**Module 5**

**Creating Dashboard with Visualization Tool**

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

**Power BI** is a data visualization and analytics platform by Microsoft that enables users to create reports, dashboards, and insights from various data sources. It helps in transforming raw data into meaningful visual representations to support decision-making.

**Difference from Excel:**  
**Excel** is great for detailed data analysis, calculations, and tabular reporting, but **Power BI** is built for interactive, dynamic dashboards and managing big data. Power BI also supports better integration with online services, automated updates, and more advanced visualization options compared to Excel.

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

In Power BI, **data modelling** refers to the process of connecting and organizing data from multiple sources to create a structured framework for analysis. It defines relationships between datasets and enables advanced calculations using **DAX formulas** to enhance insights.

**Key Features:**

* Builds **relationships** between tables, enabling seamless data integration.
* Supports **measures**, **calculated columns**, and **hierarchies** to enrich the model.
* Ensures scalability, allowing users to handle large datasets effectively.

Data modelling acts as the foundation for visualizations and helps in creating meaningful insights from complex data.

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

Power BI supports two connection types:

1. **Import Mode** – Data is imported and stored within Power BI for fast performance.
2. **Direct Query Mode** – Connects directly to the data source, allowing real-time updates without importing data.
3. **How do you handle data transformation in Power BI?**

Data transformation is managed using the **Power Query Editor**, where you can:

* Clean data by removing duplicates or null values.
* Apply transformations like splitting columns and merging tables.
* Write advanced queries using **M language** for complex data operations.

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

DAX is a formula language in Power BI for defining custom calculations and aggregations.  
Importance:

* Enables creation of measures, calculated columns, and tables.
* Provides functions for advanced analytics, such as time intelligence and filtering.

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

**Calculated Columns:** Computed when data is loaded or refreshed, stored in the model, and calculated row-by-row.

**Measures:** Calculated dynamically based on interactions in reports and used for aggregations.

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

Relationships are defined in **Model View**:

* Create relationships by linking fields using **drag-and-drop**.
* Specify relationship types (**one-to-many**, **many-to-one**) and cross-filtering directions.
* Manage relationships to combine data from different tables seamlessly.

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

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

Data refresh schedules can be set in **Power BI Service**:

1. Go to **Settings > Datasets > Scheduled Refresh**.
2. Select refresh frequency and time slots.
3. Enter credentials for data sources to enable updates.
4. **Explain the concept of row-level security in Power BI.**

**Row-level security (RLS)** is used to restrict data visibility based on user roles:

* Create **roles** in Power BI Desktop using **DAX filters**.
* Assign specific users to roles in **Power BI Service** for access control.

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

* **Power BI Desktop:** An application for building and designing reports locally.
* **Power BI Service:** A cloud platform for sharing, publishing, and collaborating on reports online.

1. **Explain the concept of Direct Query in Power BI.**

**Direct Query** connects directly to data sources without importing data.

* Ideal for handling large datasets and enabling real-time updates.
* Queries the database every time the report is accessed.

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

Power BI templates (**.PBIT**) save report designs without storing data.  
**Benefits:**

* Allow report reuse with different datasets.
* Simplify sharing and distribution of report layouts.

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

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

**Power Query** is used for **data extraction, transformation, and loading (ETL)**.

* Cleans and prepares raw data into usable formats.
* Supports merging and appending datasets for modelling.

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

**calculated Columns:** Add new fields based on row-level calculations.

**Calculated Tables:** Generate new tables derived from existing data, useful for grouping and summarizing information.

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

Custom visuals are developed using:

1. **Power BI Visuals SDK** – Build visuals with **TypeScript** and **D3.js**.
2. Import custom visuals directly from the **Power BI Marketplace**.
3. **What are the best practices for optimizing performance in Power BI?**

* Design models using **star schema** for better performance.
* Replace **calculated columns** with **measures** whenever possible.
* Use **aggregations** and filters to reduce data load.
* Optimize visuals by limiting data points displayed in charts.

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

* Connect with **Azure SQL** and **Azure Synapse** for data storage and analytics.
* Integrate with **Excel**, **SharePoint**, and **Microsoft Teams** for data sharing and collaboration.

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

Aggregations pre-compute summary data to enhance performance.

* They reduce query load by using pre-calculated data instead of detailed data.
* Suitable for analysing large datasets efficiently.

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

* Use **Power Query Editor** to detect and fix errors.
* Apply transformations to clean invalid or inconsistent data.
* Add **alerts** and conditional formatting in visuals to highlight data quality issues.

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

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