**Power BI**

**Assignment 3**

**1. List and explain different PowerBi products?**

Sure! Here are the different Power BI products offered by Microsoft along with brief explanations of each:

1. **Power BI Desktop:** Power BI Desktop is a Windows application that serves as a powerful data analysis and visualization tool. It allows users to connect to various data sources, transform and model data, create interactive reports and dashboards, and publish them to the Power BI Service.
2. **Power BI Service:** Power BI Service, also known as Power BI online or Power BI cloud, is a cloud-based platform for sharing, collaborating, and consuming Power BI reports and dashboards. It provides features like data refresh, collaboration tools, scheduled report distribution, and sharing capabilities.
3. **Power BI Mobile:** Power BI Mobile is a suite of mobile apps available for iOS and Android devices. It allows users to access their Power BI reports and dashboards on the go, enabling data exploration, sharing, and collaboration from mobile devices.
4. **Power BI Pro:** Power BI Pro is a subscription-based license that provides additional capabilities and features for individual users. It includes enhanced collaboration, sharing, and data refresh options, as well as access to premium content and larger dataset capacities.
5. **Power BI Premium:** Power BI Premium is an enterprise-level offering that provides dedicated resources and advanced features for organizations. It offers increased dataset sizes, real-time data streaming, paginated reports, AI capabilities, and the ability to share content with users who don't have a Power BI Pro license.
6. **Power BI Report Server:** Power BI Report Server allows organizations to host Power BI reports on-premises within their own infrastructure. It provides a secure and scalable solution for organizations that need to keep their data and reports behind their own firewall.
7. **Power BI Embedded:** Power BI Embedded enables developers to embed Power BI reports, dashboards, and visualizations into their own applications or websites. It provides APIs and SDKs for seamless integration and customization of Power BI features within other applications.
8. **Power BI Dataflows:** Power BI Dataflows allows users to build and manage data preparation processes in a self-service manner. It enables data extraction, transformation, and loading (ETL) operations to create reusable dataflows that can be used across multiple reports and dashboards.
9. **Power BI AI:** Power BI AI provides a set of artificial intelligence (AI) capabilities integrated into Power BI. It includes features like natural language querying (Q&A), AI-powered visualizations (such as Key Influencers and Decomposition Tree), and automated machine learning (AutoML) for predictive analytics.
10. **Power BI Embedded Analytics:** Power BI Embedded Analytics allows developers to integrate Power BI reports, dashboards, and visualizations into their own applications for their customers or end-users. It provides a white-label, customizable analytics solution that can be embedded into software applications.

**2. What limitations of Excel, Microsoft solved by PowerBi?**

Power BI was introduced by Microsoft to address several limitations of Excel when it comes to data analysis, reporting, and visualization. Here are some limitations that Power BI helps overcome:

1. **Scalability:** Excel has limitations in handling large datasets and complex data models. Power BI is designed to handle big data scenarios and can efficiently manage and process large volumes of data.
2. **Data Refresh:** In Excel, data needs to be manually refreshed, leading to potential data staleness. Power BI allows scheduled and automated data refreshes, ensuring that reports and dashboards always reflect the most up-to-date information.
3. **Data Modeling:** Excel has limited data modeling capabilities compared to Power BI. Power BI offers robust data modeling features, including relationships, measures, and calculations using the DAX language, allowing for more sophisticated and advanced data analysis.
4. **Collaborative Sharing:** Excel files are typically shared through email or shared drives, which can lead to versioning issues and lack of real-time collaboration. Power BI provides a centralized platform (Power BI Service) for sharing reports and dashboards, enabling collaboration, commenting, and real-time access to shared data.
5. **Data Visualization:** Excel has limited data visualization options compared to Power BI. Power BI offers a wide range of customizable visualizations, interactive features, and advanced formatting options, allowing users to create compelling and insightful reports and dashboards.
6. **Interactive Dashboards:** Excel lacks the ability to create interactive dashboards with cross-filtering and drill-down capabilities. Power BI allows users to build interactive dashboards that enable users to explore data, drill down into specific details, and apply filters dynamically.
7. **Data Source Connectivity:** Excel has limited connectivity options for accessing various data sources. Power BI offers a wide range of connectors to connect to diverse data sources, including cloud services, databases, files, and online platforms.
8. **Data Governance:** Excel lacks comprehensive data governance features. Power BI provides enhanced data governance capabilities, including access controls, permissions management, auditing, and data lineage, ensuring data security and compliance.
9. Real-time Analytics: Excel doesn't provide real-time analytics capabilities out of the box. Power BI supports real-time data streaming, allowing users to analyze and visualize streaming data in real-time.
10. **Embedding and Application Integration:** Excel has limitations when it comes to embedding reports and dashboards within other applications or integrating with external systems. Power BI offers robust embedding capabilities through Power BI Embedded, allowing for seamless integration of Power BI content into custom applications or websites.

**3. Explain PowerQuery?**

Power Query is a data preparation and transformation tool that is part of the Power BI ecosystem. It is also available as an add-in for Excel and can be used within Power BI Desktop. Power Query allows users to connect to various data sources, transform and shape data, and load it into the desired destination for further analysis and visualization. Here's an explanation of Power Query and its key features:

1. **Data Source Connectivity:** Power Query supports a wide range of data sources, including databases, files, online services, and cloud platforms. It offers built-in connectors for popular data sources like SQL Server, Excel, SharePoint, Salesforce, and more. It also supports web scraping and accessing data from APIs.
2. **Data Transformation and Shaping:** Power Query provides a user-friendly interface for performing data transformation tasks. It allows users to apply a wide range of transformations, such as filtering rows, removing duplicates, splitting columns, merging data, pivoting, unpivoting, and applying conditional logic. Power Query also supports advanced transformations using its formula language called "M."
3. **Query Folding:** Power Query leverages query folding whenever possible, which means it pushes transformation operations back to the data source for improved performance. This reduces the amount of data transferred and processed locally, optimizing query execution.
4. **Data Profiling:** Power Query includes data profiling capabilities that enable users to gain insights into the structure and quality of their data. It provides statistical summaries, data type analysis, column profiling, and data distribution analysis to help identify data issues and inconsistencies.
5. **Query Dependencies:** Power Query allows users to define query dependencies, enabling them to create a structured and modular data transformation workflow. Users can reference and reuse queries, creating a more organized and maintainable data preparation process.
6. **Query Parameters:** Power Query supports query parameters, which allow users to define dynamic values that can be changed before data loading or refreshing. This helps streamline the data preparation process and enables users to create more flexible and adaptable queries.
7. **Data Source Privacy and Security:** Power Query includes privacy settings that allow users to define how sensitive data is handled. It supports data source privacy levels, which control how data from different sources can interact with each other. This ensures data security and compliance.
8. **Custom Functions and Add-ons:** Power Query allows users to create custom functions and add-ons using the M formula language. This enables users to extend Power Query's functionality and create reusable transformations or incorporate external libraries.
9. **Query Optimization and Performance:** Power Query provides optimization options to improve query performance, such as reducing data volume, selecting specific columns, and enabling query folding. It also includes performance profiling tools to identify and resolve performance bottlenecks.

**4. Explain PowerMap?**

I apologize for the confusion, but as of my knowledge cutoff in September 2021, Power Map is a deprecated feature in Power BI. It was an interactive data visualization tool that allowed users to explore geographic and temporal data in 3D visualizations on top of Bing Maps. However, Microsoft has discontinued the development and support for Power Map.

For current versions of Power BI, Microsoft has integrated mapping and geospatial capabilities directly into the core Power BI Desktop and Power BI Service. These capabilities allow users to create interactive maps, plot data points on maps, apply custom visuals and colors based on geographic data, and perform geospatial analysis.

In Power BI, you can use the "Map" visual type to create maps and visualize geospatial data. You can plot points, regions, or shapes on the map, customize colors and markers, and even overlay additional layers like heat maps or boundary lines. The maps in Power BI support various map styles, including standard maps, satellite imagery, and custom map layers.

With the integrated mapping capabilities in Power BI, you can perform geospatial analysis, filter data based on location, drill down into specific regions, and gain insights from your data in a spatial context.

It's important to note that Microsoft frequently updates and enhances Power BI, so it's always recommended to refer to the official documentation and resources for the latest information and features related to mapping and geospatial analysis in Power BI.

**5. How powerBi eliminated the need to host SharePoint Server on premises?**

Power BI eliminates the need to host SharePoint Server on-premises by providing a cloud-based platform for data analysis, reporting, and collaboration. Here's how Power BI accomplishes this:

1. **Cloud-Based Solution:** Power BI is a cloud-based service offered by Microsoft. It allows users to store and access their data, reports, and dashboards securely in the cloud. This eliminates the need for hosting and managing an on-premises SharePoint Server infrastructure.
2. **Data Connectivity:** Power BI provides extensive connectivity options to various data sources, including databases, files, cloud services, and online platforms. Users can directly connect to these data sources from Power BI without the need for a SharePoint Server as an intermediary.
3. **Centralized Data Storage:** Power BI allows users to store their data securely in the Power BI cloud service. Users can upload their data or establish direct connections to cloud or on-premises data sources. This centralization of data storage eliminates the need for SharePoint Server as a data repository.
4. **Sharing and Collaboration:** Power BI offers robust sharing and collaboration features that allow users to share their reports and dashboards with colleagues, partners, or clients. Users can collaborate in real-time, provide comments and feedback, and control access and permissions. This collaborative environment provided by Power BI reduces the reliance on SharePoint Server for document sharing and collaboration.
5. **Web-Based Access:** Power BI provides web-based access to reports and dashboards. Users can access their Power BI content from anywhere using a web browser, eliminating the need for an on-premises SharePoint Server for remote access.
6. **Scheduled Data Refresh:** Power BI supports scheduled data refresh, allowing users to keep their reports and dashboards up-to-date with the latest data. This eliminates the need for manual data updates and reduces the dependency on SharePoint Server for data refreshes.
7. **Power BI Embedded:** Power BI Embedded allows developers to embed Power BI reports and dashboards directly into their own applications or websites. This enables users to access and interact with Power BI content without the need for a SharePoint Server for hosting and integration.

**6. Explain the updates done in Power Bi Service(power BI 2.0) as compared to older version ?**

As of my knowledge cutoff in September 2021, there have been significant updates and enhancements in Power BI Service (also referred to as Power BI 2.0 or Power BI Online) compared to the older version. Here are some notable updates:

1. **Modern User Interface:** Power BI Service underwent a significant redesign, introducing a more modern and intuitive user interface. The navigation, workspace, and report editing experience were improved to enhance user productivity and ease of use.
2. **App Workspace:** Power BI Service introduced the concept of App Workspaces, which are dedicated spaces for collaborative report creation and sharing. App Workspaces allow teams to work together on a set of reports, dashboards, and datasets, facilitating better collaboration and content management.
3. **Power BI Home:** Power BI Home was introduced as a landing page within Power BI Service, providing a personalized and customizable view of reports, dashboards, and content relevant to the user. It allows users to quickly access their favorite items, recent activity, and recommended content.
4. **Paginated Reports:** Power BI Service introduced support for paginated reports, which are highly formatted, pixel-perfect reports optimized for printing or generating PDFs. This addition expanded the reporting capabilities of Power BI, enabling the creation of traditional, paginated-style reports alongside interactive and analytical reports.
5. **AI-Powered Features:** Power BI incorporated various AI-powered features, such as the Key Influencers visual, which helps identify key drivers and factors affecting a particular outcome. Additionally, AI-driven visuals like the Decomposition Tree and Smart Narratives were introduced to provide deeper insights and storytelling capabilities.
6. **Power Automate Integration**: Power BI Service integrated with Power Automate (formerly Microsoft Flow) to enable workflow automation and process integration. Users can create automated workflows triggered by events in Power BI, allowing for seamless data-driven processes.
7. **Dataflows:** Power BI introduced Dataflows, allowing users to create and manage reusable data preparation processes. Dataflows enable users to extract, transform, and load (ETL) data into Power BI datasets, enabling data consolidation and reuse across reports and dashboards.
8. **Shared and Certified Datasets:** Power BI introduced the concept of shared and certified datasets. Shared datasets allow multiple reports to use the same underlying data, ensuring consistency and reducing duplication. Certified datasets provide a level of data governance, indicating that the data has been reviewed and approved for use.
9. **Power BI Apps:** Power BI Apps were introduced as a way to package and distribute content, including dashboards, reports, and datasets, to end-users. Power BI Apps simplify the sharing and consumption of Power BI content, providing a focused and curated experience for specific user groups.
10. **Power BI Premium Features:** Power BI Service introduced advanced features for Power BI Premium subscribers, including higher data capacity limits, advanced data refresh options, paginated reports, and AI-driven features like AutoML and anomaly detection.