Module 5) Creating Dashboard with Visualization Tool

Assignment

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

* Big datasets can be used to create interactive dashboards, reports, and visualizations with Microsoft's Power BI business analytics product.
* It is very good at working in teams, connecting with several data sources, and analyzing data in real time. Conversely, Excel is a spreadsheet program that works best with smaller datasets and is used for data management, simple calculations, and static reporting.
* Excel is easy to use for routine tasks, while Power BI offers more advanced functionality for sharing and analyzing vast volumes of data in more complex ways.

Que. 2) Explain the concept of data modeling in Power BI.

* The process of arranging and structuring data from several sources into a logical model that facilitates reporting and analysis is known as data modeling in Power BI.
* It includes defining metrics, constructing computed columns, and linking tables together.
* This procedure guarantees accurate, consistent data insights and improves query performance.
* Power BI users may effectively analyze complicated data, create interactive visualizations, and obtain deeper insights across several data sets by using a well-structured data model.

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

Power BI has several types of connections, including Live Connection, Direct Query, and Import:

* Live Connection

This connection is often used by IT and enterprise implementations. It can recognize a created model or cube, and turns off all data prep features. Live Connection only connects to three types of data sources, and doesn't store a copy of the data in memory. Instead, Power BI visualizations query the data source each time they're needed.

* Direct Query

This connection type is between Live Connection and Import in terms of functionality. With Direct Query, data is stored in the data source, not in the Power BI Server. When a report is refreshed, it queries the data source to get the latest information.

* Import

This connection type allows users to import and copy data sets. Power BI reports can then connect directly to the data source to view current data.

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

* Data transformation in Power BI is managed via Power Query, a powerful tool for data preparation.
* Numerous sources of data can be imported, and tasks like filtering, sorting, combining, and aggregating can be completed.
* Power Query offers a user-friendly interface along with features for dividing columns, removing duplicates, and converting data types.
* The process can be repeated and altered because these modifications are broken down into steps.
* After being altered, the data can be loaded into Power BI for modeling, visualization, and analysis.

Que. 5) What is DAX (Data Analysis Expressions) and why is it important in Power BI?

* The formula language known as DAX (Data Analysis Expressions), which is linked with Power BI, Power Pivot, and SQL Server Analysis Services (SSAS), may be used to generate custom computations, aggregations, and measures. Beyond Excel's basic features, it allows users to manage data, do complex calculations, and make informed decisions, which broadens the range of possible uses for data analysis.
* DAX is essential to Power BI because it makes it possible to produce dynamic, context-aware metrics that can be used for both dashboards and reports.
* This enhances the analytical flexibility and depth of the data model. In order to make the most of Power BI, you must comprehend DAX.

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

In Power BI, calculated columns and measures are both fields in a dataset that are used to perform calculations on data:

* Calculated columns

Are evaluated row by row during data load and refresh, and are stored in the model. They are static and don't depend on filters in the report. Calculated columns are useful for creating categorizations of values, putting calculated values in the slicer, or as an axe in the chart visual. They are also appropriate for static and row-level expressions, attributes, and categories.

* Measures

Are evaluated in the context of filtering, such as slicers or chart filtering, and are calculated at query time. They are dynamic and calculated on the fly as the user interacts with the data. Measures are useful for performing aggregations, such as ratios, profit margins, or percentage of variation, and for expressions that are responsive to the context of a specified filter. They are also useful if you need up-to-the-minute calculations, or if you want to keep the size of your workbook to a minimum and maximize its performance. Another benefit of measures is that you can apply them to other tables as well.

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

* In Power BI, relationships between tables are managed through the Modeling view.
* Users can define relationships by connecting fields (usually primary and foreign keys) from different tables.
* Relationships can be one-to-many, many-to-one, or many-to-many and can be set as either single or bidirectional for filter propagation.
* You can also specify cardinality and enforce data integrity using cross-filtering settings.
* Properly managing relationships ensures accurate data modeling, allowing related data from different tables to be used seamlessly in reports and visualizations.

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

* A Power BI Gateway connects on-premises data sources to cloud-based Power BI services.
* Power BI can access and change data that is kept locally without sending it to the cloud by enabling safe data transfer.
* Gateways support both live connections and scheduled data refreshes (DirectQuery) for imported data.
* This is essential for companies who wish to leverage the cloud-based analytics and reporting capabilities of Power BI but have data that needs to be kept on-site for performance, security, or regulatory reasons.

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

* Go to the dataset settings in Power BI Service and set up the refresh schedule under the "Scheduled refresh" section.
* This will allow you to schedule a data refresh.
* You can choose the time and frequency of the refresh (monthly or daily).
* For Pro customers, Power BI allows up to 8 daily refreshes; for Premium users, up to 48.
* You can also setup data source credentials and create failure messages in case of a refresh.
* This guarantees that, without human involvement, your reports and dashboards are always updated with the most recent data.

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

* In Power BI, row-level security (RLS) limits a user's ability to access data according to their roles or attributes.
* You can manage the data that each user or group may view in the Power BI Desktop model by creating security roles and applying filters at the row level.
* Sales managers, for instance, might only access data specific to their territories.
* By ensuring that users only access data pertinent to their roles, RLS is set up in Power BI Desktop's "Manage Roles" section and published to the Power BI Service, improving data privacy and compliance.

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

* Power BI Desktop is a free, Windows-based application used for creating, developing, and designing Power BI reports and data models.

It provides tools for data transformation, modeling, and creating visualizations.

Users work locally on their machines, building and refining reports before publishing them.

* Power BI Service , on the other hand, is a cloud-based platform where reports and dashboards are hosted, shared, and accessed.

It allows for collaboration, scheduling data refreshes, and creating live dashboards. While Power BI Desktop is for development, Power BI Service is for distribution and collaboration.

Que. 12) Explain the concept of Direct Query in Power BI.

* With Power BI's Direct Query capability, you may connect to and query data directly from a source in real-time without importing it into the program.
* This approach is useful when working with large datasets or when current data is required.
* Queries are delivered live to the data source, and responses are received as needed, so Power BI stores less data overall.
* Performance may suffer from query latency and source load even though it ensures up-to-date data.
* Direct Query supports several sources, such as SQL Server and Azure SQL Database.

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

* Power BI templates (.pbit files) are pre-built report files that contain the structure, visuals, and layout of a Power BI report but without the underlying data. These templates include the data model, DAX measures, visuals, and report formatting, allowing users to quickly create new reports by simply connecting to their own data sources.
* Templates are useful for standardizing reports across an organization, saving time in report creation, and ensuring consistency in design and structure. They enable users to reuse successful report layouts and methodologies, making report development more efficient and uniform.

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

* Power BI users can control incremental data refresh by giving a range of dates or periods for the data refresh.
* In the Power Query Editor, partitions based on date columns are created and incremental refresh policies are set up.
* Only data that is inside the specified range is refreshed by Power BI, which maximizes system performance.
* As a result, the system load is reduced.
* This technique is advantageous for large datasets since it minimizes the amount of data that must be handled and transferred, allowing for more manageable and rapid updates.

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

* With Power Query, a powerful data connectivity and transformation tool included in Power BI, users can import, clean, shape, and transform data from a range of sources.
* It provides an easy-to-use interface that does not require programming to do complex data preparation tasks.
* Users can perform a number of actions, like as filtering, aggregating, merging, and pivoting, to get data ready for analysis.
* Power Query is essential for making sure that data is structured and ready for reporting and visualization in Power BI.
* In the end, this raises the analytical process's productivity and accuracy.

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

* Calculated columns in Power BI are derived columns made with DAX (Data Analysis Expressions) calculations inside of an already-existing table.
* Row by row analysis is done, and new data is added by referencing preexisting columns. Conversely, calculated tables are full tables produced by a DAX expression.
* These independent tables may include information that was not initially included in the data model.
* Calculated tables can be used to build new relationships or data structures within the model, whereas calculated columns supplement existing tables with fresh data.

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

* Use the Power BI Developer Tools, which include the Power BI Visuals SDK, to create custom visuals in Power BI.
* Install the Power BI Visuals CLI and Node.js first. Then, use the command line to start a new visual project.
* Create your visual with TypeScript, HTML, and CSS; use other frameworks or the D3.js library as necessary.
* After doing a local test of your visualization, package it, and open the.pbiviz file in Power BI Desktop.
* Lastly, for more widespread usage, you can release the customized image to the Power BI service.

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

Optimizing performance in Power BI involves several best practices:

1. Data Modeling: Use star schema and avoid complex relationships. Minimize the use of calculated columns and tables.

2. Data Reduction: Import only necessary data by filtering at the source and using summary tables.

3. Efficient DAX: Optimize DAX formulas by avoiding iterative functions and using measures instead of calculated columns where possible.

4. Query Folding: Leverage query folding in Power Query for efficient data processing.

5. Visuals Optimization: Limit the number of visuals and complex calculations on a single report page to reduce rendering time.

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

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

* Power BI aggregations pre-summate large datasets at different granularities to optimize performance.
* Rather than asking for specific data, Power BI receives pre-aggregated responses, which reduces query times and boosts productivity.
* This is especially helpful for large datasets, since straight queries would be slow.
* Aggregations are defined in the data model using groupings like SUM, COUNT, or AVERAGE, and Power BI makes the automatic decision of when to use the aggregation or the detailed data.
* This technique improves resource management and report rendering speeds without sacrificing visualization accuracy.

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

* Power Query is the main tool used in Power BI to manage error management and data quality.
* By employing functions such as `Try...Otherwise} to detect and manage problems in data transformations, users can detect and rectify errors during data loading.
* Additionally, data profiling capabilities for identifying missing values, duplication, and inconsistencies are provided by Power Query.
* Data quality is increased by cleaning procedures like removing errors, swapping out null values, and verifying data types.
* Further validation can be obtained by utilizing DAX expressions, which guarantees that only clean and accurate data is utilized in reports.

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

* Power BI Embedded allows developers to embed Power BI reports and dashboards within their own applications, providing users with robust data visualizations without requiring them to launch Power BI.
* This is the ideal answer for developers and independent software vendors (ISVs) that want to enhance user experience by incorporating data analytics functionality into their apps.
* Power BI Embedded is used when interactive reports have to be sent to end users through a bespoke platform.
* It ensures seamless integration of workflows and offers scaled analytics capabilities without requiring separate Power BI licenses for each user.