**Module 5**

**Creating Dashboard with Visualization Tool**

1. **What is Power BI and how does it differ from Excel?**

-Power BI is a business intelligence tool developed by Microsoft that is used for data visualization, reporting, and interactive dashboards. It allows users to connect to various data sources, clean and transform data, and create insights through charts and graphs.

Difference from Excel:  
While Excel is primarily a spreadsheet application focused on data manipulation, analysis, and calculations, Power BI is designed for advanced data visualization, handling larger datasets, and providing real-time updates. Power BI also integrates better with cloud services and supports collaboration and sharing of dashboards more effectively than Excel.

1. **Explain the concept of data modeling in Power BI.**

-**Data modeling** in Power BI is the process of organizing and structuring data to create relationships between tables, enabling efficient analysis and reporting. It involves defining relationships, creating calculated columns, measures, and hierarchies to establish a logical framework for data analysis.

**Key Features:**

* Establishes **relationships** between tables using primary and foreign keys.
* Allows creation of **measures** and **calculated columns** using **DAX (Data Analysis Expressions)**.
* Supports **hierarchies** for drill-down analysis and grouping data effectively.

This structured model ensures data consistency, reduces redundancy, and improves performance for building reports and dashboards.

1. **What are the different types of connections available in Power BI?**

Power BI supports two main types of connections:

1. **Import Mode** – Loads data into Power BI for analysis, offering fast performance.
2. **DirectQuery Mode** – Connects directly to the data source without importing data, allowing real-time updates.
3. **How do you handle data transformation in Power BI?**

Data transformation is handled using **Power Query Editor** in Power BI. It allows users to:

* Clean and shape data (remove duplicates, split columns, etc.).
* Apply filters and merge/join data from multiple sources.
* Perform advanced transformations using **M language**.

1. **What is DAX (Data Analysis Expressions) and why is it important in Power BI?**

**DAX** is a formula language used in Power BI to create custom calculations and aggregations.  
**Importance:**

* Enables the creation of **calculated columns**, **measures**, and **tables**.
* Supports advanced calculations like time intelligence and conditional logic.

1. **Can you explain the difference between calculated columns and measures in Power BI?**

* **Calculated Columns:** Computed during data load or refresh, stored in the model, and calculated row-by-row.
* **Measures:** Calculated dynamically based on user interaction, not stored, and aggregated over data.

1. **How do you handle relationships between tables in Power BI?**

Relationships are managed in **Model View**:

* Drag and drop fields to create relationships.
* Define relationship types (**one-to-many**, **many-to-one**, etc.) and cardinality.
* Use **cross-filtering** to control data flow between related tables.

1. **What is the purpose of a Power BI Gateway?**

Paid.

1. **How can you schedule data refresh in Power BI Service?**

Data refresh is scheduled in **Power BI Service** under the **Dataset Settings**.  
Steps:

1. Go to **Settings > Datasets > Scheduled Refresh**.
2. Set the frequency (daily, weekly) and time intervals.
3. Configure data source credentials.
4. **Explain the concept of row-level security in Power BI.**

Row-level security (RLS) restricts data access based on user roles.

* Create **roles** in Power BI Desktop using **DAX filters**.
* Assign roles to users in **Power BI Service** to limit access to specific rows of data.

1. **What is the Power BI Desktop and how does it differ from Power BI Service?**

* **Power BI Desktop:** A Windows application used to create reports and data models locally.
* **Power BI Service:** A cloud-based platform for sharing, collaborating, and publishing reports created in Power BI Desktop.

1. **Explain the concept of DirectQuery in Power BI.**

**DirectQuery** allows Power BI to directly query the data source without importing data.

* Suitable for real-time analysis of large datasets.
* Requires a constant connection to the database.

1. **What are Power BI templates and how are they useful?**

Power BI templates (**.PBIT files**) store report designs, visualizations, and queries without including data.  
**Uses:**

* Reuse designs and models across multiple datasets.
* Simplify report sharing and distribution.

1. **How do you handle incremental data refresh in Power BI?**

Paid.

1. **What is the role of Power Query in Power BI?**

Power Query is used for **data extraction, transformation, and loading (ETL)** in Power BI.  
It helps clean, combine, and shape raw data into a structured format before analysis.

1. **Explain the difference between calculated columns and calculated tables in Power BI.**

* **Calculated Columns:** Add new columns to existing tables based on expressions.
* **Calculated Tables:** Create entirely new tables based on expressions, useful for creating summaries or filtered datasets.

1. **How do you create custom visuals in Power BI?**

Custom visuals can be created using:

1. **Power BI Visuals SDK** – Develop visuals using **TypeScript** and **D3.js**.
2. Import pre-built visuals from the **Power BI Marketplace**.
3. **What are the best practices for optimizing performance in Power BI?**

* Use **star schema** for data modeling.
* Minimize calculated columns and prefer **measures**.
* Reduce data size by removing unnecessary columns and rows.
* Use **aggregations** to improve performance.

1. **How can you integrate Power BI with other Microsoft products like Azure and Office 365?**

Power BI integrates with:

* **Azure SQL Database and Azure Synapse** for data storage and analytics.
* **Office 365 (Excel, SharePoint, Teams)** for collaboration and data sharing.

1. **Explain the concept of aggregations in Power BI.**

Aggregations pre-compute summarized data, improving performance by reducing query time.

* Ideal for large datasets, they allow queries to use pre-aggregated data instead of scanning detailed data.

1. **How do you handle error handling and data quality in Power BI?**

* Use **Power Query Editor** to remove errors and filter invalid data.
* Apply **data validation rules** to check consistency.
* Create **alerts** and **visual indicators** in reports for data quality monitoring.

1. **What is the purpose of Power BI Embedded and when would you use it?**

-Paid.