Power BI Assignment-2

**1. Explain the advantages of Natural Queries in Power BI with an example.**

Natural Language Queries in **Power BI Q&A** allow users to ask questions in plain English and receive visualized insights automatically. It enables non-technical users to explore data without writing complex queries.

**Advantages of Natural Queries in Power BI:**

✅ **User-Friendly:** No need for SQL or DAX knowledge; anyone can ask questions.  
✅ **Quick Insights:** Generates instant visualizations based on user queries.  
✅ **Improves Decision-Making:** Helps executives and analysts get quick answers.  
✅ **Dynamic and Adaptive:** Suggests related questions and refines searches.

**Example:**

A sales manager types, **"Show me total sales by region for the last quarter"** in Power BI Q&A.  
Power BI automatically generates a **bar chart** showing total sales across different regions without requiring any coding.

**2. Explain Web Front End (WFE) cluster in Power BI Service Architecture.**

The **Web Front End (WFE) Cluster** is responsible for handling **user authentication, request routing, and UI rendering** in Power BI Service.

**Key Functions of WFE Cluster:**

🔹 **Handles User Authentication:** Uses Azure Active Directory (AAD) to verify users.  
🔹 **Routes Requests to Back-End Cluster:** Passes user queries and interactions.  
🔹 **Loads Dashboards & Reports:** Displays visualizations in the browser.  
🔹 **Manages API Requests:** Supports interactions via Power BI REST APIs.

**How It Works?**

1️⃣ A user logs into Power BI Service (app.powerbi.com).  
2️⃣ The WFE authenticates the user via **Azure AD**.  
3️⃣ It forwards the request to the **Back-End Cluster** to fetch reports and dashboards.

**3. Explain Back End Cluster in Power BI Service Architecture.**

The **Back-End Cluster** is responsible for **data processing, storage, and report execution** in Power BI Service.

**Key Functions of Back-End Cluster:**

🔹 **Processes Queries:** Executes DAX, SQL, and other queries.  
🔹 **Manages Datasets:** Stores datasets, refreshes data, and handles schedules.  
🔹 **Renders Reports & Dashboards:** Generates visualizations for the user.  
🔹 **Handles Data Refresh & Gateway Communication:** Syncs with on-premise and cloud databases.

**How It Works?**

1️⃣ The WFE Cluster sends a user request to the Back-End Cluster.  
2️⃣ The Back-End Cluster fetches or computes the required data.  
3️⃣ It processes queries using **DAX and M Query Engine**.  
4️⃣ The processed data is sent back to the WFE for display.

**4. What does the ASP.NET component do in Power BI Service Architecture?**

The **ASP.NET component** in Power BI Service acts as an **interface** between users and Power BI servers.

**Role of ASP.NET in Power BI:**

✅ **Handles User Requests:** Manages HTTP requests from Power BI users.  
✅ **Manages Authentication:** Works with Azure Active Directory (AAD) for login.  
✅ **Loads Web Pages:** Renders dashboards and reports in browsers.  
✅ **Handles API Calls:** Supports interactions through REST APIs.

**How It Works?**

1️⃣ A user logs in via a browser.  
2️⃣ The ASP.NET component authenticates and processes requests.  
3️⃣ It connects to **SQL Azure and Analysis Services** for data retrieval.  
4️⃣ Sends the processed data back to the user interface.

**5. Compare Microsoft Excel and Power BI Desktop based on key features:**

| **Feature** | **Microsoft Excel** | **Power BI Desktop** |
| --- | --- | --- |
| **Data Import** | Imports structured/unstructured data | Connects to databases, APIs, cloud sources |
| **Data Transformation** | Uses Power Query for data shaping | Advanced Power Query for ETL processes |
| **Modeling** | Basic relationships & PivotTables | Advanced DAX modeling, multi-table joins |
| **Reporting** | Static reports with charts | Dynamic dashboards & visualizations |
| **Server Deployment** | Requires SharePoint or OneDrive | Uses Power BI Service (cloud-based) |
| **Convert Models** | Limited to Excel format | Converts Excel models to Power BI |
| **Cost** | One-time purchase or Microsoft 365 | Free for Power BI Desktop, Pro & Premium for cloud features |

**6. List 20 data sources supported by Power BI Desktop.**

Power BI supports multiple data sources, including databases, cloud services, and APIs.

**20 Commonly Used Data Sources in Power BI:**

1️⃣ SQL Server  
2️⃣ MySQL  
3️⃣ PostgreSQL  
4️⃣ Oracle Database  
5️⃣ Azure SQL Database  
6️⃣ Excel  
7️⃣ CSV Files  
8️⃣ JSON Files  
9️⃣ SharePoint  
🔟 Google BigQuery

🔹 SAP HANA  
🔹 Microsoft Access  
🔹 Amazon Redshift  
🔹 IBM DB2  
🔹 Azure Blob Storage  
🔹 Snowflake  
🔹 Salesforce  
🔹 OData Feed  
🔹 Web API  
🔹 Google Analytics