**Creating Dashboard with Visualization Tool (April 2023)**

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

Power BI is a business analytics tool that provides interactive visualizations and business intelligence capabilities through dashboards and reports. While Excel is primarily used for spreadsheet calculations and data analysis, Power BI is designed for more advanced data modeling, integration, and visualization. Power BI offers real-time data analysis, advanced visualizations, and seamless sharing of reports, while Excel is more suited for individual analysis and small-scale reporting.

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

Data modeling in Power BI involves creating relationships between different tables, transforming raw data into a structured format, and defining measures, calculated columns, and hierarchies. It enables users to organize and structure data in a way that supports efficient querying, reporting, and analysis.

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

* **Import Mode**: Data is imported into Power BI and stored in memory, enabling fast querying and analysis.
* **DirectQuery Mode**: Power BI queries the data source in real-time without importing data, suitable for large datasets.
* **Live Connection**: With certain services like SQL Server Analysis Services (SSAS), Power BI directly connects and queries the data without importing or storing it.

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

Data transformation in Power BI is managed using Power Query Editor. Users can perform various tasks such as filtering, removing duplicates, adding calculated columns, renaming, merging, and splitting data. These transformations help clean and prepare data before it's used for analysis.

**5. 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 in calculated columns, measures, and tables. It is essential because it allows users to create complex calculations, aggregations, and expressions to gain more insights from the data.

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

* **Calculated Columns**: These are added to a table in the data model and computed row by row when data is loaded or refreshed.
* **Measures**: Measures are used to perform calculations dynamically on aggregated data, calculated during report time rather than data load.

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

Relationships between tables in Power BI are created using the "Manage Relationships" feature, which allows users to define one-to-one, one-to-many, or many-to-many relationships based on key columns. These relationships enable effective data modeling and cross-filtering between tables.

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

A Power BI Gateway allows for secure data transfer between Power BI Service and on-premises data sources like SQL Server, Oracle, and file systems. It enables users to refresh reports with up-to-date on-premises data and enables real-time data analysis.

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

In Power BI Service, users can schedule data refreshes at specified intervals, such as daily or weekly. This ensures that reports and dashboards are updated with the latest data from connected sources. Users can configure refresh settings in the dataset settings page.

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

Row-level security (RLS) in Power BI allows users to restrict access to data based on user roles. By defining roles and filtering data for those roles, you can control which data a user can view in reports or dashboards, ensuring sensitive data remains confidential.

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

Power BI Desktop is a Windows application for creating data models, reports, and visualizations. It provides advanced features for data manipulation and report creation. On the other hand, Power BI Service is a cloud-based platform where reports and dashboards are shared, viewed, and consumed by others. Desktop is for report creation, while Service is for sharing and collaboration.

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

DirectQuery is a connection mode where Power BI queries data directly from the source without importing it into memory. This allows for real-time data analysis but can lead to slower performance, as every query is sent to the source rather than executed on a local dataset.

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

Power BI templates (.pbit) are reusable files that contain report layouts, visuals, and connections to data sources but do not include the actual data. They help standardize report formats across an organization or share report designs that can be customized with different datasets.

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

Incremental refresh in Power BI allows users to refresh only a portion of the data, typically for large datasets, by refreshing only the new or updated data. This reduces load times and resource consumption. It is configured in the dataset settings for tables in Power BI.

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

Power Query is the data transformation and cleansing tool within Power BI. It allows users to connect to different data sources and clean, transform, and load the data into Power BI for analysis. Power Query supports various transformations such as filtering, merging, and pivoting.

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

* **Calculated Columns**: These are new columns added to an existing table in the data model based on a DAX expression.
* **Calculated Tables**: These are new tables created based on DAX expressions, typically used when generating new tables based on existing data for specific analysis purposes.

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

Custom visuals in Power BI can be created using Power BI's SDK (Software Development Kit), which allows developers to design visuals using JavaScript and integrate them into reports. Alternatively, users can download custom visuals from the Microsoft AppSource marketplace.

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

Some best practices include:

* Reducing the number of visuals on a page.
* Using aggregations to minimize data processing.
* Optimizing DAX calculations and measures.
* Implementing proper relationships and indexing in the data model.
* Using Import Mode over DirectQuery where feasible.

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

Power BI integrates with Azure by connecting to services like Azure SQL Database, Azure Synapse Analytics, and Azure Data Lake. It integrates with Office 365 for sharing reports through Teams, OneDrive, and Excel. Additionally, Power Automate and PowerApps can enhance workflow automation and app creation.

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

Aggregations in Power BI refer to pre-aggregating large datasets at higher levels of granularity to improve query performance. For example, you might pre-summarize data by year or region to avoid recalculating these aggregations in real time.

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

Data quality issues are addressed in Power BI by using Power Query to clean and transform the data. Error handling can be managed by checking for nulls, duplicates, and inconsistent data types. Conditional steps can also be applied to fix or ignore errors during data load.

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

Power BI Embedded is a service allowing developers to embed Power BI reports into web or custom applications. It is helpful for organizations that want to integrate data analytics and reporting into their platforms without requiring users to have Power BI accounts.