Introduction to DAX – Part 1

Definition:

DAX is a formula expression language used in Power BI, Excel Power Pivot, and SSAS Tabular models to define custom calculations and aggregations.

Purpose:

It helps create calculated columns, measures, and tables to analyze data more effectively.

Key Features:

- Built on Excel formulas but more powerful for data modeling.
- Enables row-level and context-aware calculations.
- Works with relational data using functions like RELATED, FILTER, and CALCULATE.

Common Functions:

- Aggregation: SUM(), AVERAGE(), COUNT()
- Time Intelligence: TOTALYTD(), DATESMTD(), SAMEPERIODLASTYEAR()
- Logical: IF(), SWITCH()
- Filter: CALCULATE(), FILTER(), ALL()

Contexts in DAX:

- Row Context: Applies to calculated columns (row-by-row).
- Filter Context: Applies to measures and visuals (affected by slicers/filters).

Calculated Columns vs Measures

Feature	Calculated Columns	Measures
Definition	Adds a new column to the data model table	Calculates a value on the fly for reports
Evaluation	Row-by-row during data refresh	Dynamically during query/render time

Storage	Stored in memory (increases model size)	Not stored; computed when needed
Usage	Used like any other column in visuals or filters	Used for aggregations and KPIs in visuals
Performance	Slower for large models due to storage overhead	More efficient and optimized
Context Used	Row context	Filter context
Example	Sales[Total] = Sales[Price] * Sales[Quantity]	Total Sales = SUM(Sales[Total])

Basic DAX Syntax

General Structure:

= [Name] = <DAX expression>

Identifiers:

Column: TableName[ColumnName]

Measure: [MeasureName]

Operators:

- Arithmetic: +, -, *, /
- Comparison: =, >, <, >=, <=, <>
- Logical: AND, OR, NOT

Functions:

- **Syntax:** FunctionName(argument1, argument2, ...)
- **Example:** SUM(Sales[Amount])

Comments:

- Single-line: // This is a comment
- Multi-line: / Comment block */

```
Total Sales = SUM(Sales[Amount])
Profit % = DIVIDE([Profit], [Revenue])
```

- **Nesting:** Functions can be nested inside others
- **Example:** Sales with Tax = SUM(Sales[Amount]) (1 + Tax[Rate])

Common DAX Functions

1. SUM()

- **Purpose:** Adds up all values in a numeric column.
- **Syntax:** SUM(Table[Column])
- **Example:** Total Sales = SUM(Sales[Amount])

2. AVERAGE()

- **Purpose:** Calculates the arithmetic mean of values.
- **Syntax:** AVERAGE(Table[Column])
- **Example:** Avg Price = AVERAGE(Products[Price])

3. COUNT()

- **Purpose:** Counts the number of non-blank values in a column.
- **Syntax:** COUNT(Table[Column])
- **Example:** Order Count = COUNT(Orders[OrderID])

4. DISTINCTCOUNT()

- Purpose: Counts the number of unique (distinct) non-blank values.
- Syntax: DISTINCTCOUNT(Table[Column])
- Example: Unique Customers = DISTINCTCOUNT(Sales[CustomerID])