**Power BI Assignment 3**

1. List and explain different Power Bi products.

Ans. There are the different Power BI products:-

* **Power BI Desktop:** Power BI Desktop is a Windows application used for creating powerful data visualizations and building interactive reports and dashboards. It provides advanced data modeling, data transformation, and visualization capabilities. Power BI Desktop is primarily used by analysts and data professionals to design and develop robust BI solutions.
* **Power BI Service:** Power BI Service, also known as Power BI Online or Power BI cloud service, is a web-based platform for sharing, collaborating, and publishing Power BI reports and dashboards. It allows users to securely publish their Power BI Desktop reports to the cloud, access reports from anywhere, and collaborate with colleagues by sharing reports, dashboards, and datasets. Power BI Service offers additional features like scheduled data refresh, data alerts, and sharing options.
* **Power BI Mobile:** Power BI Mobile is a set of mobile apps available for iOS and Android devices. It allows users to access their Power BI reports and dashboards on the go, enabling real-time data exploration and decision-making from mobile devices. Power BI Mobile provides a responsive and touch-friendly interface, supports offline access to reports, and offers features like notifications and natural language Q&A.
* **Power BI Report Server:** Power BI Report Server is an on-premises solution that allows organizations to deploy and manage Power BI reports within their own network infrastructure. It provides a secure and controlled environment for hosting Power BI reports, dashboards, and KPIs on servers that are managed by the organization. Power BI Report Server enables organizations to leverage the benefits of Power BI while maintaining data governance and compliance requirements.
* **Power BI Embedded:** Power BI Embedded is a developer platform that enables developers to integrate Power BI reports and dashboards into their own applications. It provides APIs and SDKs that allow developers to embed interactive Power BI visuals, reports, and dashboards directly into their custom applications, websites, or portals. Power BI Embedded enables organizations to provide analytics and reporting capabilities seamlessly within their own applications.
* **Power BI Premium:** Power BI Premium is a licensing option that provides dedicated capacity and enhanced features for organizations with larger-scale Power BI deployments. It offers increased data capacity, advanced data refresh options, AI capabilities, and the ability to share reports and dashboards with external users without requiring individual licenses. Power BI Premium also includes Power BI Report Server for on-premises deployment.

1. What limitations of Excel, Microsoft solved by Power Bi?

Ans. Power BI was developed by Microsoft to address several limitations of Excel when it comes to data analysis, reporting, and visualization. Here are some key limitations of Excel that Power BI aims to solve:

* **Scalability:** Excel has limitations when it comes to handling large volumes of data. Power BI is designed to handle large datasets and can efficiently process and analyze millions of rows of data, whereas Excel's performance can degrade significantly with large datasets.
* **Data Refresh:** In Excel, refreshing data from multiple sources and ensuring data accuracy can be a manual and time-consuming process. Power BI provides automated and scheduled data refresh capabilities, allowing users to keep their reports and dashboards up to date with the latest data from various sources.
* **Data Modeling:** Excel offers basic data modeling capabilities, but it can become complex and difficult to manage when dealing with multiple tables and complex relationships. Power BI provides a robust data modeling engine that allows users to create and manage relationships between tables, define hierarchies, and implement complex calculations using the DAX language.
* **Visualization:** Excel provides basic charting and visualization options, but creating interactive and visually appealing reports and dashboards can be challenging. Power BI offers a wide range of pre-built data visualizations and custom visuals, along with advanced formatting and interactivity options, enabling users to create professional-looking and interactive reports.
* **Collaboration and Sharing:** Sharing Excel files and collaborating with others can be cumbersome. Power BI provides a cloud-based service (Power BI Service) where users can publish and share their reports and dashboards securely with colleagues and stakeholders. Power BI Service also supports collaboration features such as comments, sharing permissions, and content distribution.
* **Data Source Connectivity:** Excel has limited connectivity options for accessing data from various sources. Power BI offers a wide range of connectors that allow users to connect to diverse data sources, including databases, cloud services, online platforms, and APIs. Power BI's connectivity options are continuously expanding with new connectors being added regularly.
* **Real-time Data Analysis:** Excel is primarily a static tool, and analyzing real-time data can be challenging. Power BI provides real-time data analysis capabilities, allowing users to connect to live data sources and visualize real-time data updates in their reports and dashboards.
* **Self-Service BI:** Excel requires advanced technical skills to build complex data models and reports. Power BI aims to empower business users with self-service BI capabilities, providing a user-friendly interface, drag-and-drop functionality, and intuitive data exploration features that enable users to build their own reports and gain insights without heavy reliance on IT or data professionals.

1. Explain Power Query.

Ans. Power Query is a data transformation and data preparation tool that is part of the Microsoft Power BI suite, including Power BI Desktop, Excel, and Power Automate. It allows users to connect to various data sources, perform data transformations, and shape the data for analysis and reporting purposes. Explanation of Power Query:

* **Data Source Connectivity:** Power Query provides a wide range of data connectors to connect to various data sources such as databases (SQL Server, Oracle, MySQL), files (Excel, CSV, JSON), online services (SharePoint, Salesforce, Azure), and many others. It simplifies the process of accessing data from multiple sources.
* **Data Exploration and Profiling:** Power Query offers data exploration capabilities, allowing users to preview and inspect the data from the connected sources. It provides a data profiling feature to identify and analyze the characteristics of the data, including data types, quality, and patterns.
* **Data Transformation and Shaping:** Power Query enables users to perform a wide range of data transformations to clean, filter, reshape, and combine data from different sources. It provides a user-friendly interface with a set of built-in transformations and functions, such as filtering rows, removing duplicates, splitting columns, merging tables, and aggregating data.
* **Query Editor:** Power Query includes a Query Editor, which is a visual interface where users can define the data transformation steps. It allows users to navigate and edit the applied transformations, preview the results, and refine the data shaping process. The Query Editor provides a wide range of tools and options for efficient data manipulation.
* **Data Loading and Refreshing:** Once the data transformation steps are defined in Power Query, the resulting dataset can be loaded into Power BI or Excel for further analysis and reporting. Power Query supports options for data loading, including loading the data into the Data Model for advanced analytics or loading it directly into a worksheet for Excel-based analysis. It also provides options for data refreshing to keep the data up to date with the source.
* **Advanced Transformations with M Language:** Power Query uses the M formula language for defining advanced data transformations. Users can write custom formulas in the M language to perform complex calculations, create custom columns, apply conditional logic, and implement more advanced data shaping operations. The M language provides a flexible and powerful framework for data manipulation.
* **Query Dependencies and Query Folding:** Power Query optimizes data transformations by applying query dependencies and query folding. Query dependencies help ensure that the data transformation steps are applied in the correct order. Query folding pushes data transformations back to the source system whenever possible, allowing for more efficient data processing and reducing data transfer.

Power Query simplifies the process of accessing, transforming, and shaping data from multiple sources. It provides a user-friendly interface, a wide range of data connectors, and powerful data transformation capabilities, empowering users to prepare their data for analysis and reporting in Power BI, Excel, or other applications.

1. Explain Power Map.

Ans. The mapping features in Power BI:-

* **Built-in Maps:** Power BI offers built-in maps that allow users to plot and visualize data based on geographical locations. Users can map their data points to specific regions, countries, or coordinates. Power BI automatically recognizes geographic data and provides options for map visualizations.
* **Custom Maps:** Power BI allows users to import custom map files or shape files to create specialized maps. This feature is useful for creating custom boundaries, regions, or areas that may not be available in the built-in maps.
* **Map Visualization Options:** Power BI offers various visualization options for maps, including clustered and heat maps. Clustered maps group nearby data points together to avoid overcrowding, while heat maps use colors to represent data intensity or density across the map.
* **Map Layers:** Power BI supports multiple layers on maps, allowing users to overlay different datasets or map visualizations. This feature enables users to compare and analyze multiple layers of geospatial data.
* **Drill-Down and Zoom:** Users can drill down into the map visualizations to explore more detailed views or zoom in and out to focus on specific regions or levels of detail. This feature enables interactive data exploration and analysis.
* **Location Intelligence:** Power BI integrates with Azure Maps, which provides advanced geospatial capabilities, including geocoding, routing, and spatial analysis. Users can leverage these location intelligence features to enhance their geospatial analysis and visualizations within Power BI.

1. How power Bi eliminated the need to host SharePoint Server on premises?

Ans. Power BI has helped eliminate the need to host SharePoint Server on premises by providing a cloud-based platform for sharing and collaborating on business intelligence content.

There are a few key ways in which Power BI has contributed to this:

* **Cloud-based Collaboration:** Power BI offers a cloud-based service called Power BI Service (previously known as Power BI Online or Power BI in the cloud). It allows users to publish and share reports, dashboards, and datasets securely on the web. This eliminates the need for hosting and managing SharePoint Server on premises for collaboration and sharing of BI content.
* **Centralized Content Repository:** Power BI Service serves as a centralized hub for storing and accessing Power BI content. Users can upload their reports, dashboards, and datasets to the Power BI Service, making them easily accessible to authorized users across the organization. This reduces the reliance on SharePoint Server as the primary content repository for BI assets. Web-Based Access and Interaction: Power BI Service provides a web-based interface that allows users to access, interact with, and explore Power BI reports and dashboards without the need for SharePoint Server. Users can view reports, apply filters, drill down into data, and share insights directly from the Power BI Service interface.
* **Collaborative Features:** Power BI Service offers a range of collaboration features, such as sharing reports and dashboards with colleagues, assigning roles and permissions, adding comments and annotations, and discussing insights. These collaborative capabilities within Power BI Service reduce the need for SharePoint Server as a collaboration platform for BI content.
* **Mobile and Cross-Platform Accessibility:** Power BI Mobile apps enable users to access and interact with Power BI content on mobile devices. This ensures that users can view and analyze reports and dashboards from anywhere, without relying on SharePoint Server or specific on-premises infrastructure.
* **Integration with SharePoint Online:** While Power BI has reduced the need for hosting SharePoint Server on premises, it still provides integration capabilities with SharePoint Online, the cloud-based version of SharePoint. Users can embed Power BI reports and dashboards directly within SharePoint Online sites, allowing for seamless integration and access to BI content within the SharePoint Online environment.

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

Ans. Some significant updates that have been introduced in Power BI Service:-

* **Power BI Workspace Experience:** Microsoft introduced a new workspace experience in Power BI Service, providing an improved interface for managing workspaces, reports, dashboards, and datasets. The new workspace experience offers better collaboration capabilities, permissions management, and content organization.
* **Paginated Reports:** Power BI added support for paginated reports, which are optimized for printing or generating high-volume, pixel-perfect PDF or Excel exports. This feature allows users to create and distribute formatted reports with precise control over page layout and formatting.
* **Power BI Premium and Premium per User (PPU):** Microsoft introduced Power BI Premium, a capacity-based licensing model that provides enhanced performance, scalability, and advanced features for large-scale deployments. Additionally, Power BI Premium per User (PPU) was introduced, offering individual users access to Premium features without requiring organization-wide Premium licenses.
* **Power BI Apps:** Power BI Apps replaced the concept of content packs, offering a simplified and enhanced way to distribute and consume pre-packaged collections of dashboards, reports, and datasets. Power BI Apps make it easier for users to discover, install, and update content from publishers.
* **Power BI Dataflow:** Power BI Dataflow enable users to discover, connect to, and ingest data from various sources into reusable data entities within Power BI. Dataflow provide a self-service data preparation experience, allowing users to transform and shape data for analysis and reporting.
* **AI and Machine Learning Integration:** Power BI incorporates artificial intelligence (AI) and machine learning (ML) capabilities, such as AI-powered visuals, natural language querying (Q&A), and anomaly detection. These features enable users to gain deeper insights from their data and leverage advanced analytics within their Power BI reports and dashboards.
* **Power Automate Integration:** Power BI integrates with Power Automate (previously known as Microsoft Flow), allowing users to create automated workflows and notifications based on data events or changes in Power BI. This integration enhances the ability to automate data-driven processes and notifications.
* **Incremental Data Refresh:** Power BI introduced the capability to perform incremental data refresh, enabling faster and more efficient data updates for large datasets. Incremental data refresh allows users to refresh only the new or modified data, reducing the overall data refresh time.