**Assignment-4**

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1. **Explain Tableau workspace and terminology?**

* **Understanding Tableau workspace and terminology:**

1. **Workbook name:** A workbook contains sheets. A sheet can be a worksheet, a dashboard, or a story. For more information, see Workbooks and Sheets.
2. **Cards and shelves:** Drag fields to the cards and shelves in the workspace to add data to your view.
3. **Toolbar:** Use the toolbar to access commands and analysis and navigation tools.
4. **View:** This is the canvas in the workspace where you create a visualization (also referred to as a "viz").
5. **Click** this icon to go to the Start page, where you can connect to data. For more information, see Start Page.
6. **Side Bar:** In a worksheet, the side bar area contains the Data pane and the Analytics pane.
7. **Click** this tab to go to the Data Source page and view your data. For more information, see Data Source Page.
8. **Status bar:** Displays information about the current view.
9. **Sheet tabs:** Tabs represent each sheet in your workbook. This can include worksheets, dashboards, and stories. For more information, see Workbooks and Sheets.
10. **Describe Data Preparation and Transformation in Tableau?**

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* **Data Preparation and Transformation in Tableau:** Tableau Prep is a data preparation tool designed for analysts and business users who try to prepare data for themselves but might get stuck because they don’t have traditional ETL expertise. The tool empowers users to combine, shape, and cleanse data for analysis in Tableau. Tableau Prep has a clean and friendly user interface. The look feels like the final form of Tableau Desktop’s data source screen. Above is a screen shot view of a Superstore “flow” in Tableau Prep. There are a few key panes in the screen to be aware of:

1. **Connections pane:** Shows the databases and files you are connected to. Add connections to one or more databases and then drag the tables you want to work with into the flow pane.
2. **Flow pane:**As you clean, shape, and combine your data, steps will appear in the flows. This visual indication will allow the user to see an overview of their changes. The user can accomplish a variety of data cleaning tasks in moments, such as fuzzy clustering and other smart features.
3. **Profile pane:** Displays a summary of each field in your data and allows users to see the shape of their data and begin to identify any issues with their data.
4. **Changes pane:** Tableau Prep keeps track of the changes you make, in the order you make them, so you can always go back and review or edit those changes.
5. **Data grid:** Lets the user see row level detail and verify individual records**.**
6. **Elaborate Advanced visualization techniques?**

* **Advanced visualization techniques:** Working with advanced data visualization search for ways to present data to their audience by incorporating techniques such as animation, auto focus, multiple dimension views, and other interactive techniques. When a two-dimensional display cannot fully capture the meaning and context of data, advanced data visualization makes it possible to clearly depict complicated information in a way that is simple yet engaging.
  1. **Segmentation and Cohort Analytics:** Every business needs to understand its target audience very clearly. Segmenting your audience helps you to improve your marketing strategy and pull more earnings for every penny spent. A few of the questions segmentation will answer for you include:
  + Who are your customers?
  + What do they buy?
  + What are their requirements?
  + Where do they gather?
* **Cohort analysis in** Tableau helps you with the segmentation. A cohort refers to a group of people having similar characteristics. It allows you to view all the data in one place and categorize it based on different factors using cohort analysis. Segmentation can also be done using automated clustering, which is an unsupervised machine-learning technique. Tableau allows you to use clustering to segment large data, especially when there are lots of variables.

1. **Advanced Graphs:** Apart from the traditional line charts, bar graphs, etc., Tableau allows you to visualize data sets using several advanced graphs:

* **Motion Chart:** A motion chart uses the x-axis and the y-axis to represent the change in variables over time. The changes are marked by the movement of data points, and variation in the colours of data lines.
* **Bump Chart:** A bump chart is an advanced form of a line plot. It allows you to explore the ranks of different variables by comparing their positions. In short, it can be used to identify the popularity of products.
* **Donut Chart:** You can understand a doughnut chart as a pie chart with a hole in between. These charts are used to show the proportions of categorised data.
* **Waterfall Chart:** A waterfall chart helps you visualise positive and negative growth. You can use them to see changes in measures over the year.
* **Pareto Chart:** These are a combination of bar and line graphs. The chart presents the values in descending order and determines the most significant problems and risk management.

1. **Sophisticated Calculations and Statistical Functions:** Tableau also allows you to implement statistical methods, such as Correlation, Skewness, Covariance, Mode, Kurtosis, Standard Deviation, etc. Kurtosis is a measure of the tailedness of a distribution. Tailedness is how often outliers occur.

* Excess kurtosis is the tailedness of a distribution relative to a normal distribution. Distributions with medium kurtosis (medium tails) are mesokurtic. Distributions with low kurtosis (thin tails) are platykurtic. Moreover, you can use statistical models like K-Means, Naive Bayes, Random Forest, etc., to understand data and make predictions.

1. **Time Series and Predictive Analysis:** Time series analysis helps identify seasonal trends, i.e., how certain variables change over time. Tableau provides a simple interface for time series analysis that helps you understand trends and patterns in data. With this, you can understand the data better and make predictions.
2. **What-If Analytics:** The flexible user interface of Tableau has seamless input capabilities. It helps in making calculations and determining different scenarios. You can see how the output gets affected by changing input parameters. The ‘parameters’ feature allows you to change the initial conditions and helps in scenario analysis. The ‘story points’ feature allows you to define your scenarios.

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1. **Explain in brief Data blending and data reshaping?**

* **Data blending and data reshaping:** Data blending is a method for combining data. Data blending works by supplementing the data in the primary data source with the data in the secondary data source.
* **Data Blending:** Data Blending in Tableau is an approach to combine data from multiple varieties of sources and display them as a whole on one single screen. For example, consider a scenario where a business analyst needs to work with sales data. Now, let us imagine, the customer data is stored at the Oracle Database, and the order details are stored in a [SQL](https://www.simplilearn.com/want-to-launch-career-as-sql-specialist-article) Server. In such situations, the procedure of Data Blending comes in handy. Business analysts can combine the data from [Oracle Database](https://www.simplilearn.com/steps-to-become-oracle-database-certified-rar343-article) and SQL Server, treat it as a whole and extract business insights.
* **Interactive filters and parameters:** Filters in form can have multi-select values while parameters are single select base on a list or require user input. Actions are available for parameters but not for filters. Parameter actions enable changes in your view, by hover, select or menu.
* **Parameters:** The parametersin Tableau are the workbook variables like a number, date, or calculated field that allows users to replace a constant value in a calculation, filter, or reference line. For example, the user can create a new calculated field that returns True if the aggregate of total marks is greater than 90% and returns False if it is less than 90%. Users can replace the constant value of "90%" in the formula with the parameters in Tableau as per the requirements. With the parameter control, users can dynamically vary the threshold values in their calculation. There are multiple possibilities of creating the Parameters in Tableau based on the user's requirements:
* Top N Parameters in Tableau
* Date Field Parameters in Tableau
* Dynamic Measures
* Dynamic Dimensions

1. **Describe any 7 charts and graphs which is used in Tableau for visualization?**

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* **Tableau is a popular data visualization tool** that offers a wide range of charts and graphs to help users represent and understand their data. Here are seven commonly used charts and graphs in Tableau for visualization:

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* **Bar Chart:** Bar charts are used to represent categorical data with rectangular bars of varying lengths. They are useful for comparing the values of different categories or displaying the distribution of a single categorical variable. A bar chart or graph is used to represent category wise data of a dataset. The length of the bars is proportional to the value that each category represents. This gives instant insight into the data pictorially. In Tableau, we can create several variants like a simple vertical bar graph, segmented bar graph, stacked bar graph and side by side bar chart.

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* **Line Chart:** Line charts are ideal for visualizing trends over time. They connect data points with lines, making them suitable for showing how a numeric variable changes over a continuous axis, such as time. The line chart is ideal for when you want to illustrate trends over time. To use the line chart, you must have a date field. In the below example (Figure 1), we are comparing the quarterly profit by SubRegion over the course of several years.

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* **Scatter Plot:** Scatter plots display individual data points as dots on a two-dimensional plane. They are used to show the relationship between two numeric variables, making it easy to identify correlations or patterns. A scatter plot is a good choice for showing the relationship between two variables. It is also a good choice for finding patterns in data.
* **Pie Chart:** Pie charts represent parts of a whole by dividing a circle into slices. They are suitable for displaying the proportions of different categories in a dataset, but they should be used sparingly to avoid misinterpretation

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| A Guide To Highlight Tables and Heatmaps | Tableau |

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| https://help.tableau.com/current/pro/desktop/en-us/Img/boxplot1_149x388.png |

* **Heat Map:** Heat maps use colors to represent the values of a matrix or two-dimensional dataset. They are particularly effective for visualizing complex data relationships, like correlations in a matrix or geographic data with location-specific values. is a graphical representation of data where the individual values within a dataset are represented by color. Heatmaps are commonly used to visualize data that is two-dimensional, such as sales figures or customer satisfaction levels. The variation in color may be by hue or intensity, where hotter colors such as red and orange represent higher values, and cooler colors such as blue and green represent lower values.

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| How To Make A Histogram in Tableau, Excel, and Google Sheets |

* **Box plot: A box plot, also known as a box-and-whisker plot, is a statistical graph that visually shows the five-number summary of a set of data. It is a convenient way to summarize the distribution of data and identify outliers. Box plots are valuable for identifying skewness, comparing data distributions, and quickly assessing data spread and central tendencies. In Tableau, you can easily create box plots by selecting your data dimensions and measures and choosing the "Box Plot" chart type in the "Show Me" menu or by manually configuring a box plot from the visualization options.**
* **Histogram:** Histograms group data into bins or intervals and display the frequency or count of data points within each bin. They are used to understand the distribution and frequency of a continuous numeric variable. In Tableau, you can create histograms by selecting the numeric variable you want to visualize and choosing the "Histogram" chart type. Tableau will automatically bin the data and generate the histogram for you.

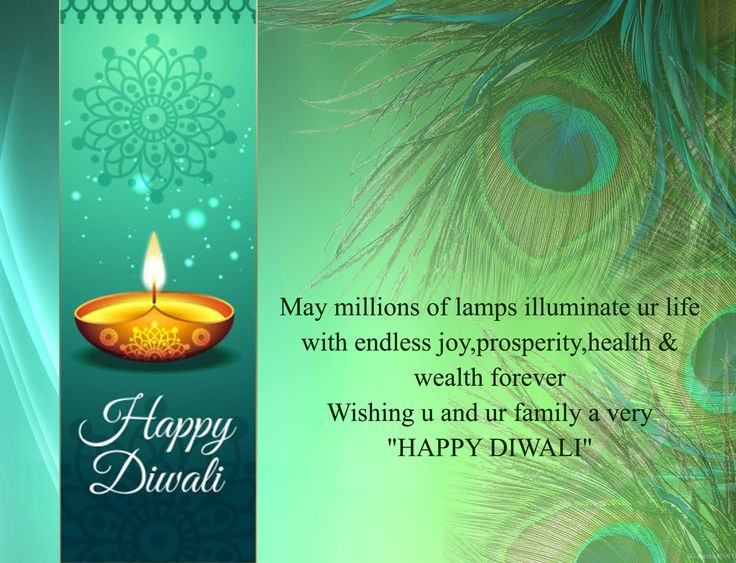
1. **Explain in briefly the Tableau Metadata API?**

* **The Tableau Metadata API** discovers and indexes all of the content on your Tableau Cloud site or Tableau Server, including workbooks, data sources, flows, and metrics. Indexing is used to gather information about Tableau content, or metadata, about the schema and lineage of the content. Then from the metadata, Metadata API identifies all of the databases, files, and tables used by the content on your Tableau Cloud site or Tableau Server.
* **You can do the following tasks using the Metadata API:**
* **Discover data:**that’s associated with the content published to your Tableau Cloud site or your Tableau ServerSearch for external assets like tables, databases, and data sources.
* **Track lineage** or the relationships between content and external assets, like data sources and workbooks. For example, identify which workbooks use a specific published data source.
* **Perform impact analysis:** Using upstream and downstream lineage information, you can evaluate impact of changes to content. For example, find all worksheets that depend on a database table column or identify the authors you should notify when a data source change occurs.
* **Tableau metadata:** The Metadata API discovers, tracks, stores, and then surfaces information about Tableau content. The content can be categorized by type (e.g., table or workbook). The content can be unique to Tableau (e.g., embedded data sources and calculated fields) and its external assets not unique to Tableau (e.g., database tables and columns). Both content and external assets can have information attached to them (e.g., tags and ratings). Both content and external assets can also have relationships to other content and external assets. The relationships among the content and external assets and the information about each is the metadata.

1. **What are the basic steps for creating a Dashboards in Tableau?**

* **Creating a dashboard in Tableau** involves several basic steps to combine and arrange visualizations to provide a comprehensive view of your data. Here are the fundamental steps for creating a dashboard in Tableau:
* **Connect to Data:** Start by opening Tableau and connecting to the data source you want to visualize. You can connect to various data sources, such as Excel, databases, cloud services, and more.
* **Create Worksheets:** Build individual worksheets by dragging and dropping dimensions and measures onto the rows and columns shelves in the worksheet tab. Customize each worksheet to display the data you want.
* **Add Visualizations:** Create various visualizations within your worksheets, such as bar charts, line charts, maps, scatter plots, and more, depending on your data and objectives.
* **Organize Layout:** Before creating a dashboard, think about how you want to arrange your visualizations. Decide on the size and layout of the dashboard. You can choose from fixed or automatic sizing options.
* **Create a Dashboard:** To create a dashboard, click on the "Dashboard" tab in Tableau. This will open the dashboard canvas.
* **Add Worksheets and Objects:** Drag and drop the worksheets and individual visualizations you want to include in your dashboard onto the canvas. You can also add objects like images, text, web pages, and more.
* **Customize Layout:** Adjust the layout of your dashboard by resizing and rearranging the visualizations and objects. You can also add horizontal and vertical containers to organize the content.
* **Apply Filters and Actions:** Create interactivity by adding filters and actions. Filters allow users to control what data is displayed, and actions enable you to connect different elements on the dashboard to drive dynamic interactions.
* **Format and Style:** Customize the appearance of your dashboard by applying formatting options such as fonts, colors, borders, and shading to ensure a consistent and visually appealing design.
* **Publish and Share:** Once you are satisfied with your dashboard, save your Tableau workbook and publish it to Tableau Server or Tableau Online to share it with others. You can also export the dashboard as a PDF or image for offline distribution.
* **Test and Iterate:** Before sharing your dashboard widely, thoroughly test it to ensure that all interactivity and visualizations work as expected. Iterate and make adjustments as necessary to improve the user experience.
* **Share and Collaborate:** Share the dashboard with your intended audience, and encourage collaboration and data exploration. You can set permissions and access controls to manage who can view and interact with the dashboard.

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