales
1	North	49	309.38
2		10	57.71
3	North	47	686.95
4	South	11	1619.19
5	East	17	1005.9
6	null	23	174.65
7	null	21	825
8		27	250
9		44	9.03
10	null	10	255.84
11	North	abc	151.24
12	South	29	251.72
13	South	42	1139.43
14	North	12	575.36
15	null	45	18.06
16	null	30	299.85
17	null	35	54.89
18	West	50	479.04
19	null	42	1879.06
20		44	86.43

Query Settings

Properties

Applied Steps

- Source
- Navigation
- Promoted Headers
- Changed Type

Shows Table..

New Column

Transform Vs Add Column

Existing Column

Steps performed while cleaning the dataset

**Features:**

The screenshot shows the Power BI ribbon under the 'Transform' tab. Several features are highlighted with green and purple boxes and arrows pointing to them:

- Group By**: Located in the 'Table' section.
- Transpose**: Located in the 'Table' section.
- Merge Columns**: Located in the 'Text Column' section.
- Extract**: Located in the 'Text Column' section.
- Split Column**: Located in the 'Text Column' section.
- Format**: Located in the 'Text Column' section.
- Parse**: Located in the 'Text Column' section.
- Trigonometry**: A dropdown menu with options like Sine, Cosine, Tangent, etc.
- Rounding**: A dropdown menu with options like Round Up, Round Down, etc.
- Information**: A dropdown menu with options like Is Even, Is Odd, Sign, etc.

**Grouping [Categorical Value]**

**Transpose**

**Common Features**

The screenshot shows the Power BI ribbon under the 'Transform' tab. Several features are highlighted with blue and orange boxes and arrows pointing to them:

- Conditional Column**: Located in the 'General' section.
- Index Column**: Located in the 'General' section.
- Format**: Located in the 'General' section.
- Trigonometry**: A dropdown menu with options like Sine, Cosine, Tangent, etc.
- Rounding**: A dropdown menu with options like Round Up, Round Down, etc.
- Information**: A dropdown menu with options like Is Even, Is Odd, Sign, etc.

**New Column Pattern**

**If-else**

**Start with 0/1/custom**

The screenshot shows the Power BI ribbon under the 'View' tab. Several features are highlighted with yellow boxes and arrows pointing to them:

- Layout**: Under 'Query Settings'.
- Data Preview**: Under 'Query Settings'.
- Parameters**: Under 'Advanced'.

**Customer ID**

**Customer Region**

**Customer Age**

**Sales**

Category	Count	Percentage
Valid	100%	100%
Error	0%	0%
Empty	0%	0%

20 distinct, 20 unique

6 distinct, 2 unique

20 distinct, 20 unique

at least 1

Sports		
Cricket	Badminton	Cricket
	Volleyball	Hockey
Badminton	Cricket	
Volleyball	Kabaddi	Volleyball
Badminton		Golf
Cricket	BasketBall	Hockey
BasketBall	Kabaddi	BasketBall
Badminton	Football	Football
BasketBall	Cricket	
	Golf	

Distinct	8	Unique	2
Cricket	Badminton	Golf	exactly 1
Kabaddi	Volleyball	Hockey	
Golf			
Hockey			
BasketBall			
Football			

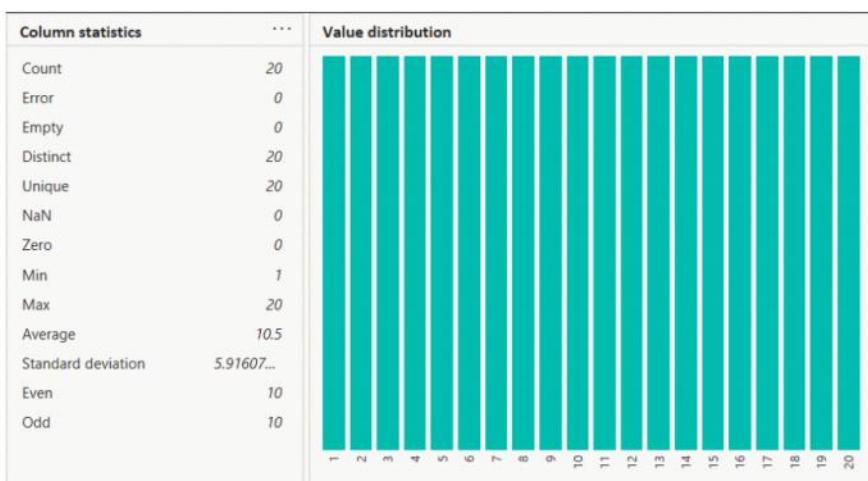
  

Cricket - 5
Badminton - 4
Kabaddi - 2
Volleyball - 3
Golf - 1
Hockey - 1
BasketBall - 3
Football - 2

Home      Transform      Add Column      View      Tools

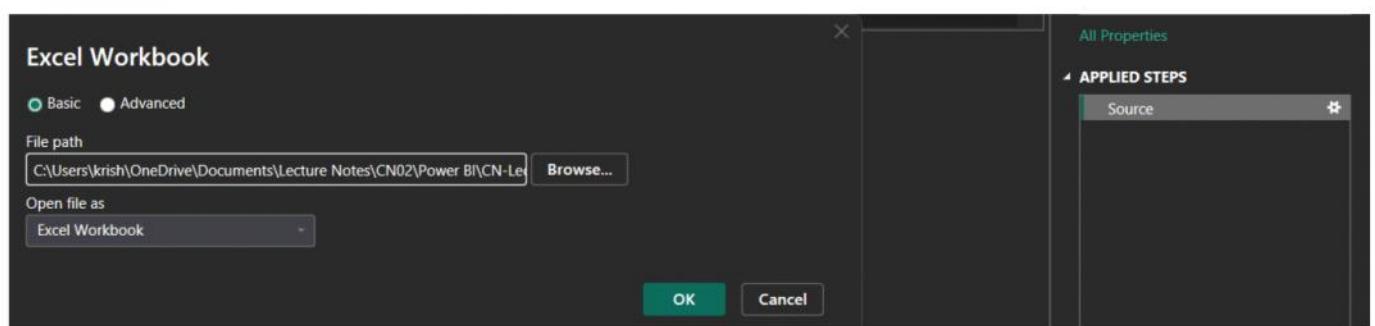
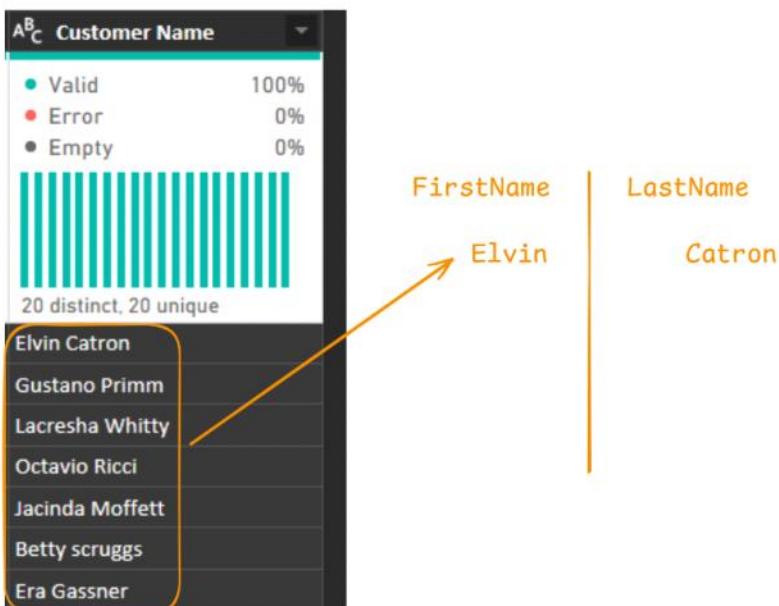
Query Settings     Monospaced     Column distribution  
 Formula Bar     Show whitespace     Column profile  
 Column quality

Layout      Data Preview



Pune@Maharashtra@India

City      State      Country

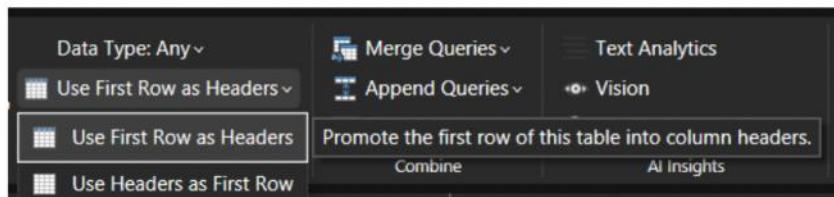


ABC 123 Column1 ABC 123 Column2

Category	Column1 Percentage	Column2 Percentage
Valid	100%	100%
Error	0%	0%
Empty	0%	0%

Customer ID Customer Name

1	Elvin Catron
2	Gustano Primmm
3	Lacresha Whitty
4	Octavio Ricci
5	Jacinda Moffett
6	Betty scruggs
7	Era Gassner
8	Laticia Crimi
9	Alberta Fabela
10	Taylor Pope



Use First Row as Headers ▾

Append Queries ▾

Vision

Combine Files

Azure Machine Le...

Demote the headers of this table to the first row.

ABC 123 Customer ID	ABC 123 Customer Name
• Valid	100%
• Error	0%
• Empty	0%
1 Elvin Catron	100% Valid
2 Gustano Primm	0% Error
3 Lacresha Whitty	0% Empty
4 Octavio Ricci	
5 Jacinda Moffett	
6 Betty scruggs	
7 Era Gassner	
8 Laticia Crimi	
9 Alberta Fabela	
10 Taylor Pogue	
11 Grisede Mariscal	
12 Sylvester Willbourn	
13 Ricky Cheshire	

APPLIED STEPS

- Source
- Navigation
- Promoted Headers

ABC 123 Customer ID	ABC 123 Customer Name
1.2 Decimal Number	Valid 100%
Fixed decimal number	Error 0%
Whole Number	Empty 0%
Percentage	
Date/Time	
Date	
Time	
Date/Time/Timezone	
Duration	
Text	
True/False	
Binary	
Using Locale...	
Laticia Crimi	
Alberta Fabela	
Taylor Pogue	

Customer Name

- 1.2 Decimal Number
- \$ Fixed decimal number
- 1 Whole Number
- % Percentage
- Date/Time
- Date
- Time
- Date/Time/Timezone
- Duration
- Text
- True/False
- Binary
- Using Locale...
- Laticia Crimi
- Alberta Fabela
- Taylor Pogue

123 Customer ID	ABC Customer Name
• Valid	100% Valid
• Error	0% Error
• Empty	0% Empty
20 distinct, 20 unique	20 distinct, 20 unique
1 Elvin Catron	100% Valid
2 Gustano Primm	0% Error
3 Lacresha Whitty	0% Empty
4 Octavio Ricci	
5 Jacinda Moffett	
6 Betty scruggs	
7 Era Gassner	
8 Laticia Crimi	
9 Alberta Fabela	
10 Taylor Pogue	
11 Grisede Mariscal	
12 Sylvester Willbourn	
13 Ricky Cheshire	
14 Karisa Oqundo	
15 Debbie Orone	
16 Loralee Widell	
17 Season Viers	
18 Juan Luker	
19 Shan texeria	
20 Yee Bordeau	

APPLIED STEPS

- Source
- Navigation
- Promoted Headers
- Changed Type

ABC 123 Column1	ABC 123 Column2	ABC 123 Column3	ABC 123 Column4
● Valid ● Error ● Empty	100% 0% 0%	67% 0% 33%	100% 0% 0%
Customer ID	Customer Region	Customer Age	Sales
1	North	49	309.38
2		10	57.71
3	North	47	686.95
4	South	11	1619.19
5	East	17	1005.9
6	null	23	174.65
7	null	21	825
8		27	250
9		44	9.03
10	null	10	255.84
11	North	abc	151.24
12	South	29	251.72
13	South	42	1139.43
14	North	12	575.36
15	null	45	18.06
16	null	30	299.85
17	null	35	54.89
18	West	50	479.04
19	null	42	1879.06

## Promoting Headers

A <sup>2</sup> <sub>3</sub> Customer ID	B <sup>2</sup> <sub>3</sub> Customer Region	C <sup>2</sup> <sub>3</sub> Customer Age	D <sup>2</sup> <sub>3</sub> Sales
 20 distinct, 20 unique	 6 distinct, 2 unique		
<span style="color: green;">● Valid</span> <span style="color: red;">● Error</span> <span style="color: black;">● Empty</span>	<span style="color: green;">● Valid</span> <span style="color: red;">● Error</span> <span style="color: black;">● Empty</span>	<span style="color: green;">● Valid</span> <span style="color: red;">● Error</span> <span style="color: black;">● Empty</span>	<span style="color: green;">● Valid</span> <span style="color: red;">● Error</span> <span style="color: black;">● Empty</span>
P.K	1 North	49	309.38
	2	10	57.71
	3 North	47	686.95
	4 South	11	1,619.19
	5 East	17	1,005.90
	6 null	23	174.65
	7 null	21	825.00
	8 Fill_Down	27	250.00
	9	44	9.03
	10 null	10	255.84
	11 North	Error	151.24
	12 South	29	251.72
	13 South	42	1,139.43
	14 North	12	575.36
	15 null	45	18.06
	16 null	30	299.85
	17 null	35	54.89
	18 West	50	479.04
	19 null	42	1,879.06
	20 null	44	86.43

'abc' = abc[XX]

**Replace Values**

Replace one value with another in the selected columns.

Value To Find: space  
Replace With: null

Advanced options:  
 Match entire cell contents  
 Replace using special characters  
 Insert special character...

OK Cancel

**Customer Region**

Valid: 65%  
Error: 0%  
Empty: 35%

6 distinct, 2 unique

Region	Value
North	North
South	South
East	East
North	null
South	null

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Filled Down

**Customer Region**

Valid: 100%  
Error: 0%  
Empty: 0%

4 distinct, 0 unique

**Untitled - Power Query Editor**

Home Transform Add Column View Tools Help

Data Type: Whole Number

Queries [2]

Customers Sales

Customer ID Customer Region Customer Age Sales

Valid: 100% Valid: 100% Valid: 100%  
Error: 0% Error: 0% Error: 5%  
Empty: 0% Empty: 0% Empty: 0%

20 distinct, 20 unique 4 distinct, 0 unique 20 distinct, 20 unique

Sum Minimum Maximum Median Average Standard Deviation Count Values Count Distinct Values

**Replace Errors**

Enter the value which will replace errors in the selected columns.

Value: 0

OK Cancel

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Filled Down
- Replaced Errors
- Calculated Average

## Replace Errors

Enter the value which will replace errors in the selected columns.

Value

29

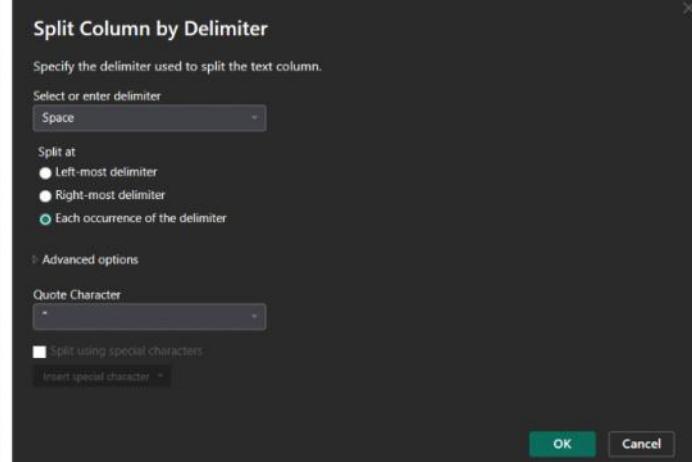
OK

Cancel

i23 Customer ID	A8c Customer Region	i23 Customer Age	\$ Sales
• Valid 100%	• Valid 100%	• Valid 100%	• Valid 100%
• Error 0%	• Error 0%	• Error 0%	• Error 0%
• Empty 0%	• Empty 0%	• Empty 0%	• Empty 0%
20 distinct, 20 unique	4 distinct, 0 unique	16 distinct, 12 unique	20 distinct, 20 unique
1 North		49	309.38
2 North		10	57.71
3 North		47	686.95
4 South		11	1,619.19
5 East		17	1,005.90
6 East		23	174.65
7 East		21	825.00
8 East		27	250.00
9 East		44	9.03
10 East		10	255.84
11 North		29	151.24
12 South		29	251.72
13 South		42	1,139.43
14 North		12	575.36
15 North		45	18.06
16 North		30	299.85
17 North		35	54.89
18 West		50	479.04
19 West		42	1,879.06
20 West		44	86.43

pe	Replace Values	Unpivot Columns
	Fill	Move
	Pivot Column	Convert to List
	Any Column	
.	TransformColumnTypes("#Promoted Headers",	
	A8c Customer Name	
%)	• Valid 100%	
%)	• Error 0%	
%)	• Empty 0%	
	20 distinct, 20 unique	
1	Elvin Catron	
2	Gustano Primm	
3	Lacresha Whitty	
4	Octavio Ricci	
5	Jacinda Moffett	
6	Betty scruggs	
7	Era Gassner	
8	Laticia Crimi	
9	Alberta Fabela	
10	Taylor Pogue	
11	Grisede Mariscal	
12	Sylvester Willbourn	

- Split Column ▾
- Format
- Parse ▾
- Any Column
- By Delimiter
- By Number of Characters
- By Positions
- By Lowercase to Uppercase
- By Uppercase to Lowercase
- By Digit to Non-Digit
- By Non-Digit to Digit



**Customer Name.1**

Elvin	Catron
Gustano	PriMM
Lacresha	Whitty
Octavio	Ricci
Jacinda	Moffett
Betty	scruggs
Era	Gassner
Laticia	Crimi
Alberta	Fabela
Taylor	Pogue
Grisede	Mariscal
Sylvester	Willbourn
Ricky	Cheshire
Karisa	Oquwndo
Debbie	Orone
Loralee	Widell
Season	Viers
Juan	Luker
Shan	texeria
Yee	Bordeau

**Customer Name.2**

Elvin	Catron
Gustano	PriMM
Lacresha	Whitty
Octavio	Ricci
Jacinda	Moffett
Betty	scruggs
Era	Gassner
Laticia	Crimi
Alberta	Fabela
Taylor	Pogue
Grisede	Mariscal
Sylvester	Willbourn
Ricky	Cheshire
Karisa	Oquwndo
Debbie	Orone
Loralee	Widell
Season	Viers
Juan	Luker
Shan	texeria
Yee	Bordeau

**fx** = Table.RenameColumns(#"Changed Type1", {"Customer Name.1", "Customer Name.2"})

**Rename the column**

Power BI ribbon toolbar:

- Data Type: Text
- Replace Values
- Unpivot Columns
- Detect Data Type
- Fill
- Move
- Rename (highlighted)
- Pivot Column
- Convert to List
- Split Column

**Customer ID**

Elvin	FirstName	LastName
Gustano	Valid	100%
Lacresha	Error	0%
Octavio	Empty	0%
Jacinda	Valid	100%
Betty	Error	0%
Era	Empty	0%
Laticia	Valid	100%
Alberta	Error	0%
Taylor	Empty	0%
Grisede	Valid	100%
Sylvester	Error	0%
Ricky	Empty	0%
Karisa	Valid	100%
Debbie	Error	0%
Loralee	Empty	0%
Season	Valid	100%
Juan	Error	0%
Shan	Empty	0%
Yee	Valid	100%
	Error	0%
	Empty	0%

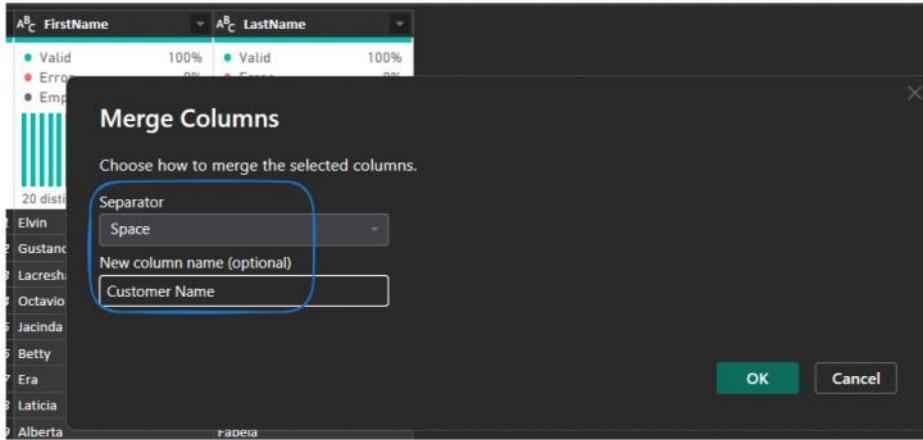
**fx** = Table.RenameColumns(#"Changed Type1", {"Customer Name.1", "FirstName"}, {"Customer Name.2", "LastName"})

**Merge Columns**

**.join()**

Power BI ribbon toolbar:

- Replace Values
- Unpivot Columns
- Move
- Pivot Column
- Convert to List
- Any Column
- Text Column
- Merge Columns (highlighted)
- Split Column
- Format
- Extract
- Parse



Column From Examples

Custom Column Invoke Custom Function Conditional Column Index Column Duplicate Column Merge Columns Extract Parse General Statistics Standard Scientific Information Date Time Duration Text Analytics Vision Azure Machine Learning From Number From Date & Time AI Insights

Queries [2]

Add Column From Examples

Enter sample values to create a new column (Ctrl+Enter to apply).  
Transform: Text.BeforeDelimiter([Customer Name], " ")

	Customer ID	Customer Name
1	1	Catron Elvin
2	2	Primm Gustano
3	3	Whitty Lacresha
4	4	Ricci Octavio
5	5	Moffett Jacinda
6	6	scruggs Betty
7	7	Gassner Era
8	8	Crimi Laticia
9	9	Fabela Alberta
10	10	Pogue Taylor
11	11	Mariscal Grisede
12	12	Willbourn Sylvester
13	13	Cheshire Ricky
14	14	Oquwndo Karisa
15	15	Orone Debbie
16	16	Widell Loralee
17	17	Viers Season
18	18	Luker Juan
19	19	texeria Shan
20	20	Bordeau Yee

FirstName  
Catron  
Primm  
Whitty  
Ricci  
Moffett  
scruggs  
Gassner  
Crimi  
Fabela  
Pogue  
Mariscal  
Willbourn  
Cheshire  
Oquwndo  
Orone  
Widell  
Viers  
Luker  
texeria  
Bordeau

Add Column From Examples

Enter sample values to create a new column (Ctrl+Enter to apply).  
Transform: Text.AfterDelimiter([Customer Name], " ")

	Customer ID	Customer Name	FirstName
1	1	Catron Elvin	Catron
2	2	Primm Gustano	Primm
3	3	Whitty Lacresha	Whitty
4	4	Ricci Octavio	Ricci
5	5	Moffett Jacinda	Moffett
6	6	scruggs Betty	scruggs
7	7	Gassner Era	Gassner
8	8	Crimi Laticia	Crimi
9	9	Fabela Alberta	Fabela
10	10	Pogue Taylor	Pogue
11	11	Mariscal Grisede	Mariscal
12	12	Willbourn Sylvester	Willbourn
13	13	Cheshire Ricky	Cheshire
14	14	Oquwndo Karisa	Oquwndo
15	15	Orone Debbie	Orone
16	16	Widell Loralee	Widell
17	17	Viers Season	Viers
18	18	Luker Juan	Luker
19	19	texeria Shan	texeria
20	20	Bordeau Yee	Bordeau

Last Name  
Elvin  
Gustano  
Lacresha  
Octavio  
Jacinda  
Betty  
Era  
Laticia  
Alberta  
Taylor  
Grisede  
Sylvester  
Ricky  
Karisa  
Debbie  
Loralee  
Season  
Juan  
Shan  
Yee

**Add Column From Examples**  
Enter sample values to create a new column (Ctrl+Enter to apply).  
Transform: Text.Combine({[FirstName], " - ", [LastName]})

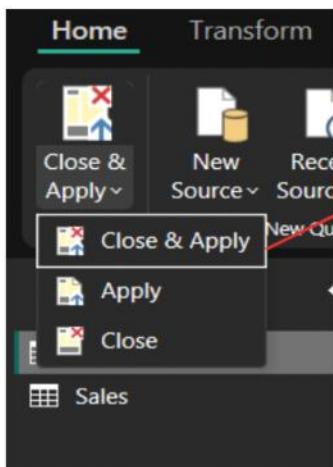
OK Cancel

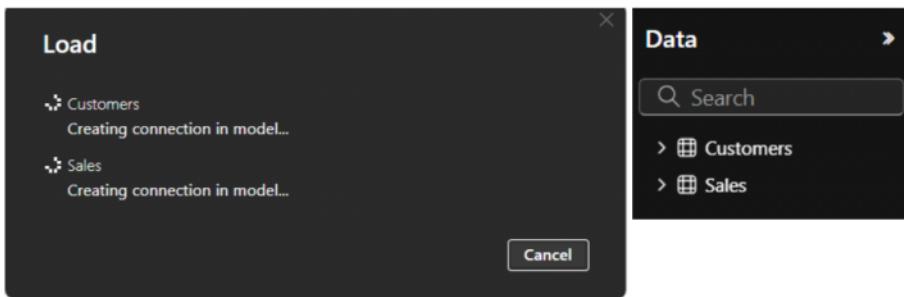
	Customer ID	Customer Name	FirstName	Last Name		Customer Full Name
1	1 Catron Elvin	Catron	Elvin			Catron - Elvin
2	2 Primm Gustano	Primm	Gustano			Primm - Gustano
3	3 Whitty Lacresha	Whitty	Lacresha			Whitty - Lacresha
4	4 Ricci Octavio	Ricci	Octavio			Ricci - Octavio
5	5 Moffett Jacinda	Moffett	Jacinda			Moffett - Jacinda
6	6 scruggs Betty	scruggs	Betty			scruggs - Betty
7	7 Gassner Era	Gassner	Era			Gassner - Era
8	8 Crimi Laticia	Crimi	Laticia			Crimi - Laticia
9	9 Fabela Alberta	Fabela	Alberta			Fabela - Alberta
10	10 Pogue Taylor	Pogue	Taylor			Pogue - Taylor
11	11 Mariscal Grisede	Mariscal	Grisede			Mariscal - Grisede
12	12 Willbourn Sylvester	Willbourn	Sylvester			Willbourn - Sylvester
13	13 Cheshire Ricky	Cheshire	Ricky			Cheshire - Ricky
14	14 Oquwndo Karisa	Oquwndo	Karisa			Oquwndo - Karisa
15	15 Orone Debbie	Orone	Debbie			Orone - Debbie
16	16 Widell Loralee	Widell	Loralee			Widell - Loralee
17	17 Viers Season	Viers	Season			Viers - Season
18	18 Luker Juan	Luker	Juan			Luker - Juan
19	19 texeria Shan	texeria	Shan			texeria - Shan
20	20 Bordeaux Yee	Bordeau	Yee			Bordeau - Yee

**Add Column Feature**

Customer ID	Customer Name	FirstName	Last Name	Customer Full Name
1	Valid 100%	Valid 100%	Valid 100%	Valid 100%
2	Error 0%	Error 0%	Error 0%	Error 0%
3	Empty 0%	Empty 0%	Empty 0%	Empty 0%
4	20 distinct, 20 unique			
5	1 Catron Elvin	Catron	Elvin	Catron - Elvin
6	2 Primm Gustano	Primm	Gustano	Primm - Gustano
7	3 Whitty Lacresha	Whitty	Lacresha	Whitty - Lacresha
8	4 Ricci Octavio	Ricci	Octavio	Ricci - Octavio
9	5 Moffett Jacinda	Moffett	Jacinda	Moffett - Jacinda
10	6 scruggs Betty	scruggs	Betty	scruggs - Betty
11	7 Gassner Era	Gassner	Era	Gassner - Era
12	8 Crimi Laticia	Crimi	Laticia	Crimi - Laticia
13	9 Fabela Alberta	Fabela	Alberta	Fabela - Alberta
14	10 Pogue Taylor	Pogue	Taylor	Pogue - Taylor
15	11 Mariscal Grisede	Mariscal	Grisede	Mariscal - Grisede
16	12 Willbourn Sylvester	Willbourn	Sylvester	Willbourn - Sylvester
17	13 Cheshire Ricky	Cheshire	Ricky	Cheshire - Ricky
18	14 Oquwndo Karisa	Oquwndo	Karisa	Oquwndo - Karisa
19	15 Orone Debbie	Orone	Debbie	Orone - Debbie
20	16 Widell Loralee	Widell	Loralee	Widell - Loralee
21	17 Viers Season	Viers	Season	Viers - Season
22	18 Luker Juan	Luker	Juan	Luker - Juan
23	19 texeria Shan	texeria	Shan	texeria - Shan
24	20 Bordeaux Yee	Bordeau	Yee	Bordeau - Yee

Column From Example





**Data**

Search

- Customers
  - Customer ID
  - Customer Name
- Sales
  - $\sum$  Customer Age
  - Customer ID
  - Customer Region
  - $\sum$  Sales

*Categorical Column*

*Numerical*

Customer ID | Customer Region | Customer Age | Sales

Customer ID	Customer Region	Customer Age	Sales
1	North	49	₹ 309.38
2	North	10	₹ 57.71
3	North	47	₹ 686.95
4	South	11	₹ 1,619.19
5	East	17	₹ 1,005.9
6	East	23	₹ 174.65
7	East	21	₹ 825
8	East	27	₹ 250
9	East	44	₹ 9.03
10	East	10	₹ 255.84
11	North	29	₹ 151.24
12	South	29	₹ 251.72
13	South	42	₹ 1,139.43
14	North	12	₹ 575.36
15	North	45	₹ 18.06
16	North	30	₹ 299.85
17	North	35	₹ 54.89
18	West	50	₹ 479.04
19	West	42	₹ 1,879.06
20	West	44	₹ 86.43

*Regional Settings*

File Home Help Table tools Column tools

Name Sales Format Currency Summarization Sum Data category Uncategorized Sort by column Sort

Data type Fixed decimal number % Auto

Structure Common currency symbols

Currency General

Customer ID	Customer Region	
1	North	\$ English (United States)
2	North	£ English (United Kingdom)
3	North	€ Euro (€ 123)
4	South	€ Euro (123 €)
5	East	¥ Chinese (PRC)
6	East	CHF French (Switzerland)
7	East	All currency symbols
8	East	¥ Chinese (PRC)
9	East	€ Euro (€ 123)
10	East	€ Euro (123 €)
11	North	Fdj Afar (Djibouti)
12	North	Nfk Afar (Eritrea)
13	South	Br Afar (Ethiopia)
14	North	\$ Afrikaans (Namibia)
15	North	R Afrikaans (South Africa)
16	East	FCFA Aghem (Cameroon)
17	North	GH₵ Akan (Ghana)

Customer ID	Customer Region	Customer Age	Sales
1	North	49	\$309.38
2	North	10	\$57.71
3	North	47	\$686.95
4	South	11	\$1,619.19
5	East	17	\$1,005.90
6	East	23	\$174.65
7	East	21	\$825.00
8	East	27	\$250.00
9	East	44	\$9.03
10	East	10	\$255.84
11	North	29	\$151.24
12	South	29	\$251.72
13	South	42	\$1,139.43
14	North	12	\$575.36
15	North	45	\$18.06
16	North	30	\$299.85
17	North	35	\$54.89
18	West	50	\$479.04
19	West	42	\$1,879.06
20	West	44	\$86.43

1:1 Cardinality [Relationship]

