**Power BI assignment**

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

**Answer:** Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights.  Power BI can connect to live data sources, allowing for up-to-the-minute analytics and dashboards.  Power BI’s visualizations are dynamic, interactive, and linked. Users can filter, sort, and navigate between visuals to explore data from different angles as compared to Excel.  Power BI is built to ingest, transform, and analyze massive amounts of data. It can efficiently handle datasets with millions of rows, enabling enterprise-wide analytics.

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

**Answer:** Data modeling in Power BI involves organizing and structuring data from various sources into a coherent schema. It includes defining relationships between tables, creating calculated columns and measures, and establishing a logical data framework to support analysis and visualization.

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

**Answer:**

* **Import Mode:** Data is imported into Power BI and stored in-memory.
* **Direct Query:** Data remains in the source, and queries are sent directly to the data source.
* **Live Connection:** Similar to Direct Query but used with SQL Server Analysis Services (SSAS) models.
* **Composite Models:** A mix of Import and Direct Query modes in the same model.

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

**Answer**: Data transformation in Power BI is handled using Power Query Editor, where you can clean, shape, and modify data. Common transformations include filtering rows, changing data types, merging tables, and creating calculated columns.

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

**Answer:** DAX is a formula language used in Power BI for creating custom calculations, such as measures and calculated columns. It is essential for performing complex calculations, aggregating data, and building sophisticated data models.

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

**Answer:**

* **Calculated Columns:** These are columns that are added to your data modelusing a DAX formula. They are computed row by row and stored in the model, which increases the size of the dataset. Calculated columns are useful for creating new fields that are used in slicers, filters, or to categorize data.
* **Measures:** Measures are also created using DAX but differ in that they are calculated on the fly based on the context of the data being analyzed (e.g., filters, rows, columns). Measures are not stored in the data model, which makes them more efficient. They are typically used for aggregations, such as sums, averages, or more complex calculations.

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

**Answer:** Relationships are managed in the data model by defining how tables are connected through keys (e.g., primary and foreign keys). You can set relationships as one-to-many, many-to-one, or many-to-many, and determine cross-filtering behavior.

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

**Answer:** A Power BI Gateway acts as a bridge between the Power BI Service and on-premises data sources. It allows secure data transfer for scheduled refreshes and live connections.

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

**Answer:** Data refresh can be scheduled in Power BI Service by setting up a refresh schedule under the dataset settings. You can specify the frequency (daily, weekly, etc.) and time for the refresh.

1. **Explain the concept of row-level security in Power BI.**

**Answer**: Row-level security (RLS) restricts data access for users based on roles. By applying filters to the data model, you can control which data specific users or groups can view in reports.

**11)What is the Power BI Desktop and how does it differ from Power BI Service?**

**Answer: Power BI Desktop:** A desktop application used for developing reports, data modeling, and data transformation.

**Power BI Service:** A cloud-based service for sharing, collaborating, and accessing reports online. It also supports features like dashboards, data refresh scheduling, and report sharing.

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

**Answer:** Direct Query is a connection mode where Power BI queries the data source in real-time, without importing the data into Power BI. This allows you to work with large datasets and ensures data is always up-to-date, but it may impact performance.

**13) What are Power BI templates and how are they useful?**

**Answer:** Power BI templates are reusable files that contain report layouts, data models, and queries, but no actual data. They are useful for standardizing report designs and quickly creating new reports with the same structure.

**14) How do you handle incremental data refresh in Power BI?**

**Answer:** Incremental data refresh allows you to refresh only the data that has changed or been added, rather than refreshing the entire dataset. This is configured in the Power BI Desktop under the data source settings and helps improve performance and efficiency.

**15) What is the role of Power Query in Power BI?**

**Answer:** Power Query is a data connection and transformation tool in Power BI. It allows users to connect to various data sources, clean, transform, and shape data before loading it into the Power BI data model.

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

**Answer:**

**Calculated Columns:** Created within a table, calculated for each row using DAX, and stored in the data model.

**Calculated Tables:** Entire tables created using DAX, which can be used to build new relationships and enrich the data model.

**17)** **How do you create custom visuals in Power BI?**

**ANSWER:** Custom visuals can be created using the Power BI Developer Tools, which allow developers to build visuals using TypeScript and Node.js. These visuals can then be imported into Power BI reports.

**18) What are the best practices for optimizing performance in Power BI?**

**ANSWER:**

* Use star schema in data modeling.
* Minimize the use of calculated columns and measures.
* Optimize DAX queries.
* Use aggregations and incremental refresh.
* Limit data loaded into the model by filtering.

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

**ANSWER:**

Power BI integrates with Azure by connecting to Azure data services (e.g., Azure SQL, Azure Data Lake) and with Office 365 through embedding reports in SharePoint, Teams, and using Excel for data export/import.

**20) Explain the concept of aggregations in Power BI.**

**ANSWER:** Aggregations in Power BI allow pre-calculated summaries of data to be stored in the model. This improves query performance by reducing the amount of data scanned when users interact with reports.

**21) How do you handle error handling and data quality in Power BI?**

**ANSWER:** Error handling and data quality are managed in Power Query using steps like removing errors, handling nulls, applying data type conversions, and using data profiling tools to ensure consistency and accuracy in the data.

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

**ANSWER:** Power BI Embedded is a service that allows developers to integrate Power BI reports and dashboards into their applications. It’s used to provide analytics and reporting capabilities to users directly within an application, without them needing separate access to Power BI.