

Homework questions

1. What is Power BI, and what are its three main components?

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.

The three main components are:

- Power BI Desktop: A free Windows application where you connect to data, transform it, and build reports;
- Power BI Service: An online SaaS (Software as a Service) where you publish reports and share them with others;
- Power BI Mobile: Apps for Windows, iOS, and Android devices to view reports on the go.

2. Name two business use cases for Power BI dashboards.

- Sales Performance Monitoring: Tracking revenue vs. targets, top-selling products, and regional performance in real-time.
- Supply Chain Management: Monitoring inventory levels, delivery times, and supplier performance to prevent stockouts.

3. How do you download and install Power BI Desktop?

You have two primary options:

- Microsoft Store: Search for "Power BI Desktop" in the Windows Store app (*Teacher's Tip: This is the best method because it updates automatically in the background*).
- Direct Download: Go to the official Microsoft Power BI website and download the .exe installer.

4. What is the difference between Power BI Desktop and Power BI Service?

| Feature | Power BI Desktop | Power BI Service |
|-----------------|----------------------------|----------------------------------|
| Primary Purpose | Creation & Authoring | Sharing & Collaboration |
| Data Modeling | Yes (Full capabilities) | Limited |
| Connectivity | Connect to any data source | Limited to cloud/gateway sources |
| Platform | Local PC application | Web Browser (Cloud) |

5. What file extension does a Power BI project use?

The standard file extension is '.pbix'.

Note: There is also '.pbixt', which is a template file that contains the report structure but no data.

6. Explain the role of Power Query in Power BI.

Power Query is the ETL (Extract, Transform, Load) engine of Power BI. Before you visualize data, you often need to clean it (remove errors, split columns, change data types, merge tables). You do all of this in the Power Query Editor.

7. Why would a business prefer Power BI over Excel for reporting?

- Data Volume: Power BI can handle millions of rows of data seamlessly, whereas Excel slows down significantly after a certain point.
- Automation: Once a Power BI report is built, refreshing data is a one-click process (or scheduled automatically), eliminating manual copy-pasting.
- Interactivity: Power BI visuals are fully interactive; clicking a bar in one chart filters all other charts on the page.

8. Describe one limitation of the free version of Power BI.

The biggest limitation is sharing. With the free version (Power BI Desktop), you can build reports for yourself, but you cannot securely share them with other people in the Power BI Service (cloud) unless they also have premium capacity or you publish to the public web (which is not secure).

9. What is a "published report" in Power BI Service?

A published report is the result of taking your local ".pbix" file from Power BI Desktop and uploading it to the Power BI Service. Once published, it exists in the cloud, allowing authorized users to view and interact with it via a web browser.

10. How does Power BI Mobile enhance accessibility?

It allows decision-makers to view data anytime, anywhere. It includes features like push notifications for data alerts (e.g., "Sales dropped below X") and touch-optimized visuals, ensuring data isn't locked inside a desktop computer.

11. Compare Power BI with Tableau—pros and cons.

| Feature | Power BI | Tableau |
|---------|---|--|
| Pros | Lower cost, familiar Microsoft interface (similar to Excel), excellent data modeling. | Superior visual customization, handles very complex visualizations better, mature community. |
| Cons | Custom visuals can be hit-or-miss, "DAX" language has a steep learning curve. | More expensive licensing, steeper learning curve for beginners, distinct interface from Office apps. |

12. Explain how Power BI integrates with Azure services.

Power BI is built on Azure. It integrates natively with:

- Azure SQL Database: DirectQuery allows real-time reporting without importing data.

- Azure Data Lake: For analyzing massive amounts of unstructured big data.
- Azure Entra ID (formerly Active Directory): For managing user logins and security.

13. What are "gateways" in Power BI, and when are they needed?

A Gateway is a bridge software installed on a local computer or server. It acts as a secure tunnel.

When needed: You need it when your data sits "On-Premises" (on a local server/computer) but your report is in the Cloud (Power BI Service). The gateway allows the cloud to reach down and refresh the data securely.

14. How would you convince a company to adopt Power BI? (ROI argument)

- Time Savings: "We currently spend X hours per week manually updating Excel sheets. Power BI automates this, saving Y hours annually."
- Single Source of Truth: "It eliminates version control issues (e.g., 'Final_Report_v3.xlsx'). Everyone looks at the same numbers."
- Proactive Decisions: "Instead of waiting for end-of-month reports, we can see daily trends and fix issues before they become losses."

15. What security features does Power BI offer for sensitive data?

- Row-Level Security (RLS): Restricts data access for given users. (e.g., The Manager of France only sees French data, even though the underlying report contains Global data).
- Microsoft Sensitivity Labels: Tags data (e.g., "Highly Confidential") which persists even if the data is exported to Excel.
- End-to-end Encryption: Data is encrypted while at rest and while being transferred.