

## Power BI Assignment: Comprehensive Data Analysis with DAX & Power Query

### Objective:

Students will develop a Power BI report while learning:

- **Power Query Editor** (Data Transformation)
- **Data Understanding & Preparation**
- **Data Modeling & Schema Design**
- **DAX Functions:**
  - Text Functions
  - Logical Functions
  - Time Intelligence Functions
- **Dataset:**
- Use the **AdventureWorks Sales Dataset** (CSV format) available on **Kaggle** (Download Here) or an **E-commerce Sales dataset** from Kaggle.

### Assignment Tasks

#### Task 1: Understanding Power Query Editor (Data Cleaning & Transformation)

1. Import the dataset into Power BI using **Power Query Editor**.
2. Perform the following transformations:
  - Remove missing values & duplicates.
  - Change data types (e.g., Date, Currency, Categories).
  - Split full names into first and last names.
  - Merge tables based on keys (e.g., Orders & Customers).
3. Save a **step-by-step documentation** of transformations done.

#### Task 2: Understanding Data & Data Modeling

1. Identify key tables: Fact (Sales, Orders) and Dimension (Customers, Products, Regions).
2. Define **Primary & Foreign Keys** and create relationships in **Model View**.
3. Implement **Star Schema** for better performance.
4. Explain why schema design is important in a short document (1-2 pages).

#### Task 3: Implementing DAX Functions

##### A) Text Functions

Create calculated columns using the following **Text DAX Functions**:

1. Extract the first 3 letters of Product Category:
2. Create a full name column from First & Last Names:

## **B) Logical Functions**

Use **Logical DAX Functions** for analysis:

1. **Discount Category**: Create a calculated column to categorize discounts
2. High-Value Customers:

## **C) Time & Intelligence Functions**

Use **Time Intelligence DAX Functions** to analyze sales trends:

1. Calculate **Total Sales Last Year**:
2. Find **Year-to-Date (YTD) Sales**:
3. Calculate **Month-over-Month Growth**

## **Task 4: Data Visualization & Report Creation**

🔗 Create a **Sales Dashboard**:

- Total Sales, Profit, and Quantity (Cards)
- Sales Trends over time (Line Chart)
- Sales by Region & Product Category (Bar Chart)
- High-Value vs Regular Customers (Pie Chart)

🔗 Create **Customer Analysis Dashboard**:

- Customer-wise sales & profits (Table)
  - Top 10 Customers (Bar Chart)
  - Discount Categories (Stacked Bar Chart)
- 🔗 Add **Filters & Slicers** for dynamic interactivity.

## **Task 5: Submission Requirements**

- **Power BI Report (.pbix) File**
- **Step-by-step Documentation** (for Power Query, Data Modeling, and DAX Functions)
- **Summary Report** (2-3 pages explaining insights & findings)