**INFS5700**

**Introduction to Business Analytics**

Week 4: Data Exploration and Visualization 1

(T2 2022)

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# Agenda

- Recap on Week 3 topic

- Introduce Power BI – Components, Workflow, and Building Blocks

- Demo with Power BI – Power Query Editor & DAX

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# An simple approach to build a Good Chart

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Understand

Create

Refine

Present and Practice

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**Week 3**

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# Refine to Impress

1. To make charts feel **neat** or **clean**, focus on design **structure** and **hierarchy**

2. For charts that just make sense or **feel instantly understood**, focus on **design clarity**

3. To make charts that look **elegant** or **beautiful**, focus on **design simplicity**

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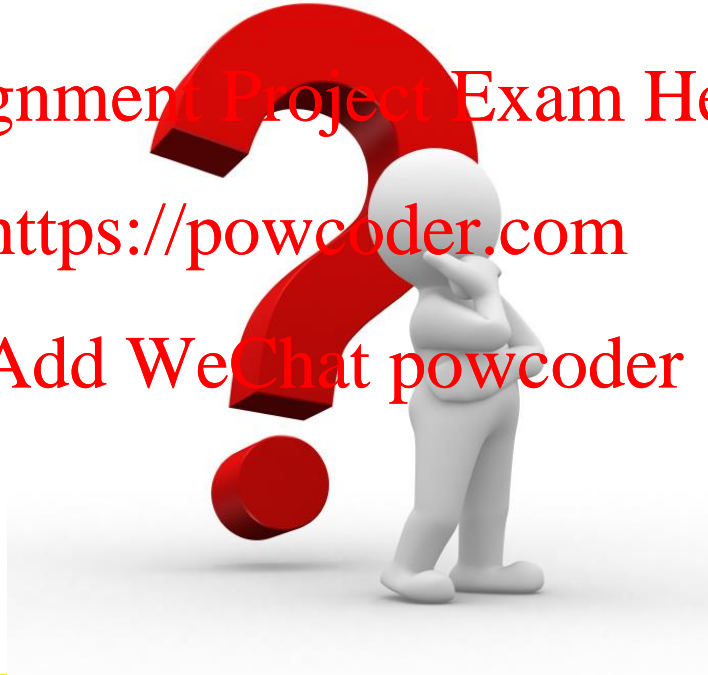Business School

# Refine to Persuade

1. Hone the **main idea**
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2. Make it **stand out**
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3. **Adjust** what's around it
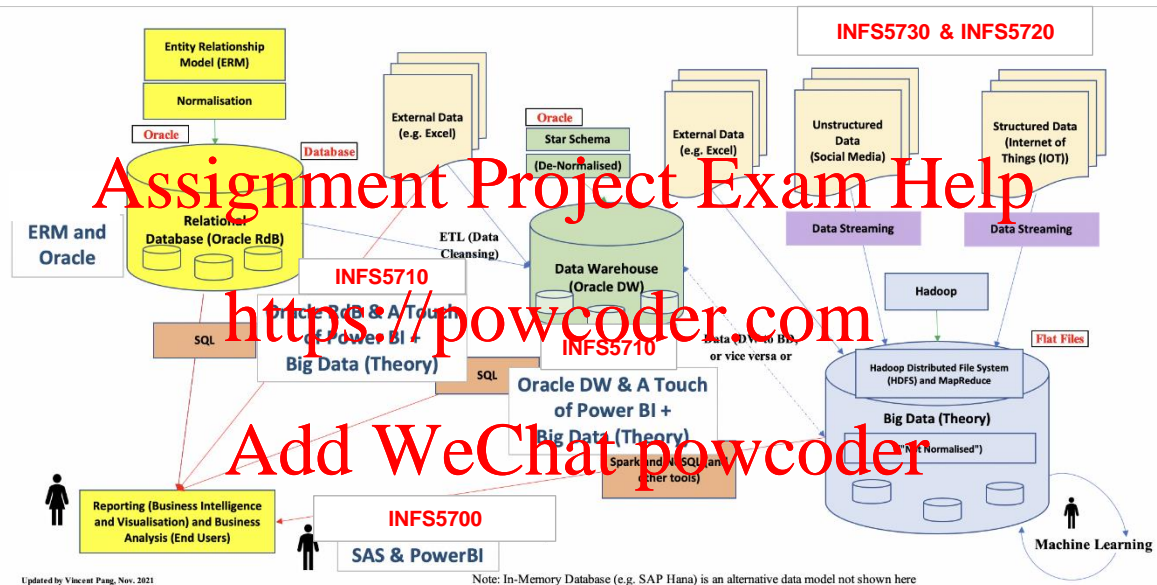
# Persuasion or Manipulation

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# The Data Analytics Eco-system



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Entity Relationship Model (ERM)

Normalisation

Oracle

Database

External Data (e.g. Excel)

Oracle

Star Schema

(De-Normalised)

External Data (e.g. Excel)

Unstructured Data (Social Media)

Structured Data (Internet of Things (IOT))

ERM and Oracle

Relational Database (Oracle RdB)

ETL (Data Cleansing)

Data Warehouse (Oracle DW)

Data Streaming

Data Streaming

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Hadoop

SQL

Oracle RdB & A Touch of Power BI + Big Data (Theory)

SQL

Data DW to Big or vice versa or

INFS5710

Flat Files

Hadoop Distributed File System (HDFS) and MapReduce

Oracle DW & A Touch of Power BI + Big Data (Theory)

Big Data (Theory)

("Not Normalised")

Spark and N SQL an ther tools)

Reporting (Business Intelligence and Visualisation) and Business Analysis (End Users)

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SAS & PowerBI

Machine Learning

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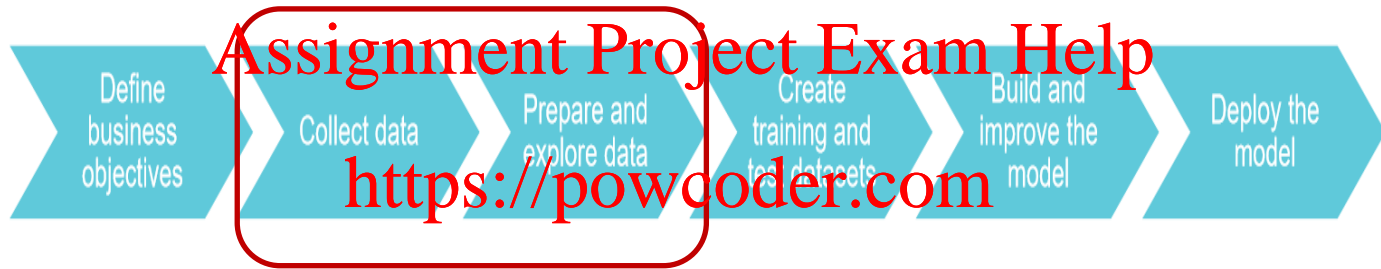Add WeChat powcoder

Updated by Vincent Pang, Nov. 2021

Prepared by Vincent Pang, Feb. 2021

Note: In-Memory Database (e.g. SAP Hana) is an alternative data model not shown here

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# How Power BI Help With the Analytics Process



Define business objectives → Collect data → Prepare and explore data → Create training and test datasets → Build and improve the model → Deploy the model

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Power BI

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# ETL Framework for Data Methods

1. **Extract**
- Pulling data from original sources (e.g., SQL, CRM, flat files, Email, Web pages)
- Array of connector options
2. **Transform**
- Data cleaning (e.g., filtering rows, splitting columns, change data types and format, etc.)
- Data integration (e.g., adding lock-up keys, joining tables, aggregating data, etc.)
- Data enrichment (e.g., create calculated columns, dynamic tables, etc.)
3. **Load**
- Power Query loads extracted and transformed data into the Power BI interface

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# ETL Framework for Data Methods



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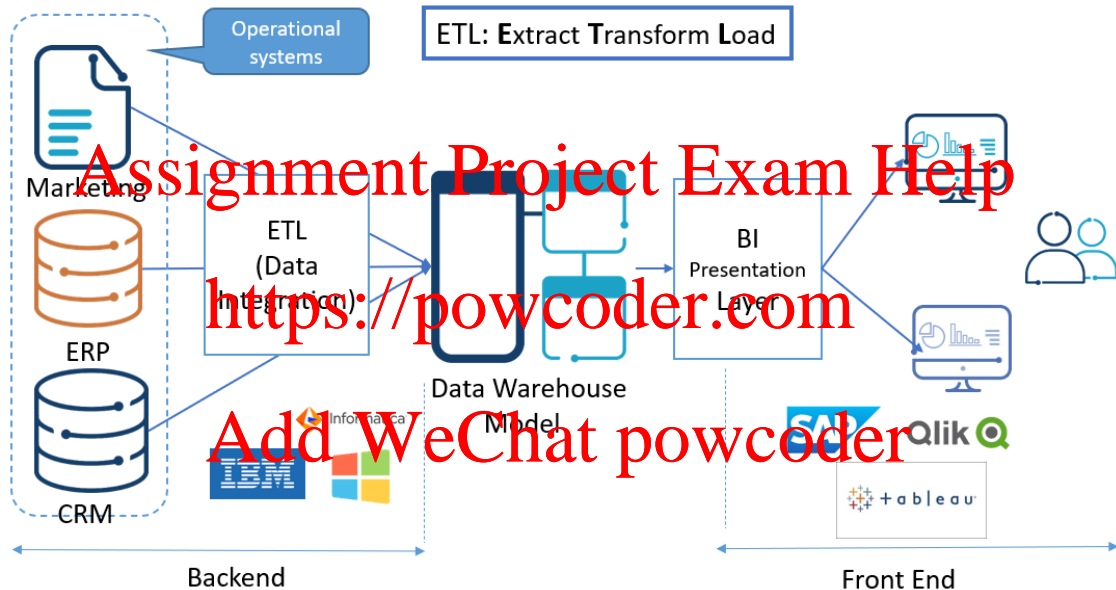
# What is Power BI?

- A collection of software services, apps, and connectors that work together to turn data into interactive insights.
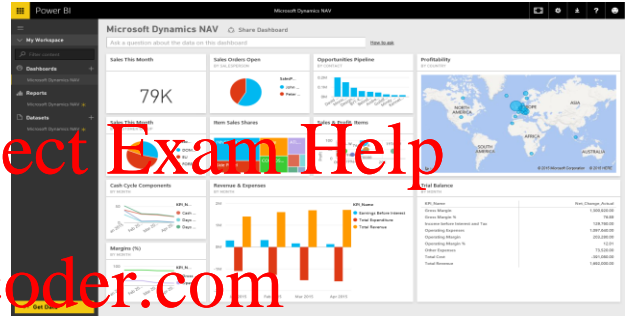
- Access to all data, wherever it may live (e.g., Excel, cloud-based or on-premises data warehouses, Web page)

- Suitable for power users

# Power BI Component

- Power BI Desktop

- Power BI Service (Power BI.com)

- Power BI Mobile

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Power BI Desktop

Power BI service

(Source: Microsoft)

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# Power BI Desktop

- An authoring tool used to create Power BI models and reports

- It enables you to:
  - Connect to data, including multiple data sources
  - Shape the data with queries that build insightful, compelling data models
  - Use the data models to create visualizations and reports

Get Data

Model Data

Create Visualizations and Reports

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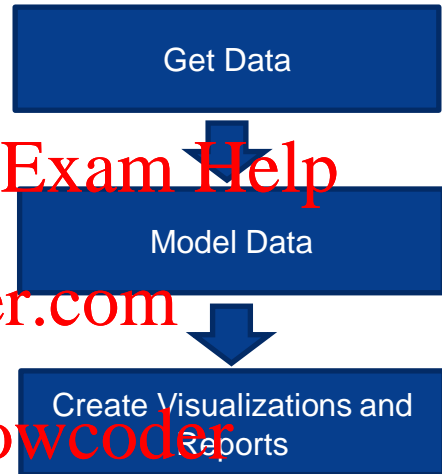
# Power BI Desktop

- Two important Power BI engines

  ➢ Power Query Editor

  ➢ Data Modelling (relationship + DAX)
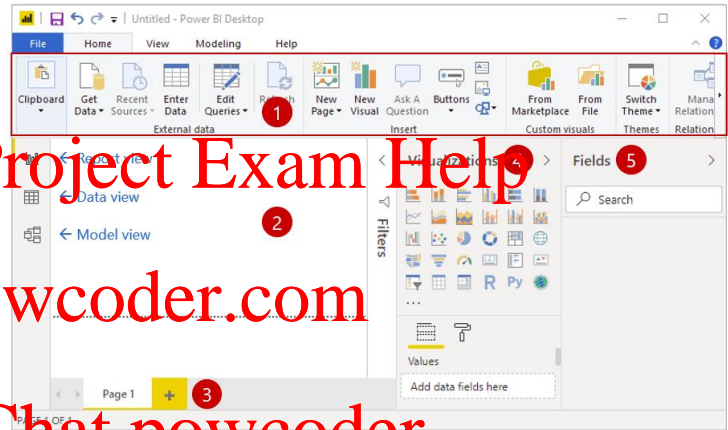
# Power BI Desktop – Power Query Editor

- Transform data into a reporting friendly format

- Remove and cleanse dirty data

- Merge and combine different data sources

- Automate



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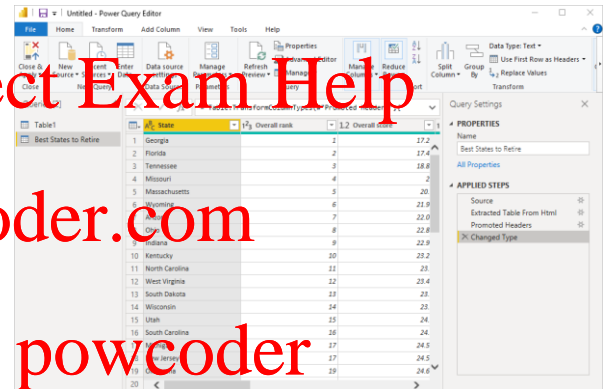
# Power BI Desktop – Data Modelling

- Creating relationship between tables or data sources

- Perform DAX (Data Analysis Expressions) calculation

- Create Hierarchies

- Categorize data
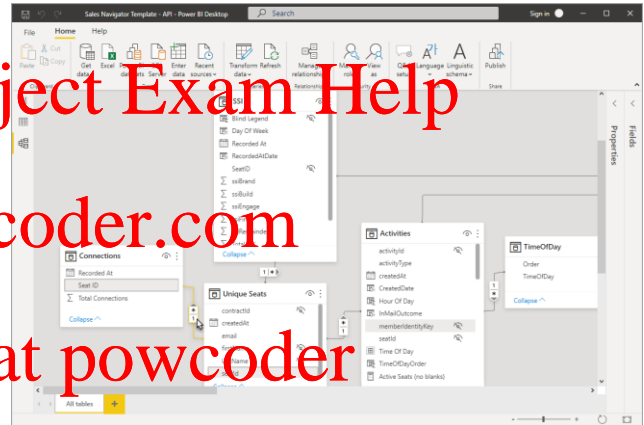
# Workflow in Power BI

1. Bring data into Power BI Desktop, and create a report.

2. Publish to the Power BI service, where you can create new visualizations or build dashboards.

3. Share dashboards with others, especially people who are on the go.

4. View and interact with shared dashboards and reports in Power BI Mobile apps.



**Power BI Desktop**
PC application for gathering, transforming, and publishing your data

**Power BI service**
Online SaaS (*Software as a Service*) for business analytics and visualization

Data

publish

Share

Create

Browser & mobile apps
(virtually all platforms)

☑ Launch and explore UI
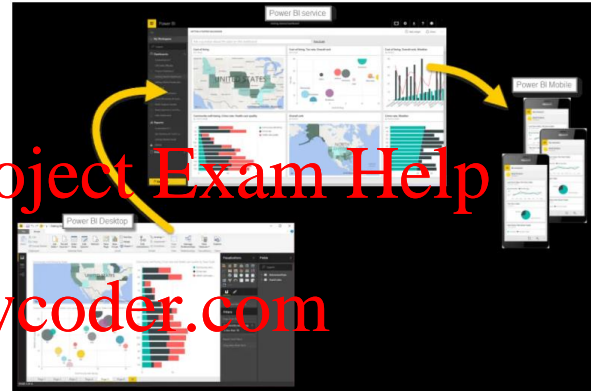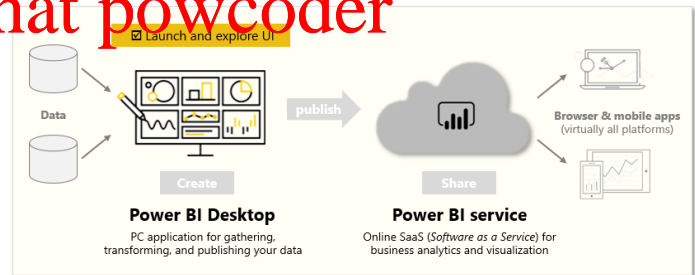
# Workflow in Power BI & Power BI tools

**Get Data**
- Power BI Service
- Power BI Desktop

**Model Data**
- Power BI Desktop

**Create Visualizations and Reports**
- Power BI Service
- Power BI Desktop

**Share with Your Team**
- Power BI Service
- Power BI mobile apps

# Building Blocks of Power BI

- Visualizations
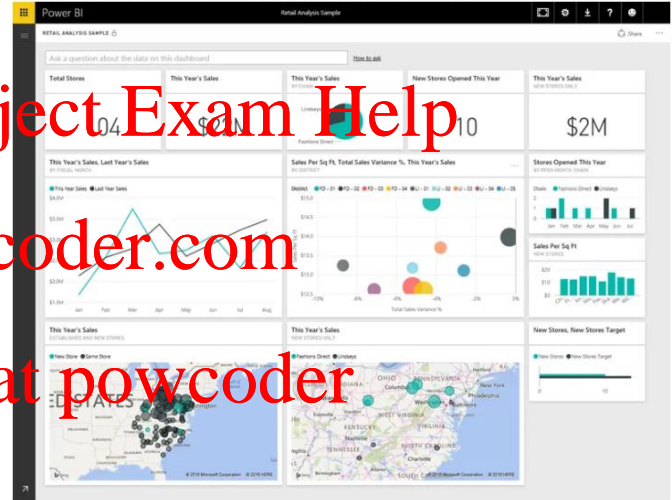- Datasets
- Reports
- Dashboards
- Tiles
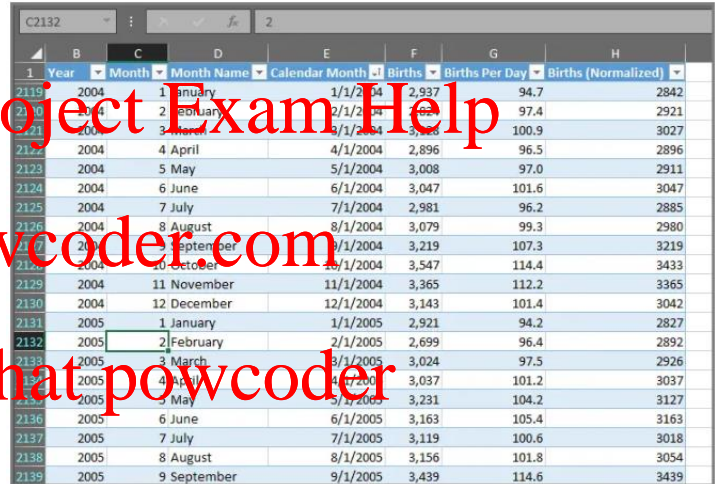
# Building blocks of Power BI - Visualizations

- A **visualization** (sometimes also referred to as a **visual**) is a visual representation of data, like a chart, a color-coded map, or other interesting things you can create to represent your data visually.

- The goal of a visual is to present data in a way that provides context and insights

# Building blocks of Power BI – Datasets (1)

- A **dataset** is a collection of data that Power BI uses to create its visualizations.

- Dataset can be single table (e.g., Excel file), or a combination of many different sources.

- An important and enabling part of Power BI is its built-in **data connectors**.

# Building blocks of Power BI – Datasets (2)

- Power BI is deigned to work with a common database structure that is called **snowflake schema**.

- A **fact table** contains events, transactions, sales records, etc. **It supports summarization**.

- A **dimension table** holds the contact information/attributes for each customer (e.g., who, what, where, when, how). You may have multiple dimension tables. **It supports filtering and grouping**.
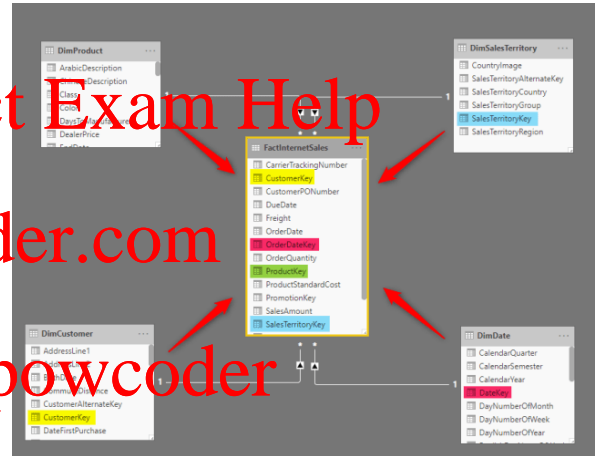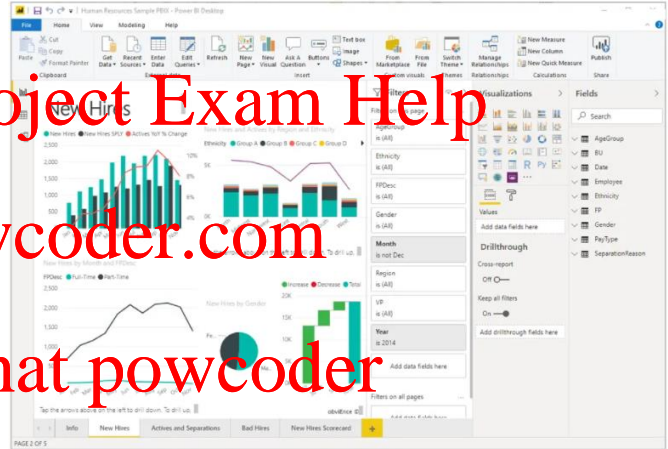
# Building blocks of Power BI - Reports

- A **report** is a collection of visualizations that appear together on one or more pages.

- You can also create reports in the **Power BI service**.

- Reports let you create many visualizations, on multiple pages if necessary, and let you arrange those visualizations in whatever way best tells your story

# Building blocks of Power BI - Dashboards

- A Power BI **dashboard** is a collection of visuals from a single page that you can share with others.

- A dashboard must fit on a single page, often called a canvas.

- Users can interact with dashboards in the Power BI service or on mobile device.
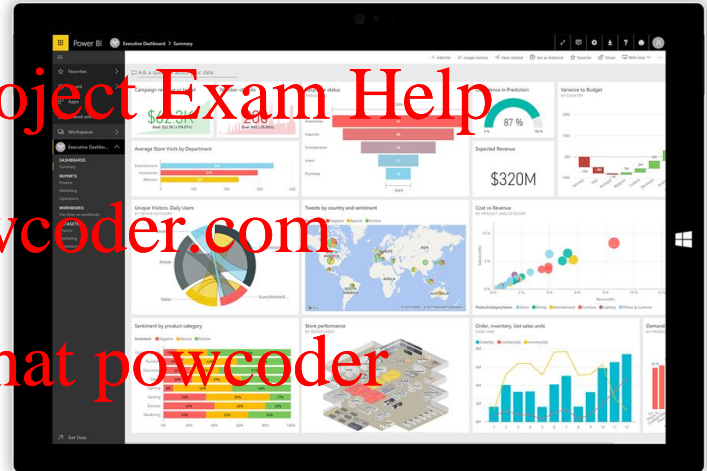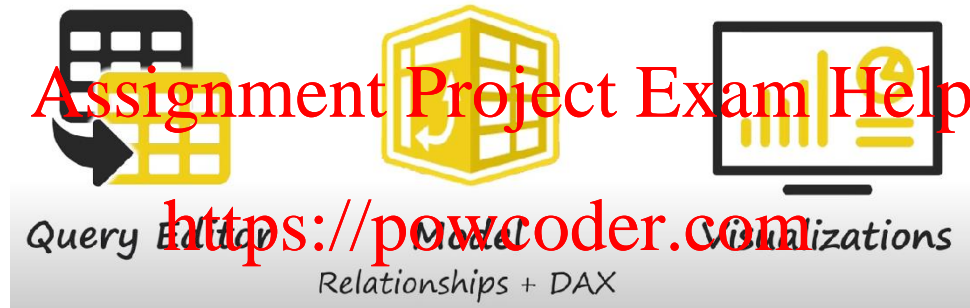
# Building blocks of Power BI - Tiles

- A **tile** is a single visualization on a dashboard.

- When creating a dashboard in Power BI, you can move or arrange tiles however you want.

- When you're viewing, or consuming, a dashboard or report, you can interact with it, but you can't change the size of the tiles or their arrangement.

# Power BI Author- 80 / 20 Rule



Query Editor    Model    Visualizations
Relationships + DAX

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**80 / 20 rule**

# Power BI Demo

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# Next Topic: Data Visualization and Exploration 2

- Create and customize visualizations in Power BI

- Create and share Dashboard with peers

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**Questions?**

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