**Power BI Assignment 1**

1. What do you mean by BI? Explain.

Answer:

**Power BI** is a powerful business intelligence (BI) tool developed by Microsoft that assists in data visualization, analysis, and reporting. It helps organizations and analysts make informed decisions by transforming raw data into meaningful insights and interactive reports. Here's how Power BI helps in BI and supports analysts:

* **Data Integration and Transformation**: Power BI allows you to connect to various data sources, including databases, spreadsheets, cloud services, and more. Analysts can import and integrate data from different sources, clean and transform it using Power Query, and create a unified dataset for analysis.
* **Data Modeling**: Power BI provides a robust data modeling environment where analysts can create relationships between tables, and define calculated columns, measures, and hierarchies. This enables them to build a structured data model that accurately represents the business logic and relationships within the data.
* Interactive Data Visualization: One of Power BI's strengths lies in its visualization capabilities. Analysts can create a wide range of interactive charts, graphs, maps, and tables to represent data patterns, trends, and insights. Visualizations can be customized extensively to suit specific reporting requirements.
* **Drag-and-Drop Interfac**e: Power BI offers an intuitive drag-and-drop interface for designing reports and dashboards. Analysts without extensive programming knowledge can easily build visually appealing and informative reports by simply selecting the relevant data fields and visualizations.
* **Dashboards and Reports**: Analysts can create interactive dashboards and reports using Power BI Desktop, which can then be published to the Power BI service. These dashboards can be shared with stakeholders, and real-time data refresh ensures that the information is always up to date.
* **Data Exploration and Analysis**: Power BI enables analysts to explore data in-depth. They can slice and dice data, apply filters, drill down into details, and perform ad-hoc analysis to uncover hidden insights and answer specific business questions.
* Natural Language Querying: Power BI supports natural language querying, allowing analysts to ask questions about the data using everyday language. The tool converts these questions into data queries, making it easier to access information without the need for complex queries or programming.
* **Collaboration**: Power BI fosters collaboration among analysts and other stakeholders. Teams can work on the same report simultaneously, leave comments, and share insights within the Power BI service.
* **Mobile Support**: Power BI provides mobile apps for various platforms, enabling analysts to access their reports and dashboards on-the-go. Reports automatically adapt to different screen sizes, ensuring a consistent user experience across devices.
* **Data Security**: Power BI offers various security features, including data encryption, access controls, and integration with Azure Active Directory. This ensures that sensitive data remains secure and only authorized users have access to it.

1. How does Power-BI helps in BI, and how does it help Analysts? Explain.

Answer: Microsoft Power BI is used to find insights within an organization's data. Power BI can help connect disparate data sets, transform and clean the data into a data model and create charts or graphs to provide visuals of the data. All of this can be shared with other Power BI users within the organization.

The data models created from Power BI can be used in several ways for organizations, including the following:

* telling stories through charts and data visualizations;
* examining "what if" scenarios within the data; and
* creating reports that can answer questions in real-time and help with forecasting to make sure departments meet business metrics.

Power BI can also provide executive dashboards for administrators or managers, giving management more insight into how departments are doing.

Though Power BI is a self-service BI tool that brings data analytics to employees, it's mostly used by data analysts and BI professionals who create the data models before disseminating reports throughout the organization. However, those without an analytical background can still navigate Power BI and create reports.

Microsoft Power BI is used by both department reps and management, with reports and forecasts created to aid sales and marketing reps, while also providing data for management on how the department or individual employees are progressing toward their goals.

In addition, Power BI offers an admin portal for administrators to help configure the implementation of Power BI, as well as usage monitoring and licenses.

### **Key features of Power BI**

Microsoft has added a number of data analytics features to Power BI since its inception and continues to do so. Some of the most important features are the following:

* **Artificial intelligence**. Users can access image recognition and text analytics in Power BI, create machine learning models using automated ML capabilities, and integrate with Azure Machine Learning.
* **Hybrid deployment support**. This feature provides built-in connectors that allow Power BI tools to connect with a number of different data sources from Microsoft, Salesforce, and other vendors.
* **Quick Insights.** This feature allows users to create subsets of data and automatically apply analytics to that information.
* **Common data model support**. Power BI's support for the common data model allows the use of a standardized and extensible collection of data schemas (entities, attributes, and relationships).
* **Cortana integration**. This feature, which is especially popular on mobile devices, allows users to verbally query data using natural language and access results using Cortana, Microsoft's digital assistant.
* **Customization**. This feature allows developers to change the appearance of default visualization and reporting tools and import new tools into the platform.
* **APIs for integration**. This feature provides developers with sample code and application program interfaces (APIs) for embedding the Power BI dashboard in other software products.
* **Self-service data prep**. Using Power Query, business analysts can ingest, transform, integrate, and enrich big data into the Power BI web service. Ingested data can be shared across multiple Power BI models, reports, and dashboards.
* **Modeling view**. This allows users to divide complex data models by subject area into separate diagrams, multi-select objects and set common properties, view and modify properties in the properties pane, and set display folders for simpler consumption of complex data models.

1. Explain Descriptive analytics.

Answer: Descriptive analytics is a branch of analytics that focuses on summarizing and interpreting historical data to gain insights into past events, trends, and patterns. Its primary objective is to provide a clear understanding of what has happened in the past, helping organizations and analysts make sense of their data and draw meaningful conclusions. Descriptive analytics is the foundational step in the broader spectrum of analytics, including predictive and prescriptive analytics. Here's a more detailed explanation of descriptive analytics:

* **Data Collection**: Descriptive analytics begins with the collection of relevant data from various sources. This data can include structured information from databases, spreadsheets, and other systems, as well as unstructured data such as text and images.
* **Data Cleaning and Preparation**: Before analysis can begin, the collected data needs to be cleaned and prepared. This involves removing inconsistencies, errors, and duplicates, as well as transforming the data into a usable format.
* **Data Exploration**: In this phase, analysts examine the data to gain a preliminary understanding of its characteristics. This might involve calculating basic statistics such as mean, median, mode, range, and standard deviation, which provide insights into the central tendency and variability of the data.
* **Data Visualization**: Visualizations such as charts, graphs, and tables are used to present data in a visually engaging manner. Common visualizations in descriptive analytics include histograms, bar charts, line charts, scatter plots, and pie charts. These visuals help identify trends, patterns, and outliers in the data.
* **Trend Analysis**: Descriptive analytics allows analysts to identify trends and patterns in historical data. For example, they might analyze sales data over the past year to observe seasonal fluctuations or growth trends.
* **Comparative Analysis**: Analysts can compare different sets of data to draw insights. For instance, comparing sales data across different regions or product categories can reveal which areas or products are performing better.
* **Data Summarization**: Summarizing data involves condensing large datasets into key insights. This can be achieved through aggregation techniques, such as calculating totals, averages, and percentages for specific groups or time periods.
* Key Performance Indicators (KPIs): Descriptive analytics often involves defining and tracking KPIs, which are specific metrics used to measure the performance of a business or process. Examples of KPIs include revenue, customer satisfaction scores, and conversion rates.
* **Narrative Reporting**: Descriptive analytics results are typically communicated through narrative reports. These reports summarize the findings, highlight important trends, and provide actionable insights for decision-makers.
* **Historical Context**: Descriptive analytics provides historical context that can be used to benchmark current performance against past performance. This historical perspective is essential for assessing growth, identifying areas for improvement, and making informed decisions.

1. Explain Predictive analytics?

Answer: redictive analytics is a branch of analytics that involves using historical data, statistical algorithms, and machine learning techniques to make predictions about future events or outcomes. Unlike descriptive analytics, which focuses on understanding past events, predictive analytics aims to forecast what might happen based on patterns and trends observed in the data. It's a valuable tool for organizations to anticipate future trends, risks, and opportunities. Here's a more detailed explanation of predictive analytics:

* Data Collection: Predictive analytics begins with the collection of relevant historical data. This data can include a wide range of variables and attributes that are believed to be predictive of the target outcome.
* **Data Cleaning and Preparation**: Similar to other forms of analytics, the collected data needs to be cleaned, transformed, and prepared for analysis. This involves handling missing values, outliers, and ensuring the data is in a format suitable for modeling.
* **Feature Selection and Engineering**: Analysts identify the most relevant features (variables) from the dataset that could potentially influence the target outcome. Additionally, new features might be created through transformations or combinations of existing variables to enhance the predictive power of the model.
* **Model Selection**: Analysts choose a suitable predictive modeling technique based on the nature of the data and the problem at hand. Common techniques include regression analysis, decision trees, random forests, support vector machines, and neural networks.
* Training the Model: The selected predictive model is trained using historical data, where the model learns the relationships between the input features and the target outcome. This involves finding the best parameters or weights that minimize the prediction error.
* **Validation and Testing**: Once the model is trained, it needs to be validated and tested using separate datasets that were not used during the training phase. This helps assess the model's performance on unseen data and prevents overfitting (model performing well on training data but poorly on new data).
* Prediction and Forecasting: After validation, the trained model can be used to make predictions on new, unseen data. Analysts input the relevant features, and the model generates predictions about future outcomes.
* **Accuracy Assessment**: The accuracy of the predictions is evaluated using various metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), or precision-recall curves, depending on the nature of the prediction problem.
* **Model Iteration and Refinement**: Predictive models might require refinement and iteration to improve their accuracy and generalization. This could involve adjusting model parameters, incorporating additional data, or trying different algorithms.
* **Business Insights and Decision-Making**: The predictions generated by the predictive model provide valuable insights that organizations can use for decision-making. For example, predictive analytics can help with inventory optimization, customer churn prediction, fraud detection, sales forecasting, and more.
* **Feedback Loop**: As new data becomes available, the predictive model can be continuously updated and retrained to incorporate the latest information, ensuring that the predictions remain accurate and relevant.

1. Explain perspective analytics.

Answer: Prescriptive analytics is a statistical method that focuses on finding the ideal way forward or action necessary for a particular scenario, based on data. Prescriptive analytics uses both descriptive and predictive analytics but the focus here remains on actionable insights rather than data monitoring. The input of prescriptive analytics is the outcome of predictive analytics algorithms. You not only predict what the future holds, but you leverage that prediction to take the best course of action for the future. A more formal definition is that prescriptive analytics is a statistical approach utilized to generate recommendations and aid decision-making based on the computational outcomes of algorithmic models.

## Differences between Descriptive, Predictive, and Prescriptive Analytics

* Descriptive analytics offers business intelligence insights into what has occurred.
* Predictive analytics forecasts possible outcomes.
* Prescriptive analytics works to find the best possible solution from a variety of options.

Prescriptive analytics have the power to help companies make better decisions by optimizing results of future events or risks involved, by creating an algorithmic model to analyze them. The process works on data that is collected from a wide range of both descriptive and predictive sources, and then creates models that can be applied to decision-making. It considers existing conditions and the results of each possible decision to make predictions that are impactful. It can even measure the consequences of any decision in multiple future scenarios.

Prescriptive analytics rely heavily on mathematics and computer science and utilize a range of statistical methods. The process continuously recreates every possible decision pattern and the various outcomes possible. Prescriptive analytics is considered the final step of business analytics and is usually accepted as an extension of predictive analytics.

To generate any automated recommendation or a decision, there needs to be a specific algorithm-based model and a clear path in mind for those using this form of analytics. Unless you know what the problem is and what you are looking to solve, you cannot generate a recommendation. The first step to prescriptive analytics therefore is a problem to work with.

Let’s take an example – a human resources manager is tasked with up-skilling a team under his care. However, he realizes that team members who lack a particular skill set may not be able to take the upgrade course he has in mind. Prescriptive analytics can come into play here to determine how he can move forward. An algorithm can identify team members who do not possess the necessary skills and send them an automated recommendation that they acquire the skill set with another course before they come to this one.

You have to remember that the recommendation generated is completely based on the accuracy of the information provided and the model developed to get an answer. The recommendation does not become a standard for all human resource personnel that are faced with a similar situation. Each algorithmic model created is uniquely customized to the particular situation and need.

1. Write five real-life questions that PowerBi can solve.

**Answer: 1. Waiting On Figures**

## **1. Waiting On Figures**

**Having to hold off on major business decisions because you’re unable to collect figures from a colleague or need to sift through numerous reports on a server to find what you need may have been considered normal routine back in the day, but business has progressed, and waiting for data reports is no longer acceptable. Power BI allows you to access your company's data analytics almost instantly. On top of that, it also makes the data easy to decipher with advanced visualizations which can be shared at the touch of a button.**

## **2. Using Data From Old Reports**

**While being able to share documents (such as quarterly reports) with employees through the cloud was exciting when it first came out, it leaves too much room for human error. For example, it’s not uncommon for documents shared in a cloud to be mislabeled, altered, and even deleted by accident. Even if stored in the correct location, finding reports this way can be incredibly time-consuming. All of these factors can lead to unnecessary mistakes and delays.**

**Using Power BI reduces the possibility of error by allowing reports to be run in seconds using only the most current data. This ensures that reports can’t be altered or deleted and eliminates the time spent sifting through files to find the correct data.**

## **3. Excessive Time Spent Preparing For Presentations**

Whether it’s for a meeting with potential investors, sharing the latest figures with your shareholders, or leading an internal meeting with your colleagues, presentation preparation can be tedious. On top of collecting all of the data you want to share, the information has to then be put into a visually appealing presentation. If you want to include charts, graphs, and images, presentations can take a significant amount of time to produce. In addition to that, by the time the presentation is complete, the data will already be outdated.

Power BI can quickly and easily create visual representations of your data and provide stunning and accurate presentations for your meetings. Using Power BI’s automated reporting tools can save hours of preparation.

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## **4. Being Unable To Find Specific Data Sets**

Sifting through spreadsheets in search of specific data sets is time-consuming and inefficient. One of the most useful Power BI solutions is the ability to easily search for data and data-sets.

Power BI allows IT members to publish data catalogs for others to view. This makes it easier for you to find the data sets needed to perform an analysis. Additionally, using natural language technology and its Question & Answer feature provides a more natural experience to locate and better understand your BI.

## **5. Not Being Able To Determine Your Level Of Success**

While business intelligence offers a lot of useful information, not everyone knows how to use it. Even with the numbers in plain view, it can be difficult to determine whether or not your business is successful and what areas need improvement. Using Power BI’s Question & Answer feature, it’s now possible to ask your software these questions using natural language. Ask what your profits were for that month or how customer subscription numbers compare to last year’s.

The natural language technology makes it incredibly easy, and you don’t have to worry about putting your questions in any specific format. The tool will also draw your attention to any problem areas that need to be addressed, ensuring you don’t miss even the smallest opportunities to make a profit.

**Common business issues are slowing you down,** and it’s not only a poor use of time but it may also be costing you business. Your competition is using business intelligence tools to stay ahead of the game, and it’s only a matter of time before you fall behind. Take advantage of Power BI solutions that can make your company’s day-to-day activity far more efficient, tech-savvy, and less frustrating for you and your employees.

Stay ahead of the competition by using the tools available to provide you with useful information and take your current business to the next level.