

# Introduction To Power BI - Lecture 1

## Introduction To Power BI

- MS Excel , SQL
- Awesome Project [Resume].
- Interview [DAX , Data Modelling]

Introduce The Power BI -  
USER Interface.

- Settings might be change
  - Power BI - version.
- Consistent
- Adventure Works - Bike Store

Analyst

Insights/  
Patterns

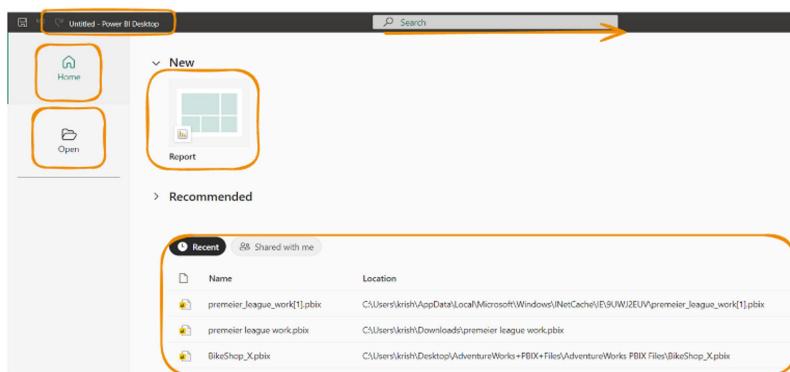
Prediction

Role of Analyst

Dashboard /  
Visualization Report

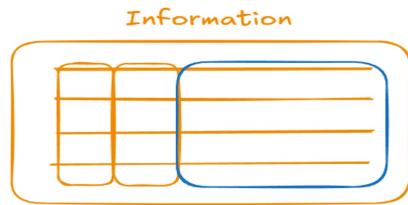
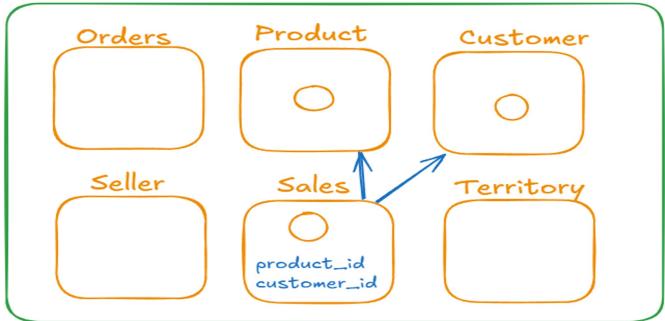
Training a model.

ML  
DL  
Advance Technology



SHARK TANK

### Schema [Database] [Amazon]



Redundant  
Less Efficient.  
High Computational.



**1 : 1 Relationship**  
**1 : \* Relationship**  
**\* : 1 Relationship**  
**\* : \* Relationship**

Power BI [Dimension Table Vs Fact Table]

---- Rule of Normalization.

[Reducing the redundant data]

Product Table

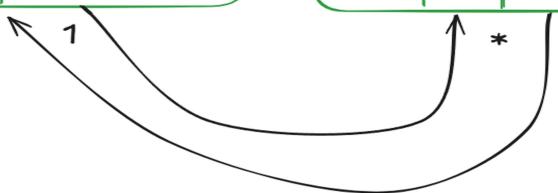
Product ID [P.K]	
1	

Sales Record

Prd.ID	Cus.ID	Quantity
[F.K]	[F.K]	Product Price
*	*	

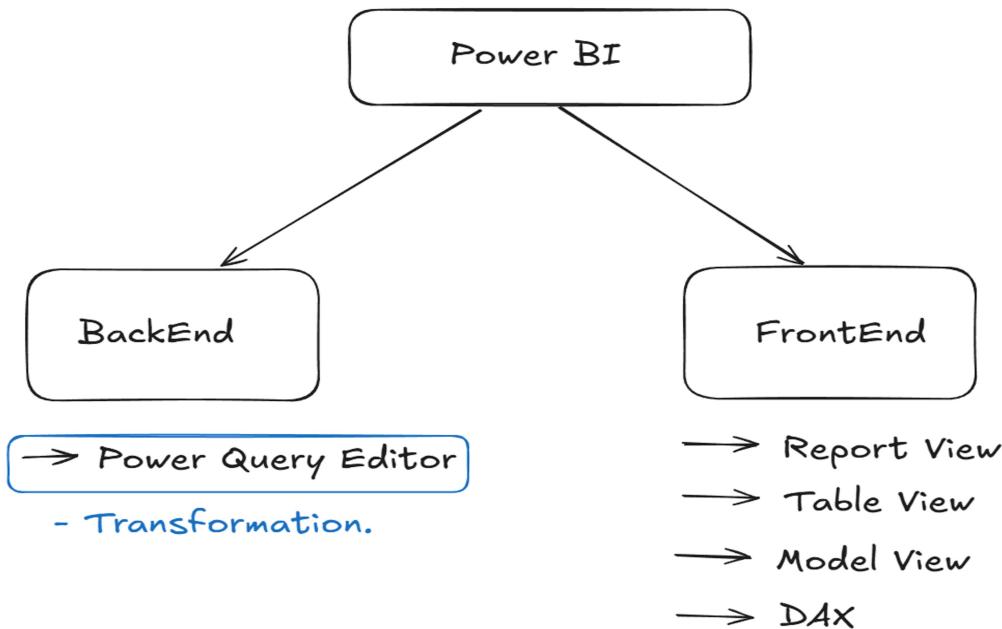
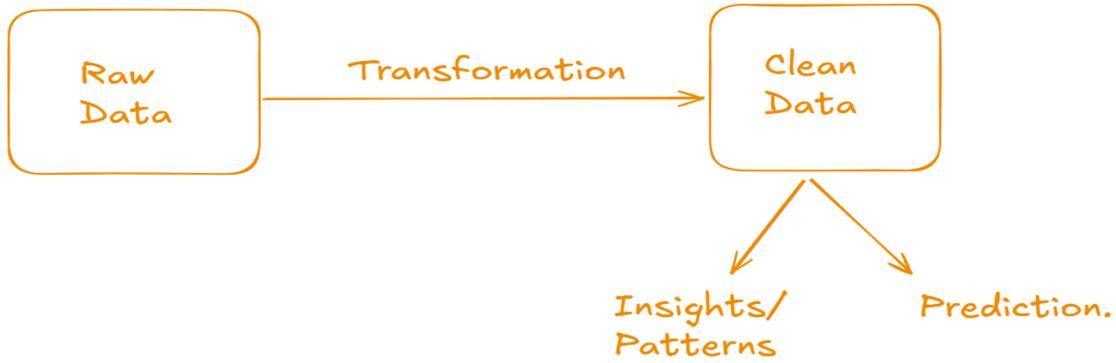
Customer Table

Customer ID [P.K]	



1 : \* Relationship [Cardinality]

\* : 1 Relationship [Cardinality]



## What is POWER BI

Microsoft Power BI is a self-service business intelligence platform, which includes both desktop and web-based applications for connecting, modeling, and visualizing data.



Microsoft Power BI

# FEATURE OF POWER BI?

## 1. Connect, transform and load millions of rows of data

- Access data from virtually anywhere (database tables, flat files, web, cloud services, folders, etc.), and create fully automated workflows to extract, transform and load data for analysis

## 2. Build relational models to blend data from multiple sources

- Create table relationships to analyze holistic performance across an entire relational data model

## 3. Define complex calculations using Data Analysis Expressions(DAX)

- Enhance datasets and enable advanced analytics with powerful and portable DAX expressions

## 4. Bring data to life with interactive reports and dashboards

- Build professional-quality reports and dashboards with best-in-class visualization tools

## 5. Develop a versatile, in-demand skill set

- Power BI is the industry leader in self-service BI, and the skills you build in this course will be highly transferrable

# Why We Use Power BI



## 1. Data Visualization:

- Power BI helps transform raw data into interactive and visually appealing reports and dashboards.  
It makes complex data easy to understand.

## 2. Integration:

- Power BI integrates seamlessly with various data sources like Excel, SQL Server, cloud services, and more, allowing you to consolidate and analyze data from different platforms.

## 3. Business Intelligence:

- With Power BI, you can gain insights into your business performance, track key metrics, and make data-driven decisions..

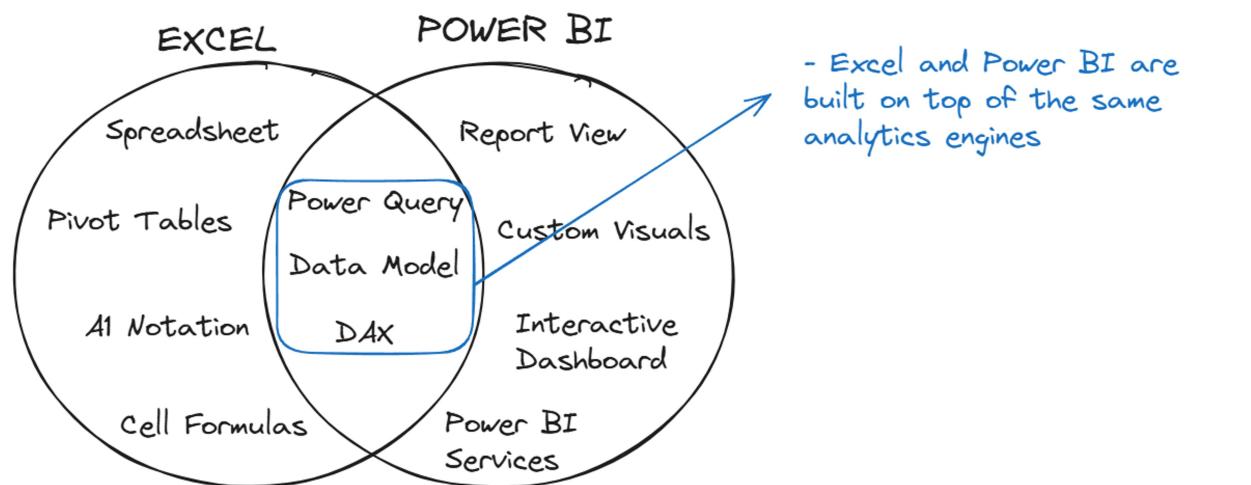
## 4. Real-time Data:

- You can connect to real-time data sources to ensure your reports and dashboards reflect the most up-to-date information.

## 5. User-Friendly Interface

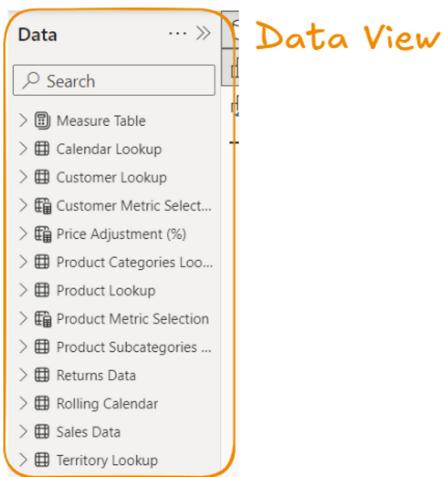
- The intuitive interface makes it accessible for users of all skill levels, from beginners to advanced analysts.

## EXCEL VS. POWER BI



- Excel and Power BI are built on top of the same analytics engines

- Power BI takes the same data transformation and modeling capabilities and adds powerful visualization and publishing tools
- Transitioning is easy; you can import an entire data model directly from Excel!

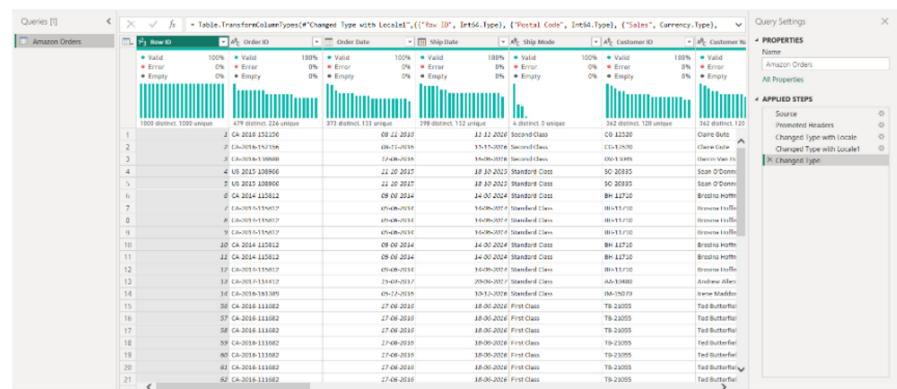


# Power BI Work Flow :

Data is loaded & transformed in the Power Query Editor



Data models are configured in the Model View

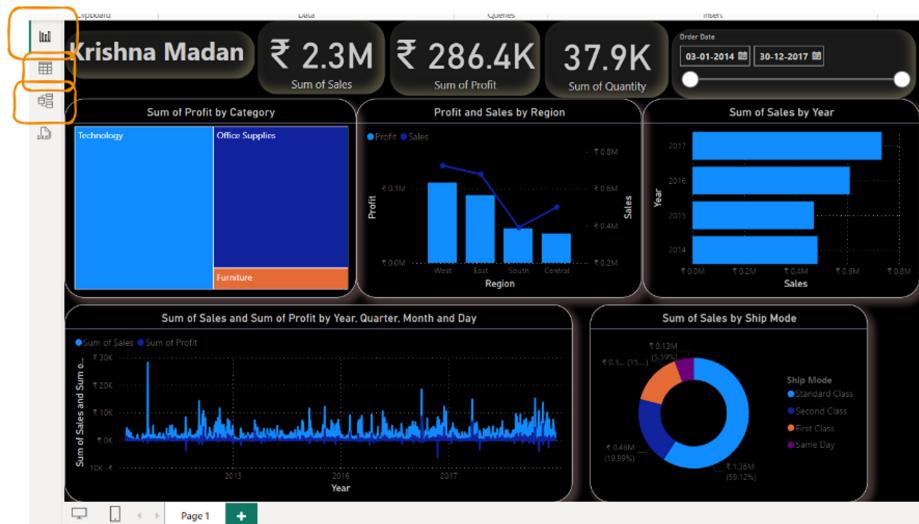


Power Query Editor - Backend

Table features & calculations are added in the Data View



Visuals & reports are designed in the Report View



Front End

## CONNECTING & SHAPING DATA

In this section we'll connect to source files and cover some of the most common techniques for extracting, cleaning, and shaping data to prepare it for modeling and analysis.

### TOPICS WE'LL COVER:

1. Intro to Power Query

2. The Query Editor

3. Data QA & Profiling

4. Calendar Tools

5. Data Connectors

6. Connection Modes

7. Table Transformations

8. Combining Queries

### GOALS FOR THIS SECTION:

- Explore Power BI's query editor and understand the role that Power Query plays in the larger BI workflow
- Introduce different types of connectors and connectivity modes available for getting data into Power BI
- Review tools for checking data quality and key profiling metrics like column distribution, empty values, errors and outliers
- Transform tables using text, numerical and date/time tools, pivot and group records, and create new conditional columns
- Practice combining, modifying and refreshing queries

## FRONT-END VS. BACK-END

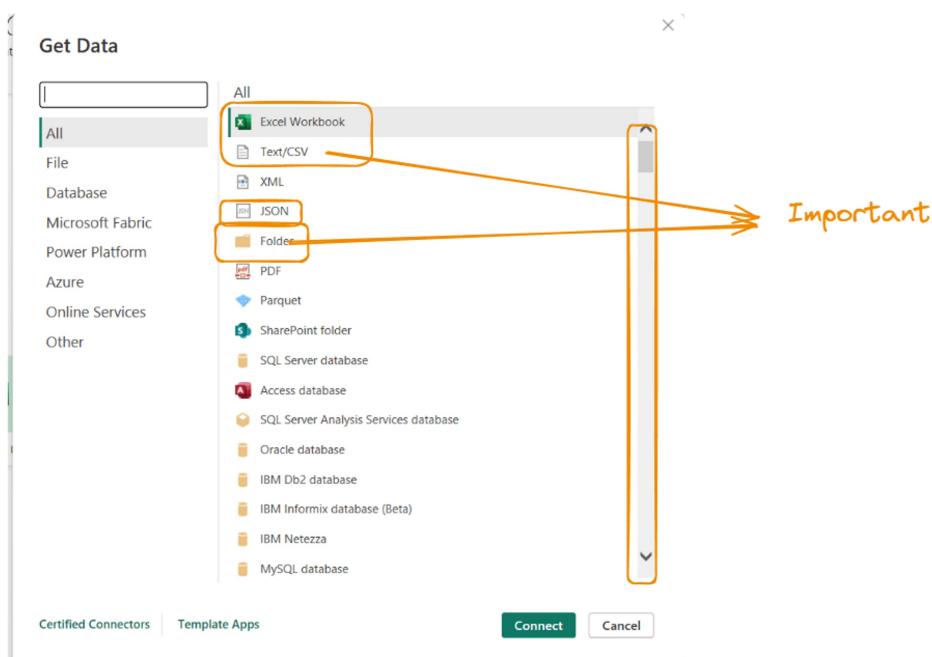
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- Power BI Desktop essentially has two distinct environments: a front-end and a back-end

- The front-end includes the Data, Model & Report views, where most of the modeling, analysis and visualization takes place
- The back-end includes the Power Query Editor, where raw data is extracted, transformed, and loaded to the front-end (ETL)

BACK-END	FRONT-END
<ul style="list-style-type: none"><li>• Connect &amp; extract data using pre-built connectors</li><li>• Profile &amp; QA the data to explore, clean and prepare it for modeling and analysis</li><li>• Transform &amp; shape tables to add new features, modify values, group records, or sort and filter columns</li><li>• Merge or append queries to join and combine them prior to loading to the front-end</li></ul>	<ul style="list-style-type: none"><li>• Build data models by creating table relationships between primary and foreign keys</li><li>• Add calculated measures &amp; columns using Data Analysis Expressions (DAX)</li><li>• Design reports to visualize the data and create interactive, dynamic dashboards</li><li>• Publish &amp; share your Power BI workbooks using Power BI Service (cloud application)</li></ul>

## TYPES OF DATA CONNECTORS



## POWER QUERY EDITOR

The screenshot shows the Power Query Editor interface. At the top, the ribbon includes File, Home, Insert, Modeling, View, Optimize, Help, and External Tools. The 'External Tools' tab is highlighted with an orange box. Below the ribbon is the 'Query Editing Tools' section, which includes icons for Transform, Add Columns, View, Tools, and Help. The main area shows a table with columns: Customer Key, Prefix, First Name, Last Name, Birth Date, Gender, and Marital Status. The 'Customer' query is selected in the Queries pane on the left. The 'Applied Steps' pane on the right shows steps like 'Removed Columns'. The 'Formula Bar' at the top right contains M code: = Table.RemoveColumns(#"Filtered Rows",{"Customer"}). Arrows point from labels to specific parts of the interface: 'Queries Pane' points to the list of queries; 'Table Name & Properties' points to the 'Name' field in the 'Properties' section; and 'Applied Steps' points to the 'Applied Steps' pane.

## Practical Approach :

### Step1 : Download the data from Github

Provide the folder Name

AdventureWorks Images  
Sales Data  
AdventureWorks Calendar Lookup  
AdventureWorks Customer Lookup  
AdventureWorks Product Categories L...  
AdventureWorks Product Lookup  
AdventureWorks Product Subcategor...  
AdventureWorks Returns Data  
AdventureWorks Sales Data 2020  
AdventureWorks Sales Data 2021  
AdventureWorks Sales Data 2022  
AdventureWorks Territory Lookup  
Date Table (UK) - Sheet1  
Product Category Sales (Unpivot Dem...)

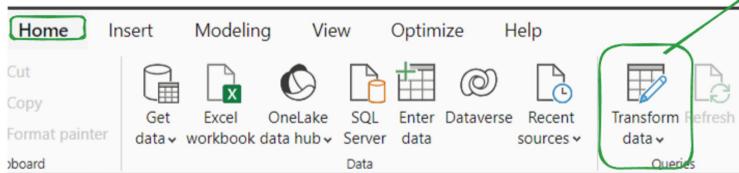
Folder - Dataset

extract using winRAR.

Name	Date modified	Type	Size
Today			
Product Category Sales (Unpivot Dem...)	09-11-2024 10:07	Microsoft Excel Co...	1 KB
AdventureWorks Calendar Lookup	09-11-2024 10:07	Microsoft Excel Co...	11 KB
AdventureWorks Customer Lookup	09-11-2024 10:07	Microsoft Excel Co...	1,849 KB
AdventureWorks Product Categories L...	09-11-2024 10:07	Microsoft Excel Co...	1 KB
AdventureWorks Product Lookup	09-11-2024 10:07	Microsoft Excel Co...	57 KB
AdventureWorks Product Subcategor... AdventureWorks Returns Data	09-11-2024 10:07	Microsoft Excel Co...	1 KB
AdventureWorks Sales Data 2020	09-11-2024 10:07	Microsoft Excel Co...	36 KB
AdventureWorks Sales Data 2021	09-11-2024 10:07	Microsoft Excel Co...	122 KB
AdventureWorks Sales Data 2022	09-11-2024 10:07	Microsoft Excel Co...	1,102 KB
AdventureWorks Territory Lookup	09-11-2024 10:07	Microsoft Excel Co...	1 KB
Date Table (UK) - Sheet1	09-11-2024 10:07	Microsoft Excel Co...	1 KB
AdventureWorks Images	09-11-2024 10:07	File folder	
Lecture Notes	09-11-2024 10:07	File folder	
Sales Data	09-11-2024 10:07	File folder	

## Step 2 : Click on Transform Data.

Power Query Editor



We can import the data inside Power Query Editor.

Else we can directly import it from Front End.

The screenshot shows the Power BI ribbon with the 'File' tab selected. On the left, there's a sidebar with options like 'Excel Workbook', 'SQL Server', 'Analysis Services', 'Text/CSV', 'Web', 'OData feed', 'Blank Query', and 'More...'. In the center, under 'Common data sources', 'Text/CSV' is selected. At the bottom, a file browser window is open, showing a folder structure for 'AdventureWorks Raw Data'. Inside, several CSV files are listed, with 'AdventureWorks Calendar Lookup.csv' being selected. The 'Open' button at the bottom of the file dialog is highlighted with a green box.

AdventureWorks Calendar Lookup.csv

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

Column1
Date
2020-01-01
2020-01-02
2020-01-03
2020-01-04
2020-01-05
2020-01-06
2020-01-07
2020-01-08
2020-01-09
2020-01-10
2020-01-11
2020-01-12
2020-01-13
2020-01-14
2020-01-15
2020-01-16
2020-01-17
2020-01-18
2020-01-19
2020-01-20

Extract Table Using Examples Load Transform Data Cancel

Front End

Power Query Editor

AdventureWorks Calend...

Column1

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

913 distinct, 913 unique

Column1

913 (100%) Distinct | 913 (100%) Unique

Remove Duplicates ...

7	2020-01-06
8	2020-01-07
9	2020-01-08
10	2020-01-09
11	2020-01-10
12	2020-01-11

Rename the table

◀ PROPERTIES

Name  
Calendar Lookup

A <sup>B</sup> <sub>C</sub> Column1	
● Valid	100%
● Error	0%
● Empty	0%
913 distinct, 913 unique	
1	Date
2	2020-01-01
3	2020-01-02
4	2020-01-03
5	2020-01-04
6	2020-01-05
7	2020-01-06
8	2020-01-07
9	2020-01-08
10	2020-01-09

Column Profile , Column Distribution.

Transform   Add Column   View   Tools

Ir  Monospaced  Column distribution  
 Show whitespace  Column profile  
 Column quality

Data Preview

A<sup>B</sup><sub>C</sub> Column1

Valid	100%
● Error	0%
● Empty	0%
913 distinct, 913 unique	

M-Code

```
= Csv.Document(File.Contents("C:\Users\krish\Desktop\AdventureWorks Raw Data\AdventureWorks Calendar Lookup.csv"),[Delimiter=",", Columns=1, Encoding=1252, QuoteStyle=QuoteStyle.None])
```

Krishna

◀ PROPERTIES

Name  
Calendar Lookup

All Properties

◀ APPLIED STEPS

Source

Home   Transform   Add Column   View   Tools   Help

New Source Recent Sources Enter Data Data source settings Manage Parameters Refresh Preview Advanced Editor Choose Columns Remove Columns Keep Rows Remove Rows Reduce Rows Sort Split Column Group By Data Type: Text Use First Row as Headers

A <sup>B</sup> <sub>C</sub> Column1	
● Valid	100%
● Error	0%
● Empty	0%
913 distinct, 913 unique	
1	Date
2	2020-01-01
3	2020-01-02
4	2020-01-03

Promote Headers

The screenshot shows the Power BI Data view interface. On the left, there's a sidebar with various data types: Decimal Number, Fixed decimal number, Whole Number, Percentage, Date/Time, Date, Time, Date/Time/Timezone, Duration, Text, True/False, and Binary. The 'Date' type is selected and highlighted with an orange box. In the center, the 'APPLIED STEPS' section lists 'Source', 'Promoted Headers', and 'Changed Type', also highlighted with an orange box. Below this is a context menu with options: Close & Apply (highlighted with an orange box), New, Source, Close & Apply, Apply, Close, and Calendar Lookup. An orange arrow points from the 'Close & Apply' option to the right. To the right, the main Data view shows a search bar and a list item 'Calendar Lookup'. A vertical toolbar on the far right contains icons for Data, New, Source, and other operations.

This screenshot shows the Power BI Frontend. At the top, there's a date picker set to 'Date' showing dates from January 1 to January 10, 2020. Below it is a data view pane containing a table with columns 'Date' and 'DayName'. The table shows the days of the week for January 2020. To the right, there's another data view pane titled 'Data' with a search bar and a list item 'Calendar Lookup'.

This screenshot shows the Power BI Frontend again. It displays a card for 'Calendar Lookup' with a 'Date' field. To the right, the 'Properties' pane is open, showing settings for 'Cards': 'Show the database in the header when applicable' (No selected) and 'Show related fields when card is collapsed' (Yes selected). Below the properties is another data view pane with a search bar and a list item 'Calendar Lookup'.