100 Power BI Interview Questions

APOORVA IYER

Introduction to Power BI

Power BI is a powerful business analytics tool developed by Microsoft. It helps users visualize and share data insights easily.

Power BI is a self-service business intelligence (SSBI) tool. SSBI lets non-technical business people make reports and visualizations. They don't need coding backgrounds. This way, even non-technical users can create dashboards to help their businesses make informed decisions.

Power BI smoothly blends with other Microsoft services. It also has robust data visualization. This is why Power BI is gaining popularity. Learning Power BI is essential for anyone in data analytics or business intelligence.

Beginner Level Questions

1. What is Power BI?

• Power BI is a Microsoft tool for creating interactive visualizations and business intelligence reports.
• It allows users to connect to data, transform it, and build detailed visuals.
• It includes components like Power BI Desktop (for report creation), Power BI Service (for sharing online), and Power BI Mobile (for mobile access).
• Power BI is widely used in businesses to drive data-informed decisions.

---

2. What are the main components of Power BI?

• **Power BI Desktop:** Windows application for building reports, transforming data, and creating visuals.
• **Power BI Service:** Cloud-based platform for sharing reports and dashboards.
• **Power BI Mobile:** Mobile app for accessing Power BI content on the go.
• **Power BI Gateway:** Connects on-premises data to Power BI Service for refreshes and live queries.
• **Power BI Report Server:** On-premises server for hosting Power BI and paginated reports.
• **Power BI Report Builder:** Tool to create paginated reports optimized for printing or PDF

export.

• **Power BI Embedded:** Service for developers to embed reports into custom apps.

---

3. How do you connect to data in Power BI?

• Use the **Get Data** feature in Power BI Desktop.

• Connect to various sources such as Excel, SQL Server, SharePoint, or web APIs.

• Load data directly or use **Power Query Editor** to transform and clean data before analysis.

• This centralized process improves ease of analysis and visualization.

---

4. What is Power Query?

• Power Query helps users connect, combine, and transform data before loading it into the model.

• It can:

  • Connect to data sources like Excel, databases, and cloud services

  • Merge and append data from multiple sources

  • Clean, reshape, and transform data (e.g., remove errors, filter rows, add columns)

• Power Query ensures high-quality data for effective analysis and reporting.

---

5. What are the different views available in Power BI Desktop?

• **Report View:** Create and format visuals like charts, tables, and KPIs.

• **Data View:** Inspect data tables after transformation. You can also create calculated columns here.

• **Relationship View:** Manage relationships between tables to ensure data integrity.

• **DAX Query View:** Use DAX queries to examine and validate data returned from the model.

• Each view serves a unique purpose in the report development process.

---

6. How do you publish a report in Power BI?

• Save your report in Power BI Desktop.

• Click the **Publish** button and sign in to your Power BI account.

• Choose a workspace in Power BI Service to upload the report and underlying dataset.

• Once published, you can:

  • View and share it in Power BI Service

  • Set up scheduled refreshes

  • Manage access and permissions

• Publishing enables collaboration and ensures up-to-date reports.

---

7. What are Filters in Power BI? Name some.

• Filters help narrow down the data displayed in reports.

• **Types of Filters in Power BI:**

  • Visual-level Filters – apply to one visual only

  • Page-level Filters – apply to all visuals on a single report page

  • Report-level Filters – apply to all pages in the report

  • Drillthrough Filters – let users navigate to details from a specific data point

• Filters enhance focus and precision in reporting.

---

8. What is a calculated column in Power BI?

• A calculated column is created using DAX to add new fields based on existing data.

• Calculations are applied row by row.

• The result becomes a new column in the table.

• Calculated columns are useful for adding extra logic or classifications to your dataset.

---

9. What is a measure in Power BI?

• A measure is a dynamic DAX-based calculation that runs during report interaction.

• Unlike calculated columns, measures are not stored in the model.

• Measures calculate values based on filters and context applied to visuals.

• Examples: Total Sales, Average Revenue, or Year-over-Year Growth.

• They are key to responsive, interactive reporting.

---

10. What are the different types of data sources you can connect to in Power BI?

• **Excel** – import from spreadsheets
• **SQL Server** – connect to structured databases
• **SharePoint** – integrate with lists and libraries
• **Azure** – access cloud data like SQL DB or Data Lake
• **Web Data** – connect using APIs or URLs
• **Other Databases** – MySQL, Oracle, PostgreSQL
• **Online Services** – Google Analytics, Salesforce, etc.
• **Flat Files** – import from CSV, XML, JSON
• **Fabric/OneLake** – unified access to Microsoft data sources
• Power BI supports diverse sources, making it a versatile BI platform.

---

11. What is a Fact Table and Dimension Table in Power BI?

• **Fact Table:**
  • Stores quantitative/transactional data like sales, revenue, or quantity
  • Example: Sales table with columns like SalesID, ProductID, CustomerID, DateID, and SalesAmount
• **Dimension Table:**
  • Contains descriptive context like product names, customer regions, or time periods
  • Example: Product table with columns like ProductID, ProductName, Category, Supplier
• Fact tables hold metrics, while dimension tables explain them.

---

12. What are the rules regarding Dimension Tables?

• Each dimension table should have a **unique key** to relate to fact tables.
• Include **descriptive attributes** such as names or types.
• **Denormalize** to reduce joins and improve performance.
• Add **hierarchies** for drill-down (e.g., Year > Month > Day).
• Maintain **consistent granularity** with the fact table.
• These practices ensure efficient and accurate data modeling.

13. How do you connect a Fact Table and a Dimension Table in Power BI?

• Use a **key column** shared between both tables.
• In Model view, drag the key from the dimension table to the fact table.
• This forms a relationship used in visuals and calculations.
• The relationship connects data contextually, enabling accurate reporting.

---

14. What are the different languages used in Power BI?

• **M Language:**
  • Used in Power Query for data transformation
  • Helps clean, reshape, and prepare data
• **DAX (Data Analysis Expressions):**
  • Used for calculations like measures and calculated columns
  • Enables aggregations, filtering, and logic
• Both languages work together to build robust Power BI models.

---

15. What is the easiest method to navigate in Power BI?

• Use **Bookmarks** to capture the current state of a report page.
• Link bookmarks to **buttons or images** for interactive navigation.
• Use built-in navigation buttons like **Page Navigator**, **Bookmark Navigator**, or **Back**.
• These methods enhance user experience by making movement across pages smooth and intuitive.

Would you like me to continue with **Intermediate Level Questions (16–33)** next?

---

16. What is a dashboard in Power BI?

A dashboard in Power BI is a single-page, often called a canvas, that uses visualizations to tell a story. It is created in Power BI Service and is typically used to display key performance indicators

(KPIs) and summaries from multiple reports or datasets. Unlike reports, dashboards do not have multiple pages. 📌 A dashboard is a one-page summary view created in Power BI Service to track key metrics using visuals from different reports.

---

17. What are tiles in Power BI?

Tiles are the individual visualizations displayed on a Power BI dashboard. Each tile represents a single chart, graph, map, or other visual elements. You can pin visuals from reports to dashboards to create tiles. 📌 A tile in Power BI is a visual element pinned to a dashboard.

---

18. What is the difference between a report and a dashboard in Power BI?

A report in Power BI contains multiple pages and is built using Power BI Desktop. It can include multiple visuals and detailed analysis.

A dashboard is a single page created in Power BI Service and is used for summarizing key information. It can include visuals from multiple reports. 📌 Reports are multi-page analytical views, while dashboards are single-page summaries.

---

19. What are slicers in Power BI?

Slicers are visual tools used to filter data in a report. You can use them to create interactive filters, like dropdowns, lists, or buttons, that help users view specific portions of the data. 📌 Slicers are interactive visual filters that help users explore and analyze report data more easily.

---

20. What are bookmarks in Power BI?

Bookmarks capture the current state of a report page, including filters, slicers, and visual selections. You can use them to navigate between report views or create interactive storytelling experiences. 📌 Bookmarks save specific report views for navigation or presentation purposes.

---

21. What is drill-down in Power BI?

Drill-down is a feature in visuals like bar or pie charts that lets users explore data at different

levels of detail. For example, you can click on a year to see data by quarter or month. 📌 Drill-down helps users explore data hierarchies from high-level summaries to detailed views.

---

22. What is a tooltip in Power BI?

A tooltip is a small box that appears when you hover over a visual element. It provides additional data or context related to the data point. You can customize tooltips to show extra information. 📌 Tooltips display extra details when hovering over a visual in a report.

---

23. What is data modeling in Power BI?

Data modeling is the process of connecting tables, defining relationships, and creating calculations to build a structured and efficient data model for analysis. It helps you prepare the data before creating visuals. 📌 Data modeling is the process of organizing tables and relationships to support analysis in Power BI.

---

24. What is Power BI Q&A feature?

Power BI Q&A allows users to type natural language questions and get answers in the form of visuals. It uses AI to understand user queries and return charts or graphs automatically. 📌 Power BI Q&A lets users ask questions in plain language and get instant visual answers.

---

25. What is the role of Power Query Editor in Power BI?

Power Query Editor is used to clean, transform, and shape data before loading it into Power BI. It allows you to remove columns, change data types, merge tables, and apply filters — all without writing code. 📌 Power Query Editor is used for preparing and transforming data before analysis in Power BI.

Intermediate Level Questions

26. What is DAX?

• DAX (Data Analysis Expressions) is a formula language used in Power BI, Excel Power Pivot, and SQL Server Analysis Services.

• It is used for data modeling and creating advanced calculations.

• **Purpose:** Enables users to create calculated columns, measures, and custom tables.

• **Syntax:** Similar to Excel formulas but more powerful, supporting aggregations, filters, and logic across relational data.

• **Functions:** Includes math, statistics, logic, text, and time intelligence functions.

📌 DAX is a powerful formula language in Power BI for data modeling and creating complex calculations.

---

27. Can you give an example of a DAX function?

• A common DAX function is **FILTER**, which creates a table of rows that meet certain conditions.

• **Purpose:** To return a filtered subset of a table.

• **Syntax:** FILTER(<table>, <condition>)

• **Example:**

West Region Sales = FILTER(Sales, Sales[Region] = "West")

This returns only the sales records from the "West" region.

• Other useful DAX functions include: **SUM, SUMX, AVERAGE, TOTALYTD, DISTINCTCOUNT,** and **CALCULATE.**

📌 FILTER returns a subset of a table that meets specific conditions in DAX.

---

28. Explain the difference between a calculated column and a measure.

• Both are created using DAX, but they serve different purposes:

Calculated Column:

• Created during data load.

• Stored in the table.

• Performs row-by-row operations.

• Useful when you need values to be placed in slicers.

• Example: Calculate profit margin for each sale.

Measure:

• Calculated on the fly at query time.

• Not stored in the table.

• Used for aggregations and calculations based on report context.

• Example: Sum of total sales for a selected date range.

📌 Calculated columns are stored and evaluated at load time, while measures are dynamic and calculated at query time.

---

29. Which gives better performance: Calculated columns or measures?

• **Measures** usually provide better performance in Power BI:

• **Memory Usage:** Measures use less memory as they are not stored in the model.

• **Dynamic Calculation:** Measures are evaluated during report interaction. Calculated columns are computed during data load, which can slow performance on large datasets.

• **Flexibility:** Measures adapt to filters and slicers in real-time.

📌 Measures are more efficient for dynamic reporting, while calculated columns are useful for static, row-level data.

---

30. What are the different types of relationships in Power BI?

• Relationships define how data tables are linked. Power BI supports three types:

One-to-One (1:1):

• Each row in one table relates to one row in another.

• Example: Employee table and employee details table.

• Often best to merge such tables.

One-to-Many (1:*):

• A row in one table relates to many rows in another.

• Example: Customers to Orders.

Many-to-Many (:):

• Rows in both tables relate to multiple rows in the other.

• Example: Students and Courses.

📌 Relationships in Power BI include One-to-One, One-to-Many, and Many-to-Many.

---

31. How do you create relationships in Power BI?

• You can create relationships between tables in two ways:

• **Manually:** Use primary and foreign keys to drag and connect related columns in the model view.

• **Automatically:** Power BI detects and creates relationships based on matching column names and data types.

📌 Relationships can be created manually or automatically based on key columns and matching data types.

---

32. Can you have a table in the model which does not have any relationship with other tables?

• Yes, disconnected tables are allowed in Power BI.

• These are commonly used for:

  • **Parameter Tables:** Provide slicer values for user inputs (e.g., time ranges, scenarios).

  • **Placeholder for Measures:** Let you organize and control measure logic without needing direct table relationships.

📌 Disconnected tables are used for slicers, scenarios, and dynamic measure control without joining them to fact tables.

---

33. What is Row-Level Security (RLS)?

• RLS restricts data access at the row level, so each user sees only the data they're authorized to view.

• This is configured using roles and filters in Power BI Desktop and applied in Power BI Service.

• Helps protect sensitive data by controlling what each user can see.

📌 Row-Level Security allows role-based access to data in Power BI reports.

---

34. What are the different types of joins in Power BI and their uses?

• In Power BI, joins are used in **Power Query** to combine (merge) data from different tables using a common key.

• The main types of joins and their uses include:

Inner Join:

• Returns only matching rows from both tables.

• Useful for finding records that exist in both tables (e.g., customers who made purchases).

Left Outer Join:

• Returns all rows from the left table and matched rows from the right table.

• Unmatched rows from the right table appear as null.

• Use to retain all records from the left table (e.g., list of employees, including unassigned ones).

Right Outer Join:

• Returns all rows from the right table and matched rows from the left.

• Unmatched rows from the left table appear as null.

• Useful for keeping all records from the right table (e.g., all sales regions and representatives).

Full Outer Join:

• Returns all rows from both tables, with nulls where no matches exist.

• Ideal for combining full sets from both sources (e.g., all customers and orders, including unmatched).

Anti Join:

• Returns rows from one table that do not match any in the other.

• Useful for finding missing or unmatched records (e.g., customers who haven't purchased).

📌 Use joins in Power Query to merge data appropriately: Inner, Left Outer, Right Outer, Full Outer, and Anti Join.

---

35. What are the major differences between Power BI and Excel?

• **Power BI** and **Excel** are both tools for data analysis, but they serve different use cases:

Data Relationships:

• Excel: Supports one-directional relationships.

• Power BI: Supports bi-directional relationships for complex modeling.

Cross-Filtering:

• Excel: Limited to one-directional cross-filtering.

• Power BI: Supports bi-directional interactive filtering.

Security:

• Excel: Limited security features.

• Power BI: Robust role-based security, including Row-Level Security (RLS).

Data Import Options:

• Excel: Primarily supports import mode.

• Power BI: Offers **Import Mode**, **DirectQuery**, and **Composite Models** for real-time connectivity.

📌 Excel is ideal for quick analysis and modeling. Power BI is designed for scalable, interactive, and secure business intelligence reporting.

---

36. How to set up Auto-refresh in Power BI?

• Auto-refresh is managed via **Power BI Service**.

• Go to your dataset settings and:

  • Set the refresh schedule (daily, hourly, etc.)

  • Ensure correct credentials are saved

• Power BI will automatically update the data at the specified interval.

📌 Use scheduled refresh in Power BI Service to keep your reports and dashboards up to date.

---

37. Explain the difference between Power BI Desktop and Power BI Service.

• Both are essential tools in the Power BI ecosystem:

Power BI Desktop:

• Used to build reports and data models locally.

• Offers full data transformation and modeling features.

• Free desktop application for Windows.

Power BI Service:

• Cloud-based platform to publish, share, and access reports.

• Enables collaboration, scheduled refresh, and real-time dashboards.

• Works across web and mobile.

📌 Power BI Desktop is used for report creation; Power BI Service is used for sharing and collaboration.

---

38. What is a Power BI workspace?

• A workspace in Power BI is a **collaborative environment** for managing:

  • Reports

  • Dashboards

  • Semantic Models (datasets)

  • Dataflows

• Workspace owners can assign roles (Viewer, Contributor, Member, Admin) to manage access.

• Workspaces serve as shared hubs for team-based analytics and publishing.

📌 Power BI workspaces support collaboration and centralized management of related BI content.

---

39. How do you optimize Power BI reports for performance?

• Follow best practices to make reports faster and more responsive:

• **Reduce Data Volume:** Remove unnecessary columns and rows.

• **Efficient Modeling:** Use proper relationships and limit unused tables.

• **Use Aggregations:** Pre-aggregate data at the source if possible.

• **Simplify Visuals:** Fewer visuals = faster reports.

• **Optimize DAX:** Write efficient measures and avoid nested loops or heavy logic.

• **Avoid DirectQuery:** Use Import Mode when possible for better performance.

• **Use Performance Analyzer:** Identify and fix slow visuals.

• **Enable Query Reduction:** Disable auto-refresh for every interaction using Optimization Presets.

📌 Performance tuning in Power BI includes reducing data, simplifying visuals, optimizing DAX, and using Import Mode where feasible.

---

40. What is the difference between a slicer and a filter in Power BI?

• **Slicers** are visual elements on the report canvas that allow users to filter data interactively.

  • Can be dropdowns, lists, buttons, or sliders

  • Easily customized and visible in the report

  • Can sync across pages or be scoped to specific visuals

• **Filters** are applied via the filter pane and can be:

  • Visual-level

  • Page-level

  • Report-level

• Filters are often invisible to the user and are set in the background.

📌 Slicers offer interactive filtering through the report canvas, while filters are background-level controls via the filter pane.

---

41. Explain the difference between SUM and SUMX in DAX.

• Both **SUM** and **SUMX** are used to calculate totals but behave differently:

SUM:

• Adds all values in a single column.

• Example: SUM(Sales[Amount]) adds the Amount column.

SUMX:

• Iterates over a table, evaluates an expression for each row, and then adds the results.

• Example: SUMX(Sales, Sales[Quantity] * Sales[Price]) calculates sales total row-by-row.

📌 Use SUM for simple column totals and SUMX when you need row-level expressions. Other iterators include AVERAGEX, MINX, MAXX, and COUNTX.

Advanced Level Questions

42. What is the purpose of time intelligence functions in Power BI?

• Time intelligence functions simplify working with **time-based data** in Power BI.
• They help users calculate and compare data across time periods (days, months, quarters, years).
• These functions dynamically respond to the **date context** in visuals.
• They are useful for tracking trends, comparing past and current values, and forecasting.

Examples of Time Intelligence Functions:

• **SAMEPERIODLASTYEAR:** Returns dates shifted back one year. Useful for YoY comparisons.
• **DATESYTD:** Returns dates from the start of the year to the current context.
• **DATEADD:** Shifts dates by a specified interval (e.g., +1 month, -1 year).

📌 Time intelligence functions allow period-over-period analysis using date context in Power BI.

---

43. What is a Semantic Model?

• A semantic model in Power BI (formerly called a dataset) is the foundation of a report.
• It includes tables, relationships, hierarchies, calculations, and security rules.
• It's created in Power BI Desktop and published to the Power BI Service.
• Reports and dashboards are built on top of this reusable model.

📌 A semantic model defines the structure and logic of your data and is used to power reports and dashboards.

---

44. What is the difference between a star schema and a snowflake schema in data modeling?

Star Schema:

• Central fact table connected to denormalized dimension tables.

• Easy to understand and fast for queries.

• Fewer joins, better performance.

Snowflake Schema:

• Dimension tables are normalized into sub-tables.

• Reduces redundancy but increases complexity.

• More joins, potentially slower queries.

📌 Star schema is optimized for performance and simplicity. Snowflake schema supports normalization but adds complexity.

---

45. What is the purpose of the CALCULATE function in DAX?

• CALCULATE modifies the **filter context** of an expression.

• It allows complex and dynamic calculations based on custom filters.

• Use it to override report filters and apply your own logic.

• Example: CALCULATE(SUM(Sales[Amount]), Region = "West")

📌 CALCULATE is a powerful DAX function that changes the filter context to perform advanced calculations.

---

46. What is the USERELATIONSHIP function in DAX?

• USERELATIONSHIP activates an **inactive relationship** between two tables in DAX calculations.

• It's useful when a table has **multiple relationships** with another table but only one can be active at a time.

• It allows you to control which relationship to use in a specific measure.

📌 USERELATIONSHIP enables using alternate relationships in DAX without changing the data model.

---

47. How do you handle many-to-many relationships in Power BI?

• Power BI allows **many-to-many relationships**, but they can be risky.

• Issues include ambiguous results, performance slowdown, and harder maintenance.

Recommended approach: Use a Bridge Table

• Create a new table that contains unique combinations of keys from the related tables.

• Establish **one-to-many** relationships from both original tables to the bridge table.

• This provides better control and accuracy.

📌 For reliable results, use a bridge table to manage many-to-many relationships in Power BI.

---

48. What is the difference between VALUES and DISTINCT in DAX?

VALUES:

• Returns unique values from a column and **includes a blank row** if nulls exist.

• Can also return a full table with one column.

DISTINCT:

• Returns only the distinct values from a column.

• **Excludes blank** if the column has nulls.

📌 Use VALUES when blanks are important. Use DISTINCT for cleaner output without blanks.

---

49. What is the purpose of the CROSSFILTER function in DAX?

• CROSSFILTER changes the **direction of filter propagation** between two related tables.

• Can be set to **one-way**, **both**, or **none**.

• Useful in scenarios where filters need to flow in a non-default direction (e.g., from many to one).

• Example: CROSSFILTER(Sales[CustomerID], Customers[CustomerID], Both)

📌 CROSSFILTER gives control over how filters travel across relationships in your data model.

---

50. How do you manage dynamic data updates in Power BI?

• Power BI supports several methods to keep reports current:

Scheduled Refresh:

• Set a refresh schedule in Power BI Service (e.g., daily/hourly).

• Ideal for regularly updated datasets.

Live Connection:

• Connects directly to sources like SQL Server or Azure Analysis Services.

• Shows real-time data without import.

Real-Time Streaming:

• Uses streaming datasets and services like Azure Stream Analytics.

• Best for dashboards showing live telemetry or sensors.

📌 Use scheduled refresh, live connection, or real-time streaming depending on your data update needs.

---

51. Explain Row Context and Filter Context.

• In DAX, row context and filter context are two key concepts that affect how calculations are performed.

Row Context:

• Row context refers to the current row being processed in a table. It applies when DAX functions evaluate each row individually.

• Example: When adding a calculated column to a sales table to calculate profit (sales amount minus cost), DAX applies the formula to each row separately, which is the row context.

Filter Context:

• Filter context is the set of filters applied to data before a calculation. These filters can come from slicers, report filters, or DAX functions like CALCULATE.

• Example: If a report is filtered to show sales for a specific year, the filter context includes only data for that year. When calculating total sales, it sums only the sales for the selected year, respecting the filter context.

📌 In DAX, row context applies to calculations on individual rows. Filter context applies filters before a calculation, affecting the data considered.

---

52. What is the difference between 'Append Query' and 'Merge Query' in Power BI?

• In Power BI, Append Query and Merge Query are used to combine data, but they work differently:

Append Query:

• Adds rows from one table to another.

• Use it to stack data from tables with similar structures, such as combining monthly sales tables into one table.

Merge Query:

• Combines columns from two tables based on a common key.

• Use it to join tables by matching rows using a key column, similar to a SQL join, such as merging a customer table with an orders table based on CustomerID.

📌 Append Query adds rows from one table to another. Merge Query combines columns from two tables based on a common key.

---

53. How do you compare last year's numbers to this year's numbers in Power BI?

• To compare last year's numbers to this year's in Power BI, you can use the DAX functions SAMEPERIODLASTYEAR or DATEADD inside a CALCULATE statement.

SAMEPERIODLASTYEAR:

• Shifts dates by exactly one year, making it ideal for year-over-year comparisons. It's straightforward and easy to use for comparing the same period across different years.

DATEADD:

• Offers more flexibility, allowing you to shift dates by various intervals such as days, months, or years. This is useful for comparisons over different time periods, not just yearly.

---

54. What is the purpose of the 'What If' parameter in Power BI?

• The 'What If' parameter, now called a Numeric Range Parameter, in Power BI allows users to visualize different scenarios by dynamically changing parameter values.

• It's ideal for interactive reports, enabling users to see changes in visuals and calculations instantly. This is useful for scenario analysis and forecasting.

• With the 'What If' parameter, users can simulate different situations. For example, they can adjust sales targets, costs, or other key metrics and see the impact on performance.
• To create one, select "New parameter" from the Modeling tab in Power BI Desktop, and choose "Numeric range."

---

55. Can we have two active relationships between two tables in Power BI?

• No, you cannot have two active relationships between two tables in Power BI at the same time.
• Power BI allows only one active relationship between any two tables. However, you can have multiple inactive relationships.
• These can be activated in specific DAX calculations using the USERELATIONSHIP function.

---

56. What is a Power BI App?

• A Power BI App bundles related dashboards and reports. This makes data access and interaction more organized and consistent. It is shared with user groups, ensuring everyone has access to the right data.
Packaged Content: An app can include one or more dashboards and reports.
Sharing: Apps make it easy to share these collections with other users, ensuring they have access to the right data.
Navigation: Users can easily navigate through the app to find the specific data they need. This eliminates the need to search through multiple individual reports or dashboards.
Updates: When the data or reports within an app are updated, the changes are automatically available to all users of the app.
📌 A Power BI App bundles dashboards and reports for organized, consistent data access and easy sharing with user groups.

---

57. What are dataflows in Power BI and some of their benefits?

• Dataflows in Power BI let users create, manage, and reuse data preparation steps across multiple reports and dashboards.
Benefits of Dataflows:

• Data Reuse: Dataflows can be reused in different reports and dashboards, saving time and ensuring consistency.

• Improved Data Consistency: They centralize data transformation rules, leading to more accurate and reliable reports.

• Centralized Data Management: They simplify governance by storing and managing data in one place, making it easier to maintain quality.

📌 Dataflows in Power BI enable reusable data preparation across multiple reports and dashboards.

---

58. Where is data stored in Power BI?

• In Power BI, data storage depends on the connectivity mode you choose.

Import Mode:

• Data is imported into Power BI and stored within the Power BI memory cache dataset itself.

• Best for smaller datasets or when fast performance is needed, as the data is stored in-memory.

DirectQuery Mode:

• Data remains in the source system, and Power BI queries it in real-time.

• Ideal for large datasets or when you need the most current data. Performance can be slower since queries are sent to the original data source.

Composite Models:

• Allow a report to have two or more data connections, including DirectQuery connections or Import, in any combination.

• You can set the storage mode for each table individually in your model.

• You can choose between Import, DirectQuery, and Dual.

• Dual Mode combines both Import and DirectQuery modes for a single table. The mode used depends on the context:

• Calculations or measures requiring real-time data will trigger DirectQuery mode.

• Calculations that can be performed on pre-cached data will use Import mode.

📌 In Power BI, data storage depends on the connectivity mode: Import Mode for in-memory storage, DirectQuery Mode for real-time queries, and Composite Models for a mix of both.

---

59. What is Fabric?

• Microsoft Fabric is an end-to-end data analytics platform. It integrates various data services and tools into a single, unified experience.

• Data engineers and admins use the platform to manage and integrate the organization's data infrastructure. It facilitates collaboration between data engineers, data scientists, and business analysts.

• Power BI is part of Microsoft Fabric. Other services include Data Engineering, Data Factory, Data Science, Real-Time Analytics, Data Warehouse, and Databases.

• Many Azure products are bundled into Fabric, like Synapse Analytics, Azure Machine Learning, Data Lake Storage, Databricks, and more. It also includes OneLake, which is the centralized storage. It's a single point of entry for all the internal data sources (like OneDrive for data).

📌 Microsoft Fabric is a comprehensive data analytics platform that integrates various data services, including Power BI, into a unified experience.

---

60. What is OneLake Data Hub?

• OneLake Data Hub, formerly Power BI Data Hub, is a shortcut on the Power BI ribbon that lets users find and connect to existing Microsoft Fabric items, such as Power BI semantic models, lakehouses, warehouses, or Datamarts.

• OneLake is akin to OneDrive for data, providing integrated cloud storage and a single entry point for all internal data sources.

📌 OneLake Data Hub allows users to connect to Microsoft Fabric items. It serves as integrated cloud storage for all internal data sources, similar to OneDrive for data.

---

61. What is the difference between CALCULATETABLE and CALCULATE in DAX?

• CALCULATE evaluates an expression in a modified filter context, returning a scalar value (such as a number or text).

• CALCULATETABLE, on the other hand, returns a table instead of a scalar. It's useful when you want to filter a table based on certain conditions and then use it in further DAX logic.

📌 Use CALCULATETABLE when you need to return a filtered table; use CALCULATE when you need to return a single value.

---

62. How does the ALLEXCEPT function work in DAX?

• ALLEXCEPT removes all filters from a table except for the ones specified in the argument.
• It's useful when you want to aggregate data while preserving filters on one or more specific columns.

📌 ALLEXCEPT clears filters from all columns of a table except the ones you specify.

---

63. What are composite models in Power BI and why are they useful?

Composite models allow you to combine data from multiple sources using both Import and DirectQuery modes in a single dataset.

Benefits include:

• Combining real-time data with cached data.
• Creating scalable and flexible models.

📌 Composite models offer flexibility by allowing both Import and DirectQuery modes in one semantic model.

---

64. What is Incremental Refresh in Power BI?

Incremental refresh updates only new or changed data instead of refreshing the entire dataset. This improves performance and reduces resource usage for large datasets.

📌 Incremental refresh optimizes dataset performance by loading only new or modified data.

---

65. What is the purpose of SELECTEDVALUE in DAX?

SELECTEDVALUE returns the value when a single value is selected in a column, otherwise it returns a default value (or blank).

It is commonly used with slicers.

📌 SELECTEDVALUE is useful for dynamic titles and custom logic based on user selections.

---

66. How do you use the GENERATE function in DAX?

GENERATE combines each row from a table with a table of rows returned by a second expression.

It's used for producing Cartesian products or handling complex relationships.

📌 GENERATE performs a row-wise cross-join between two tables.

---

67. How does the TREATAS function work in DAX?

TREATAS applies the values from one table as filters to another table.

It's useful for dynamic relationships without actual physical relationships in the model.

📌 TREATAS simulates relationships between unlinked tables using filter logic.

---

68. What are custom visuals in Power BI and how are they managed?

Custom visuals are user-created or third-party visuals that can be imported into a Power BI report.

They are managed via the Power BI Marketplace or uploaded manually as .pbiviz files.

📌 Custom visuals expand Power BI's functionality for specialized charting needs.

---

69. How do you use DAX Studio in conjunction with Power BI?

DAX Studio is an external tool used for writing, testing, and optimizing DAX queries against Power BI semantic models.

It helps analyze performance, inspect measures, and execute queries.

📌 DAX Studio is ideal for deep performance tuning and query testing.

---

70. What is evaluation context transition in DAX and when does it happen?

Context transition occurs when a row context is converted into a filter context—usually when a row context enters a measure using CALCULATE.

This enables dynamic filtering based on current row data.

📌 Context transition is key to understanding how calculated columns and measures interact differently in DAX.

---

71. How do you optimize large datasets for better performance in Power BI?

Use aggregations: Pre-compute summary data (such as totals, averages) at the source or in Power BI itself, reducing the volume of data that Power BI needs to process and improving query performance.

Reduce calculated columns and use measures instead: Calculated columns are calculated during data load and stored in the model, consuming memory. Measures, on the other hand, are calculated dynamically during query time, which can be more efficient for large datasets.

Optimize DAX queries: Ensure DAX formulas are efficient, avoiding complex expressions and unnecessary calculations on large datasets. This can significantly improve report performance.

Use Import Mode over Direct Query when possible: Importing data into Power BI memory offers faster performance because it avoids querying the source data each time. Direct Query can be slower as it relies on the performance of the underlying data source.

---

72. What are bi-directional filters, and when should they be used cautiously?

Bi-directional filters allow filters to flow in both directions between related tables. This means that when you apply a filter on one table, it will automatically filter related tables, and vice versa.

While bi-directional filtering can simplify model design, it can also create issues:

Ambiguity in relationships: Using bi-directional filters in complex models may result in ambiguous relationships, making it unclear how data flows, especially when there are multiple relationships between tables.

Performance issues: Bi-directional filters can lead to slower performance due to increased query complexity and the higher likelihood of query duplication when multiple filters are applied. It's best to use them cautiously, especially in large datasets or complex models.

---

73. How do you handle circular dependencies in DAX calculations?

Circular dependencies occur when calculations reference each other in a loop. For example, a calculated column or measure refers back to itself either directly or indirectly, leading to a situation where the system cannot determine which calculation should be performed first.

To resolve circular dependencies:

- Restructure formulas: Break down complex calculations into intermediate steps or layers to prevent the formulas from referring back to themselves.
- Use intermediate calculated columns or measures: Create temporary columns or measures that perform part of the calculation, helping to break the circular dependency chain.

Avoid circular references whenever possible to ensure the model remains stable and the calculations can be evaluated correctly.

---

74. How do you debug errors in complex DAX formulas?

Use tools like DAX Studio: DAX Studio helps you write, analyze, and debug DAX queries more effectively by providing a detailed breakdown of each step in the query execution.

Break down formulas into smaller components: If you are encountering errors, try separating the DAX formula into smaller parts and check each part individually to isolate the error.

---

75. What are parameters in Power Query, and how are they used?

Parameters in Power Query allow dynamic input for queries.

Use cases:

- Set up a parameter to filter data dynamically based on user input (e.g., selecting a specific date range or region).
- Parameters allow users to change query behavior without needing to modify the query logic directly, making reports more interactive.

---

76. How do you connect Power BI to multiple data sources simultaneously?

Use Power Query to connect to various sources like SQL databases, APIs, Excel files, and others.

After connecting, you can combine data from different sources using:

- Merge Queries: Join tables from different sources based on a common key (e.g., CustomerID).
- Append Queries: Combine tables with similar structures (e.g., appending sales data from different regions into one table).

---

77. What is the purpose of decomposition trees in Power BI?

Decomposition trees allow users to break down a metric or measure hierarchically, helping them understand how different factors contribute to the value of the measure.

Use case: For example, if you want to analyze total sales, you can use a decomposition tree to break it down by product category, region, and sales channel.

The interactive nature of decomposition trees allows users to click on various levels to further drill down and identify the contributing factors, enhancing their ability to analyze complex data.

---

78. How can you implement conditional formatting in Power BI visuals?

Conditional formatting allows you to visually highlight data based on specific rules or conditions. In Power BI, you can apply conditional formatting to matrix, table, and card visuals. You can format background colors, font colors, data bars, or icons based on the value of a field or measure.

To apply:
- Select the visual.
- Go to the Format pane.
- Choose the specific field and enable conditional formatting.
- Choose rules, gradients, or specific thresholds based on fields or measures.

This enhances report interactivity and makes insights more noticeable.

---

79. What are quick measures in Power BI?

Quick measures are predefined DAX calculations available in Power BI that help users quickly build commonly used formulas without writing DAX manually. These include aggregations like running total, filtered value, or time-based comparisons.

To use:
- Right-click a table > New quick measure.
- Select a calculation type.
- Choose the fields for the calculation.

This is especially useful for beginners who are unfamiliar with DAX but need advanced logic.

---

80. How can you enable and use Q&A visual in Power BI?

The Q&A visual lets users ask natural language questions about their data and receive answers in the form of visuals. It uses machine learning to interpret the question and render the most appropriate chart.

To enable:
- Add the Q&A visual from the visualizations pane.
- Type a question such as “Total Sales by Region.”

Power BI attempts to parse the question using field names, synonyms, and the model’s metadata. You can train it further by adding suggested questions and managing synonyms in the Q&A setup.

81. How does Power BI handle null or missing values?

Power BI treats null or missing values based on how the data is loaded and transformed. In Power Query, nulls can be filtered, replaced, or filled.

Options include:
- Replace values: Replace null with a default.
- Fill down/up: Fill nulls with the next or previous valid value.
- Remove rows: Remove nulls during transformation.
- Use DAX: You can handle nulls in calculated columns or measures using IF, ISBLANK, or COALESCE functions.

This ensures clean data modeling and accurate visualizations.

---

82. What are disconnected tables and how are they used?

Disconnected tables are not directly related to other tables in your data model. They're often used for:
- Parameter inputs.
- What-If scenarios.
- Custom slicers or toggles to modify visuals without affecting model relationships.

A disconnected table can drive DAX logic without interfering with the existing relationships, offering dynamic filtering or calculations without structural changes.

---

83. Explain the use of COALESCE function in DAX.

COALESCE returns the first non-blank value from a list of expressions. It’s used to handle missing or null values efficiently.

Example:
`COALESCE([Actual Revenue], [Estimated Revenue], 0)`

This checks each expression in order and returns the first that is not blank. It improves readability and performance compared to nested IF or ISBLANK functions.

---

84. How do you use GROUPBY function in DAX?

The GROUPBY function in DAX allows you to create a summary table grouped by one or more columns, and optionally perform calculations on each group.

Syntax:
GROUPBY(table, groupBy_columnName, [name, expression]…)

Example:

GROUPBY(Sales, Sales[Region], "TotalSales", SUMX(CURRENTGROUP(), Sales[Amount]))

It's useful when creating intermediate calculated tables where you want to aggregate results by group without affecting your original model.

---

85. What is a KPI visual in Power BI and how is it used?

The KPI (Key Performance Indicator) visual is used to show progress toward a measurable goal. It compares a current value to a target (goal) and uses color or symbols to indicate progress.

Use Case:
- Actual vs Target Sales
- YTD vs Forecasted Metrics

You need at least three values: Indicator (current), Target, and Trend axis (date). This helps track business metrics at a glance.

---

86. What is the significance of cardinality in Power BI relationships?

Cardinality defines the relationship between the data in two tables. It affects how Power BI processes data in visuals and DAX calculations.

Types:
- One-to-many (common): One product, many sales.
- Many-to-one (reverse direction).
- Many-to-many (less common): Requires bridge tables or composite models.

Choosing the correct cardinality ensures accurate filtering, data joins, and performance optimization.

---

87. How do you use SWITCH function in DAX?

The SWITCH function evaluates an expression against a list of values and returns the result that matches the first true condition.

Example:
```
SWITCH([Region],
    "North", 100,
    "South", 200,
    "East", 300,
    0)
```

It's cleaner and more readable than nested IF statements and is used in categorizing values, assigning ranges, or setting labels.

---

88. What are tooltip pages in Power BI?

Tooltip pages are custom report pages designed to appear when a user hovers over a visual. They provide detailed contextual information without navigating away.

Steps to use:
- Create a new report page and enable 'Tooltip' in Page Information.
- Add visuals relevant to context.
- Link the tooltip to target visuals through the format pane.

Tooltips enhance interactivity and user experience by showing drill-down data on hover.

---

89. What are the different types of filters in Power BI and how do they differ?

Power BI supports multiple types of filters, each serving a specific purpose:

- **Visual-level filters**: Apply to individual visuals on a report page.
- **Page-level filters**: Apply to all visuals on a specific report page.
- **Report-level filters**: Apply to all visuals across all pages.
- **Drillthrough filters**: Used to filter data on a different report page based on a selected value.
- **Cross-filtering and cross-highlighting**: Occur when interacting directly with visuals.

Understanding where to apply each filter is essential for creating dynamic and user-friendly reports.

---

90. What is the significance of the "Dual" storage mode in composite models?

The "Dual" storage mode allows a single table in Power BI to act as both Import and DirectQuery. This enables optimized performance because:

- When the table is used in a scenario where data is available in memory, it uses Import mode.
- When the table needs real-time data, it switches to DirectQuery.

Dual mode provides flexibility and helps balance performance with real-time data needs.

---

91. What are KPIs in Power BI and how are they implemented?

Key Performance Indicators (KPIs) are visuals that show progress toward a measurable goal. In Power BI, KPIs display:

- A current value (e.g., this year's revenue)
- A target value (e.g., revenue goal)
- An indicator (e.g., green, red, yellow color)

To implement:
- Create a KPI visual.

- Assign a measure for value, a target, and optionally a trend (date axis).

KPIs provide a snapshot of performance and are ideal for dashboards.

---

92. What is the use of DAX function PATH() and PATHCONTAINS()?

PATH() is used in parent-child hierarchies to create a path string showing lineage. For example, in an organizational chart, it shows the reporting path from a manager to subordinates.

- `PATH(EmployeeID, ManagerID)` returns a delimited string.

PATHCONTAINS() checks whether a specific ID exists in that path.

- `PATHCONTAINS(PATH(EmployeeID, ManagerID), "102")` returns TRUE if "102" exists in the hierarchy chain.

These functions are essential for working with organizational structures or recursive data.

---

93. What is sensitivity labeling in Power BI?

Sensitivity labeling is part of Microsoft Information Protection. It allows data owners to classify and protect data in Power BI using labels like "Confidential", "Highly Confidential", or "Public".

When a report or dataset is labeled:
- It enforces policies (e.g., encryption, sharing restrictions).
- Labels propagate across Office tools (Excel, Outlook).

Sensitivity labels help maintain compliance and prevent unauthorized access, especially in enterprise environments.

---

94. How does field parameters feature help in dynamic reporting?

Field parameters allow users to switch dimensions or measures in a visual using slicers, without needing multiple visuals.

Benefits:
- Enables one visual to serve multiple purposes.
- Reduces report clutter.
- Improves user experience through self-service analytics.

For example, a user can toggle between "Sales by Region", "Sales by Product", and "Sales by Channel" using a single slicer and visual, backed by field parameters.

---

95. How does RELATED() differ from RELATEDTABLE()?

RELATED() retrieves a single value from a related table based on a one-to-many relationship. RELATEDTABLE() returns a table containing all rows that are related to the current row from another table.

Use RELATED() when you want to pull a single field value from another table.
Use RELATEDTABLE() when you want to evaluate multiple related rows or apply further filtering.

---

96. What is EARLIER(), and when would you use it?

EARLIER() is used to access data from a previous row context when nested row contexts exist.

It's commonly used in calculated columns, especially when performing ranking or running total operations.

Example:
If you are calculating a column where the row context changes within a nested expression (e.g., using FILTER), EARLIER() helps refer back to the outer row context.

---

97. How do you create dynamic titles using DAX?

Dynamic titles are created using DAX measures that reflect user interactions such as slicer selections.

Example:
Title = "Sales Report for " & SELECTEDVALUE(Calendar[Year])

This will dynamically update the chart or visual title based on the selected year from the slicer.

---

98. How do you implement dynamic filtering using slicers with DAX?

Dynamic filtering can be done using SELECTEDVALUE(), ALLSELECTED(), or TREATAS() in DAX.

These functions allow you to modify measures and visuals depending on what users choose from slicers. This supports interactive dashboards where the data updates instantly based on user input.

---

99. How do you debug complex measures in Power BI?

To debug complex DAX measures:
- Use variables (VAR) to break formulas into steps.
- Use intermediate measures to isolate parts of the logic.
- Use DAX Studio to analyze query plans and measure performance.
- Use Performance Analyzer in Power BI Desktop to identify slow visuals and measures.

100. What is the difference between a calculated column and a measure in DAX?

A calculated column is created at the row level in a table and stored in the data model. It is static and recalculated only when the data model is refreshed.
A measure, on the other hand, is dynamic and calculated on the fly based on the context of the report or visualization.

For example:
• Calculated Column: Profit = Sales[Revenue] - Sales[Cost]
• Measure: Total Sales = SUM(Sales[Revenue])

---

101. Explain row context and filter context in DAX.

• Row Context refers to the evaluation of expressions for each row in a table, typically used in calculated columns or iterating functions like SUMX.
• Filter Context applies when filters are introduced via slicers, visuals, or DAX functions like CALCULATE. It determines which rows are visible for calculations.

---

102. What are iterator functions in DAX? Provide examples.

Iterator functions perform row-by-row evaluations.

Examples include:
• SUMX()
• AVERAGEX()
• MAXX()

These functions evaluate an expression for each row in a table and return a single value. For instance:
AVERAGEX(Sales, Sales[Quantity] * Sales[Price]) calculates the average revenue per sale.

---

103. What is the purpose of the ALL() function?

The ALL() function removes all filters from a column or table. It is often used in percentage or total calculations to evaluate data in an unfiltered context.

Example:
% of Total Sales = SUM(Sales[Revenue]) / CALCULATE(SUM(Sales[Revenue]), ALL(Sales))

---

104. How do you calculate year-over-year (YoY) growth in DAX?

YoY Growth =
(SUM(Sales[Revenue]) - CALCULATE(SUM(Sales[Revenue]),
SAMEPERIODLASTYEAR(Calendar[Date]))) /

CALCULATE(SUM(Sales[Revenue]), SAMEPERIODLASTYEAR(Calendar[Date]))

This calculates the growth in sales compared to the same period last year.
