**1. Basics:**

1. **What is the difference between Discrete and Continuous Data?**

**Discrete Data**

1. Discrete in general means “individually separate and distinct”.
2. In Tableau Discrete fields are Blue in colour.
3. Generally, discrete fields are considered finite in range.
4. They usually add headers to the view.
5. The Data in Tableau can be categorised into ‘Dimensions and Measures’.
6. Dimensions contain qualitative values such as names, dates, age, product Id etc.
7. Dimension gives the user a categorical data.
8. Dimensions can be put into filter shelf, once put it asks the user to select between the categories.
9. Dimensions affect the level of details in the view. The user can see it by looking to the marks given on the left side of the view when the user adds a dimension the number of marks increases.
10. Discrete Dimensions are more common and Discrete Measures are less common in Tableau.
11. Data values can be both Discrete and Continuous.
12. When the Discrete fields are dropped on the colour mark card, Tableau displays a categorical palette and automatically assigns a colour to each value of the field.

**Continuous Data**

1. Continuous in general means “series or unbroken chain without interruption”.
2. In Tableau Continuous fields is Green in colour.
3. Continuous fields are mostly considered as infinite in range.
4. They add axes to the view.
5. Measures in Tableau are quantitative values i.e., the values that can be measured such as sales values, profit/loss values etc.
6. Measures can also be put into the filter shelf. When the user drops a continuous measure into the filter shelf, Tableau firstly prompts to choose an aggregation for the filter and then prompts to specify how to filter the continuous range of values.
7. When the user drops a continuous dimension into the filter shelf, Tableau just prompts to specify how to filter the continuous range of values.
8. When the user drops a continuous dimension into the filter shelf, Tableau just prompts to specify how to filter the continuous range of values.
9. Continuous measures are more common and continuous dimensions are less common.
10. Date values can be both continuous and discrete.
11. When continuous fields are dropped on colour in the marks card, Tableau displays a Diverging palette with a continuous range of colours.
12. **What is the criteria for data to land into dimensions and measures?**

**Dimensions**

A dimension is a field that can be considered an independent variable. Dimensions in Tableau produce headers when added to the Rows or Columns shelves in the view. By default, Tableau treats any field containing qualitative, categorical information as a dimension. However, in relational data sources, the actual definition of a Dimension is slightly more complex.

**Measures**

A measure is a filed that is a dependent variable; its value is a function of one or more dimensions. Measures typically produce axes when added to the rows or columns shelves. By default, Tableau treats any filed containing numeric(quantitative) information as a measure.

**Dimensions VS Measures**

A measure can be aggregated for each value of the dimension. For example, if we want to calculate the Sum of “Sales” for every “State in India”. In this scenario, the State field is acting as a Dimension because you want to aggregate sales for each state. The values of Sales fields (Measures) are dependent on the State, So State is an independent field

And Sales is a dependent field.

The values of Sales fields (Measures) are dependent on the State filed. This means that a measure is a function of other dimensions placed on the worksheet. In this case, the Sales filed is acting as a measure because you want to aggregate the filed for each state. But measures could also result in a non-numeric result.

1. **What is Metadata, where is it present in the workbook?**

**Metadata**

The metadata model is snapshot (or in GraphOL terms, a graph) of how Tableau interpret and relates a set of Objects on the Tableau Online site or Tableau Server.

From the metadata model, one can understand the dependencies and relationships in the data.

After connecting to the data source, Tableau captures the metadata details of the source like columns and their data types. This is used to create the dimensions, measures, and calculated fields used in views. You can browse the metadata and change some of its properties for some specific requirements. After connecting to a data source, Tableau presents all possible tables and columns present in the source.

Consider the source ‘Sample Superstore’ for checking the metadata. Click the data menu and choose to connect to a data source. Browse for the MS access file named ‘Sample Superstore’. Drag the table named Product to the data canvas. On choosing the file, you get the following screen which shows the column names, their data types.

The string data types are shown as Abc and Numeric data types are show as #.

1. **What happens when you aggregate or disaggregate the Data?**

**Aggregate**

The process of viewing numeric values or measures at higher and more summarized levels of the data is called aggregation. When you place a measure on a shelf. Tableau automatically aggregates the data, usually by summing it.

We can easily determine the aggregate applied to a field because the function always appears in front of the field’s name when it is placed on a shelf. For Example, Sales becomes SUM(Sales). We can aggregate measures using Tableau only for relational data sources. Multidimensional data sources contain aggregated data only. In Tableau, multidimensional data sources contain aggregate data only. In Tableau, multidimensional data sources contain aggregated data only. In Tableau, multidimensional data sources are supported only in Windows.

**Disaggregating**

According to Tableau, Disaggregating the data allows to view every row of the data source which can be useful when we are analysing measures that we may want to use both independently and dependently in the view. For Example, Analysing the results from a product satisfaction survey with the Age of participants or disaggregate the data to determine what age participants were most satisfied with the product.

1. **You are working on a dataset, the client adds in more data to the dataset. What happens to the Visualization that you had created? Give the explanation for both Live and Extracted data.**

By default, when we connect to data in Tableau, whether it’s a file stored locally on our computer or in a cloud database, a live data connection is created, this means that every change we make in Tableau Desktop will cause a new query to be sent to the data source.

With a live data source our visualizations will be updated every time we open our workbook or if we manually refresh the data source.

When we swap our Data Connection from ‘Live’ to ‘Extract’ a static snapshot of the data is taken. The extract is embedded in the workbook and becomes available offline. This means any queries sent to the data source can happen much faster.

Once we have created an extract there are now two places where we can Refresh.

1. The first option is the same as for the Live Data Connection. This will not update the data in our workbook if any changes are made to the original data.
2. The second option refreshes the extract, specially. This will create a new extract and therefore it will update the data in our workbook.

**Live and Extracted data:**

Live and extracted are the two ways we can make the data connection to the tableau. Live allows us real-time data while extracts are kind of batch which needs to be refreshed from time to time to get the updated data. So, in the case of live connection whatever changes will be done at the Data source end that will be directly available to the Tableau desktop. While in case of Extracting any changes made in the data source won’t reflect in the report immediately.

1. **What are the file extensions in Tableau and how each one is different?**

* **Workbooks (.twb): -** Tableau workbook files have the .twb files extension. Workbooks hold one or more worksheets, plus zero or more dashboards and stories.
* **Bookmarks (.tbm): -** Tableau bookmark files have the .tbm file extension. Bookmarks contain a single worksheet and are an easy way to quickly share your work.
* **Packaged Workbooks (.twbx): -** Tableau packaged workbooks have the .twbx file extension. A packaged workbook is a single zip file that contains a workbook along with any supporting local file data and background images. This format is the best way to package your work for sharing with others who don’t have access to the original data.
* **Extract ( .hyper or .tde): -** Depending on the version the extract was created in, Tableau extract files can have either the .hyper or .tde file extension. Extract files are a local copy of a subset or entire data set that we can use to share data with others, when we need to work offline, and improve performance.
* **Data Source (.tds): -** Tableau data source files have the .tds file extension. Data source files are shortcuts for quickly connecting to the original data that we use often. Data source files do not contain the actual data but rather the information necessary to connect to the actual data as well as any modifications we have made on top of the actual data such as changing default properties, creating calculated fields, adding groups, and so on.
* **Packaged Data Source (.tdsx): -** Tableau packaged data source files have the .tdsx file extension. A packaged data source is a zip file that contains the data source file (.tds) described above as well as any local file data such as extract files (.hyper or .tde), text files, Excel files, Access files, and local cube files. Use this format to create a single files that we can then share with others who may not have access to the original data stored locally on your computer.

**2. Text Table, Highlight Tables, Heat Maps, Tree Map:**

1. Create a text table for the Avg (Sales) for each subcategory using Sample Superstore? List which Sub Category is got Avg (Sale) more than $1000? - **Sample Superstore**
2. Create a Heat Table for the order date and Region against the Sub Category based in Count of Sales with two colours diverging that is distinguished by Sum of Profit - **Sample Superstore**
3. Create a Highlight table for the States for the Order Date Year whose highlighting is done based on Sum of profits - **Sample Superstore**
4. Which customer is having maximum of sales in the year 2012? - **Global Superstore**
5. How much is profit share less in Pennsylvania when compared to New York? - **Sample Superstore**
6. Check for the pane wise percentages of sales with Category, Sub- Category and quarter wise order date, also check for the Row wise grand totals and Column wise grand totals. - **Sample Superstore**

**3. Filled Maps, Symbol Maps:**

1. Use Global Superstore. Check Which Western Country in EMEA region has least profit percentage.
2. Use **“Sample Superstore. Xls”,** which state shares boarders only profit for tables
3. Use **“Sample Superstore. Xls”,** which state has no data for Profits for Office Supplies

**4. Bar Charts, Stacked, Side by Side:**

1. Which Customer name & Year is having all the Product Categories sum of profit less than over-all Average profit? - **Sample Superstore**
2. What is the Maximum of Life Expectancy Female for the region Africa & year 2012? - **World Indicators**
3. What is the share of the top 20 customers based on the sales amount compared to the customers based on profit amounts - **Sample Superstore**

**5. Line Graphs, Dual Line, dual axis:**

1. How can you show two different graphs in one view? - **Global Superstore**
2. Which Region is having Sum of Energy Usage>1000000 and sum of Population 65+>10? - **World Indicators**

**6. Trendlines, Cluster, scatter Plot, boxplot, Word Cloud (Packed Bubbles), Histogram:**

1. Draw a trend line for profit as a linear function of sales only for product technology? - **Sample Superstore**
2. Create a histogram showing the number of Sales using Sales Bins of $1000. Which bins have profit ratios of more than 25%? - **Global Superstore**
3. Using “**Sample Superstore”**, use order sheet create a histogram showing the number of orders using sales bins of $1000.
4. Using **“Global Superstore**”, use the orders sheet, build a scatter plot showing the sum of sales on the x-axis and sum of profits on the y axis for all products (Product name). What is the equation for linear regression for products in Technology?
5. Use **“World Indicators”.**  Take Health Exp% GDP, Health Exp/Capita, Life Expectancy Male, Female. What are the variables that are considered to create the clusters by default?

**7. Calculate Fields, Quick table calculations, LOD:**

1. **How do you create a profit ratio using the Calculated fields?**

**Creating a Simple Calculated Field**

Sometimes our data source does not contain a field (or column) that we need for our analysis. For Example, our data source might contain fields with values for Sales and Profit, but not for Profit Ratio. If this is the case, we can create a calculated field for Profit Ratio using data from the Sales and Profit fields.

Steps 1: Create the calculated field

1. In a worksheet in Tableau, select Analysis > Create Calculated Field.
2. In the Calculation Editor That opens, give the calculated field a name.
3. In this example, the calculated field is called Profit Ratio.

Step 2: Enter a formula

1. In the Calculation Editor, enter a formula.
2. This example uses the following formula:

**Sum([Profit])/Sum([Sales])**

Formulas use a combination of functions, fields, and operators.

1. When finished, click OK.

The new calculated field is added to the Data pane. If the new field computes quantitative data, it is added to measures. If it computed quantitative data, it is added to Dimension.

1. Global Superstore data set; Region wise year wise sales are ranked. What is the rank of some country when compared to last year?
2. What percent of total profits do the top 10 customers by Sales represent? - **Sample Superstore**
3. Find the customer with the lowest overall profit. What is his/her profit ratio? - **Sample Superstore**
4. Ranking States based on Sales what is the rank of state which has sales crossed $20000. - **Sample Superstore**
5. What is the percent of orders which took more than 7 days on an average to deliver.
6. Use **“World Indicators”.** Without using table calculations what is the proper syntax to build a calculated field which will display overall total GDP on this view?

**8. Filters:**

1. **What are the different types of filters and give their working order?**

There are basically 6 types of filters and by order of operation they are:

1. **Extract Filter**

When we’re loading in our data, we can choose to extract it, saving a snapshot of how it looks in our workbook and ultimately reducing the number of times Tableau queries the data source. To further reduce the size of the data going into Tableau, we can apply filters to the extract, which can be either by a certain dimension or measurement.

1. **Data Source Filter**

Data Source Filters reduce the amount of data being fed into Tableau and restrict what data the viewer can view all of underlying data, so if not control sensitive data. One thing that is important to note is that, Extract and Data Source Filters are not linked. So if we change back to a live connection our Data Source Filters will still be intact.

1. **Context Filter**

All filters in Tableau are applied to all rows of our data without regards to other filters.

If for example, we need one filter to be applied before other filters, either for performance reasons (filter out a certain category to show Top X) or if we have a Fixed function in our view that needs to be filtered, making this a Context filter will make sure it is processed first. Context Filters are limited to the view but can be applied to Selected Sheets, all using Same Data Source or all using Related Data Source. While Context filters can improve performance, if they do not reduce the data enough (the rule is by 1/10 or more), the cost of computing them is too high to be beneficial.

1. **Dimension Filter**

Another name for non-aggregated filters (blue pills), such as Dimensions, Groups, Bins, Sets, etc. These are applied by both dragging them on the Filters pane or right-clicking on specific dimension and selecting Show Filter.

We can Choose to either only show the things highlighted or by ticking Exclude it will instead filter out the Dimensions selected. This will be shown by a strikethrough. If we have many dimensions we can search for it, but make sure to click All or None to select/deselect all depending on what we want to do.

In the filter dialog that pops up, there are three tabs for Wildcard, Condition, and Top. Here we can choose if we want to show the Top 10 (or by Parameter) by certain measurement or by a certain condition. The filters can be edited at any time by right-clicking on the pill and edit Filter.

1. **Measure Filter**

Aggregated filters are applied after non-Aggregated filters, no matter what order they are shown on the Filters pane. When dragging it on, Tableau will ask us how we want to filter in other words, what aggregation to use (Sum, Avg, Median, Standard Deviation, etc.) The second step will give us four options: Range of values, At least, At most and Special. We can choose to drag or type in the number we want to filter on. Special is if we want to include Null values or not.

1. Create a list of Top 10 Products based on Profits whose sale value is more than $5000? - **Global Superstore**
2. Create a Chart with Customer Name and Profit and check for the Sale Value for top 15 Customers? - **Global Superstore**
3. Apply filter to all the worksheet, filter by year 2011, then find the sum(sales) for the highest subcategory.- **Global Superstore**
4. What is the name of 375th top most customer by sum of profits - **Sample Superstore**

**9. Dashboards & story:**

1. **What are the different device type preview that Dashboards can use?**

Dashboards can include layouts for different types of devices that span a wide range of screen sizes. When we publish these layouts to Tableau Server or Tableau Online, people viewing our dashboard experience a design optimized for their phone, tablet, or desktop.

Device layouts appears on the Dashboard tab, under Default. Initially, each device layout contains every item in the Default dashboard and derives its size and layout from Default as well.

Think of the Default dashboard as the parent, and the device layouts (desktop, tablet, and phone) as its children. Any view , filter, action, legends or parameter that we want to add to a device layout must first exist in the Default dashboard.

**Phone layouts and the Default dashboard**

To save time with unique Phone layout option that automatically reflects changes to the Default dashboard, either click the open lock icon, or choose Auto-Generate Layout from the pop-up menu.

If we instead click the close lock icon or choose Edit Layout from the menu, the Phone layout becomes fully independent, so we’ll need to manually add and arrange items to reflect changed to the Default dashboard.

**Desktop and Tablet layouts and the Default dashboard**

Unlike Phone layouts, we need to manually add Desktop and Tablet layouts to dashboard. Desktop and Tablet layouts are always fully independent from the Default dashboard, so each device layout can contain a unique arrangement of objects.

**Automatically add phone layouts**

Two options let us automatically add phone layouts:

* To create phone layouts whenever we open old dashboards that lack them, choose Dashboard> Add Phone Layouts to Existing Dashboards
* To create phone layouts whenever we create a new dashboard, choose Dashboard> Add Phone Layouts to New Dashboards.

**Preview and manually add device layouts**

1. Open a dashboard.
2. On the Dashboard tab on the left, click Device Preview.
3. Take a moment to click through the Device types and Models and explore the different screen size. Then set these options:

* To see how the dashboard will look in landscape vs portrait mode, click . Usually, landscape is optimal for tablets and portrait is best for phones.
* Select Tableau Mobile app to see how the dashboard will look with the app instead of the browser. This option is available for iOS or Android devices and shrinks the dashboard slightly, leaving space for the app controls.

1. Choose a Device type, such as Tablet.
2. In the upper-right corner, click the Add Layout button for the device we selected (for example, add Tablet Layout).
3. Add an additional layout by selecting a new Device type and clicking Add Layout.

Creating a layout for each device type gives us the most control over our users' experience as they view our dashboard from different devices. After we publish a dashboard with all three layouts, users won't see the default dashboard layout; instead, they'll always see the appropriate device-specific layout.

**Customize a device layout**

After we've added a device layout to our dashboard, we can start rearranging objects to create the look you want.

1. For Desktop and Tablet layouts, click Custom.

For Phone layouts, either click the lock icon , or choose Edit Layout from the pop-up menu.

1. Anything we can add to our layout is listed on the left, under Layout. If an item has a blue check mark, it means that it's part of the device layout that we're currently working on.
2. If we remove an item, it's only removed from the current device layout. It still exists on the default dashboard and can be added to the device layout again.
3. Click through the Device model options to see how the layout will appear on different models.

Ultimately, it's the size of the web browser that loads the dashboard that determines which layout appears on the device.

1. At left, explore the options under Size.
2. Create a dashboard using **World Indicators** showing the all the Actions that can be performed in Tableau.

**10. Time Series:**

1. Use Order date and drill down the information for Quarter and Month level separately and show the line Chart in a Continuous Form- **Global Superstore**

**11. Sets, Parameters, Groups:**

1. **Parameters can be used in?**

Parameters are useful when we want to add interactivity and flexibility to a report, or to experiment with what -if scenarios. Suppose we are unsure which fields to include in our view or which layout would work best for our viewers. We can incorporate parameters into our view to let viewers choose how they want to look at the data.

When we use parameters, we need to tie them to the view in some way:

* We can use parameters in calculations and calculated fields that are used in the view.
* We can display the parameter control in the view for users to select parameters.
* We can reference parameters in Parameter actions.

Before we begin, decide which fields we want to make interactive. For example, we could allow users to view the categories within a dimension by colour, or to view sales data over a period of time that they choose, and so on. The example described here sets up a table which users can select the dimensions to display in the columns and rows.

1. **What are the different ways to create a Parameter?**

**Step 1: Getting Started**

We can start out by opening Tableau and connecting to the Superstore Sample Dataset.

1. Drag Order Date to the Columns Shelf and Sales to the Rows Shelf.
2. Right- Click the Year Pill on the Column Shelf.
3. Go to More > Custom.
4. When the Custom Date dialogue box appears, click on the Month/Year option from the dropdown menu.

**Step 2: Creating Parameters in Tableau**

So, the scenario I’m trying to create is a what-if scenario. For example. What if Sales were 3% more.

To create a parameter, do the following:

1. Go to Analysis Menu and select Create Calculated field. Alternatively, you could right-click within the Measures pane and select Create Calculated Field from there as well.
2. Now, before creating the calculated field that is going to use our parameter, we have to create the parameter. So on the lower half of the window, there is a section titled Parameter and a link next to it that says Create. Click on Create.
3. Fill in the fields exactly as shown.
4. Click on OK. Our Parameter now shows up in the Parameter box.

**Step 3: - Using the Tableau Parameters in Calculations**

Now, for this scenario, we now want to use our parameter and some Tableau functions to create a calculated field to add to our graph to see its effect on our data. While still in the Calculated Field dialogue window, created our calculated field:

1. Name our Calculated Field IF\_Scales(Calc)
2. Formula: [Sales]\*(([IF Sales Param]/100)+1)
3. Click on OK.

**Step 4: - Parameter Control**

Coming back to the Tableau main view, we will see our Calculated field in the Measures pane, and the parameter in the Parameters pane of our Data Window.

1. Click on the Parameter IF Sales Param
2. Select Show Parameter Control
3. At the top right of our view, our parameter Control Filter will be Displayed.

**Step 5: - Using Tableau Parameters in our Visualization**

1. Drag the Calculated Field IF Sales(Calc) and drop it on top of our Sales Axis. As we hover over it, we will notice a transparent equal sign.
2. After dropping we will notice Measure Names has now been added to our Colour Shelf and IF\_Scales.
3. Because our Parameter control is at 0, our lines are on top of each other.
4. Click on our Parameter control, and we will see the two lines appear.

These lines represent the running values of Sales from our dataset and our Calculated Sales simultaneously. And we’ve successfully incorporated our parameter in our visualization.

**12. Forecast:**

1. You are provided with the dataset for the past 10yrs. How can you forecast the data for next 4 years, Quarter wise.

**Step 1: Connect to data**

* In Tableau Desktop, connect to Superstore sample data provided by Tableau.

**Step 2: Create Visualization**

* Create a line chart with Order Date (Year) in the Columns shelf and Sales in the Rows shelf. Go to the Analysis tab and click on Forecast under Model category.
* Change the Order Date (Year) to Order Date (Quarter).
* On completing the above step, we will find the option to set various options for forecast by right clicking on the estimated line we will get option like Forecast and after selecting this click on Forecast Option. Choose the Forecast Length as 4 Years and leave the Forecast Model to automatic and then click Ok.
* We can also get minute details of the forecast model by choosing the option Describe Forecast. To get this option, right-click on Forecast diagram.

1. Use **“Sample Superstore”.** What is the Sales Forecast Estimate for the month of September 2018?

**13. Pie Chart:**

1. Create a Pie Chart using regions and sum of sales, sort the pie in ascending order, increase the size in the view and label them with Count of Quantity and Sum of Profits- **Sample superstore**