1. Worksheets

Overview

- **What It Is:**
  A worksheet in Tableau is the primary workspace where you build individual visualizations (charts, graphs, maps, etc.). Think of it as a blank canvas where you drag and drop data to create your visual story.

- **How to Access:**
  When you open Tableau, you typically start on a worksheet by clicking on a new worksheet tab (the tab labeled with a sheet icon). You can also create additional worksheets by clicking the "New Worksheet" icon at the bottom of the screen.

- **Uses:**

    - Build and customize individual visualizations.
    - Combine multiple worksheets in dashboards.
    - Explore and analyze your data visually.

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2. Adding Columns and Rows

What They Are:

- **Columns and Rows Shelves:**
  In a worksheet, you'll notice shelves labeled "Columns" and "Rows." These shelves determine the layout of your visualization. Columns generally create the horizontal structure, and Rows create the vertical structure.

How to Add Columns and Rows:

- **Drag and Drop:**

    - **Select a Field:**
      From the Data pane on the left side, click on a field (dimension or measure) you want to analyze.

    - **Drag to Shelf:**
      Drag the selected field to the **Columns** shelf for a horizontal arrangement or to the **Rows** shelf for a vertical arrangement.
    - **Multiple Fields:**
      You can drag multiple fields onto each shelf. Tableau will generate a grid or a combination chart depending on your selections.
- **Using the Toolbar:**

    - Some quick actions and options (like creating calculated fields) might be available via toolbar buttons which can then be dragged onto these shelves.

What It's Used For:

- **Defining the Structure:**
  The fields placed on these shelves determine the axes and layout of your chart.
- **Comparisons:**
  Placing different dimensions or measures in columns and rows lets you create cross-tabulations and visual comparisons.
- **Detailing Data:**
  Breaking down your data by different categories (for example, Sales by Region) becomes straightforward.

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3. Adding Marks (Labels, Colors, etc.)

What the Marks Card Is:

- **Marks Card:**
  The Marks card is a versatile tool that controls the details of how your data is displayed in the view. It includes options like Color, Size, Label, Tooltip, Detail, Shape, and sometimes more depending on the chart type.

How to Use the Marks Card:

- **Accessing the Marks Card:**
  The Marks card is typically located to the left of your visualization area. When you select a particular type of chart (e.g., bar, line, map), the options on the Marks card may adjust accordingly.

- **Adding Labels:**
    - **Drag a Field to Label:**
      Drag a field from the Data pane and drop it onto the **Label** shelf on the Marks card.
    - **Edit Label Text:**
      Click on the Label shelf to format how the label appears (e.g., change font size, color, alignment).
- **Changing Colors:**
    - **Drag a Field to Color:**
      To color-code your data, drag a field (commonly a categorical dimension) onto the **Color** shelf.
    - **Customize Colors:**
      Click on the Color legend or the Color shelf to change the color palette or adjust individual color assignments.
- **Adjusting Size:**
    - **Drag a Field to Size:**
      This is often used with measures to change the size of marks (such as bubbles in a scatter plot).
    - **Fine-Tuning:**
      Click on the Size shelf to adjust the slider for mark size.
- **Additional Options:**
    - **Shape:** For charts like scatter plots, you can drag a dimension to the **Shape** shelf to differentiate data points with different shapes.
    - **Tooltip:** Customize what appears when you hover over a mark by adding fields to the **Tooltip** shelf.
    - **Detail:** To add extra data without displaying it visually, drag fields to the **Detail** shelf.

What It's Used For:

- **Enhancing Clarity:**
  Marks allow you to add multiple layers of information to your charts (e.g., color to differentiate categories, labels for precise values).
- **Improving Visual Appeal:**
  Adjusting marks can help make your visualizations more engaging and easier to interpret.

- **Highlighting Data Points:**
  Using different sizes or shapes can emphasize particular aspects of your data, such as outliers or clusters.

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4. Filters

What Filters Are:

- **Filters:**
  Filters in Tableau let you control which data is displayed in your visualization. They allow you to include or exclude specific subsets of your data, making your analysis more focused.

How to Add and Use Filters:

- **Drag-and-Drop Filtering:**
  - **Select a Field:**
    From the Data pane, select the field you want to use as a filter.
  - **Drag to Filters Shelf:**
    Drag the field to the **Filters** shelf (usually located on the right side of the workspace).
  - **Set Filter Conditions:**
    After placing the field on the Filters shelf, a dialog box appears where you can choose how to filter the data:
    - For dimensions, you can select specific values.
    - For measures, you can set ranges or conditions (e.g., greater than, less than).
- **Using Quick Filters:**
  - **Show Filter:**
    Right-click on a field on the Filters shelf and choose **Show Filter** to display a filter control on the worksheet. This allows you or your viewers to interactively change the filter settings.
- **Advanced Filtering Options:**
  - **Context Filters:**
    When dealing with large data sets, setting a filter as a **Context Filter** can improve performance by reducing the data set before other filters are applied.

- **Relative Date Filtering:**
  For date fields, you can filter data relative to a current date (e.g., last 7 days, next month) which is useful for dynamic dashboards.

What It's Used For:

- **Focus Analysis:**
  Filters help in narrowing down your data to the relevant subset for your analysis.
- **Interactive Dashboards:**
  When published to Tableau Server or Tableau Public, interactive filters let end-users explore the data by selecting the values they are interested in.
- **Performance:**
  By limiting the data that Tableau processes, filters can also help improve the performance of your visualizations.

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1. Bins Must Be Numeric

What Bins Are:

- **Definition:**
  Bins are a way to group continuous numeric data into discrete intervals (or "buckets"). This is particularly useful for creating histograms or segmenting data into ranges (for example, age groups or income brackets).

Why Bins Must Be Numeric:

- **Numeric Requirement:**
  Since bins group numeric ranges, the field you create bins from must be a numeric measure. Tableau needs to understand the underlying order and magnitude of the numbers to correctly segment them.

How to Create Bins:

1. **Select the Field:**
   In the Data pane, locate the numeric field you want to bin.
2. **Right-Click and Create:**
   Right-click the field and choose **"Create" > "Bins…"**.
3. **Configure the Bin:**
   In the dialog box:

    - **Name:** Assign a meaningful name to the bin field.
    - **Size of Bins:** Specify the bin size (e.g., 10, 50, etc.). This determines the range each bin covers.
4. **Confirm:**
   Click **OK**. Tableau will create a new bin field that appears in the Data pane under Dimensions.

Usage:

- **Histograms:**
  Place the bin field on the Columns shelf and a count of records on the Rows shelf to create a histogram.
- **Data Segmentation:**
  Use bins to group continuous data for comparative analysis, such as segmenting customer ages into ranges.

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2. Quick Table Calculation

What Quick Table Calculations Are:

- **Definition:**
  Quick table calculations are built-in computations in Tableau that allow you to quickly derive new values (like running totals, percentages, differences, etc.) based on the current view.

How to Apply a Quick Table Calculation:

1. **Build a Basic View:**
   Create a simple visualization (for example, a bar chart with sales over time).
2. **Right-Click the Measure:**
   In the view, right-click on the measure (e.g., SUM(Sales)) that you want to compute a table calculation for.
3. **Select "Quick Table Calculation":**
   From the context menu, choose the desired calculation (e.g., Running Total, Percent of Total, Difference).
4. **Adjust if Necessary:**
    - **Edit Table Calculation:**
      If you need to change the addressing or partitioning settings, right-click the measure again and select **"Edit Table Calculation…"**.

- **Options:**
  Configure how Tableau should compute the values along the table (e.g., Table Across, Table Down, Specific Dimensions).

Usage:

- **Trend Analysis:**
  Use running totals to show cumulative trends over time.
- **Relative Comparison:**
  Percent of total calculations are useful for understanding the contribution of each segment relative to the whole.

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3. Save Calculation by Control-Clicking and Dragging to the Left Table

What This Means:

- **Saving Calculations:**
  After creating a calculated field or applying a quick table calculation, you might want to add it permanently to your data pane for future use. One way to do this is by control-clicking and dragging the calculation into your list of fields (usually on the left side in the Data pane).

How to Save a Calculation:

1. **Perform Your Calculation:**
   Create your calculated field or quick table calculation on your worksheet.
2. **Control-Click and Drag:**
   - **Control-Click (Cmd-Click on Mac):**
     While holding down the Control (or Command) key, click on the calculated field or the pill representing the calculation.
   - **Drag to Left Table:**
     Drag it into the Data pane's area where fields are listed. This action "saves" the calculation as a reusable field.
3. **Confirmation:**
   The field now appears in your Data pane, and you can use it in other worksheets or dashboards.

Usage:

- **Reusable Calculations:**
  Saving calculations in the Data pane makes them easily accessible for repeated use across multiple analyses.
- **Organization:**
  It helps keep your workbook organized by centralizing your custom computations.

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4. Create Calculated Field

What a Calculated Field Is:

- **Definition:**
  A calculated field allows you to create new data columns by applying custom formulas or expressions to existing data. This is useful for deriving new metrics, transforming data, or applying business logic.

How to Create a Calculated Field:

1. **Open the Calculated Field Dialog:**
   - **Right-Click in the Data Pane:**
     Right-click in an empty area of the Data pane (or on an existing field) and select **"Create Calculated Field…"**.
   - **Menu Option:**
     Alternatively, go to the **Analysis** menu at the top and select **"Create Calculated Field…"**.
2. **Enter Details:**
   - **Name:**
     Give your calculated field a clear and descriptive name.

Formula:
Enter your calculation formula using Tableau's formula syntax. For example:
IF [Sales] > 1000 THEN 'High' ELSE 'Low' END

   -
3. **Validate:**
   - **Check Syntax:**
     Tableau will validate the formula. If there are errors, they will be indicated, and you can adjust accordingly.

4. **Save:**
   Click **OK** to create the field. It will now appear in the Data pane as either a dimension or a measure based on the output of your calculation.

Usage:

- **Custom Metrics:**
  Use calculated fields to define custom metrics like profit margin, growth rates, or categorizing values.
- **Data Transformation:**
  Transform raw data into more meaningful insights, such as creating flags (e.g., “Above Target” vs. “Below Target”) or concatenating text fields.
- **Conditional Logic:**
  Apply if/then statements to segment data, perform aggregations conditionally, or create new buckets.

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1. Bar and Line Graph

Bar Graph

- **Purpose:**
  Bar graphs are used to compare different categories by displaying rectangular bars with lengths proportional to the values they represent. They are great for showing differences among discrete categories (e.g., sales by region).

- **How to Create a Bar Graph:**

  1. **Connect to Data:**
     Start by connecting Tableau to your data source.
  2. **Drag a Dimension to the Columns Shelf:**
     For example, drag "Category" or "Region" onto the Columns shelf.
  3. **Drag a Measure to the Rows Shelf:**
     For example, drag "Sales" onto the Rows shelf.
  4. **Adjust and Customize:**
     - Use the Marks card to change color, size, or add labels.
     - Sort bars by clicking on the sort icon in the toolbar.

Line Graph

- **Purpose:**
  Line graphs are ideal for showing trends over time or continuous data. They display data points connected by lines and are used to track changes over intervals (e.g., monthly revenue trends).

- **How to Create a Line Graph:**

  1. **Drag a Date Field to the Columns Shelf:**
     Use a continuous date (e.g., Year, Month) to set up the time axis.
  2. **Drag a Measure to the Rows Shelf:**
     For example, drag "Sales" or "Profit" to the Rows shelf.
  3. **Change the Mark Type (if needed):**
     If the default isn't a line, click the Marks card and select "Line" as the mark type.
  4. **Customize:**
     - Format the axes, adjust colors, or add labels to highlight important trends.
     - Add multiple measures to compare trends across different categories.

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2. Longitude and Latitude (Maps)

Purpose:

- **Mapping Data:**
  Longitude and latitude are used to plot geographic data on maps. This is useful when you want to visualize data that includes geographical locations (e.g., store locations, customer distribution).

How to Create a Map:

1. **Drag Geographic Fields to the View:**
   - Drag the **Longitude** field to the Columns shelf.
   - Drag the **Latitude** field to the Rows shelf.
2. **Assign Geographic Roles:**
   Ensure your fields are recognized as geographic data. If not, right-click the field, select **Geographic Role**, and choose the appropriate role (e.g., City, State, Country).
3. **Set the Mark Type:**
   Tableau automatically sets the mark type to "Map" when it recognizes geographic data.
4. **Customize the Map:**

- Use the Marks card to add detail (e.g., color-code by category, size marks by sales volume).
- Add layers (e.g., borders, background maps) using the Map menu.
- Zoom and pan to focus on specific areas.

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3. Density

Purpose:

- **Visualizing Concentrations:**
  Density charts (or heat maps) show the concentration of data points in a given area. They're useful for identifying clusters or hotspots in geographic data.

How to Create a Density Map:

1. **Plot Geographic Data:**
   Start with a map by dragging your Longitude and Latitude fields to the Columns and Rows shelves.
2. **Change the Mark Type:**
   On the Marks card, change the mark type to "Density" (or "Heat Map").
3. **Customize the Appearance:**
   - Adjust the color gradient to represent lower to higher densities.
   - Use the Options in the Marks card to fine-tune the density intensity and smoothing.
   - Overlay other details if needed (e.g., adding points to show exact locations in conjunction with density).

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4. Other Chart Types

Box and Whisker Plot

- **Purpose:**
  Box and whisker plots (or box plots) display the distribution of a data set through their quartiles. They highlight the median, variability, and potential outliers.
- **How to Create:**
  1. **Drag a Dimension to Columns:**
     Use a categorical field like "Category."

2. **Drag a Measure to Rows:**
   Use a continuous measure like "Sales."
3. **Change the Mark Type:**
   Click the Analytics pane or use the Show Me panel and select the box-and-whisker plot option.
4. **Customize:**
   - Edit the details to adjust whiskers, outlier indicators, and box styles.
   - Use the tooltip to display additional summary statistics.

Pie Chart

- **Purpose:**
  Pie charts show proportions of a whole, making it easy to see the percentage distribution among categories.
- **How to Create:**
  1. **Drag a Dimension to the Color Shelf on the Marks Card:**
     This defines the slices of the pie.
  2. **Drag a Measure to the Angle Shelf:**
     For example, dragging "Sales" to Angle divides the pie according to the measure's values.
  3. **Adjust Pie Size and Labels:**
     Use the Size shelf to resize the pie and the Label shelf to add percentages or values.
  4. **Customize:**
     - Change colors to differentiate segments.
     - Consider using pie charts sparingly, as they can be hard to read with too many slices.

Area Chart

- **Purpose:**
  Area charts are similar to line graphs but shade the area under the line. They are used to emphasize the magnitude of change over time and the cumulative totals.
- **How to Create:**
  1. **Set Up a Line Chart:**
     Drag a date field to the Columns shelf and a measure to the Rows shelf.
  2. **Change the Mark Type:**
     On the Marks card, select "Area."
  3. **Customize:**
     - Adjust transparency and colors to clearly show overlapping areas if using multiple measures.

- Add labels or tooltips for additional context.

Packed Bubbles

- **Purpose:**
  Packed bubble charts display data as circles of varying sizes, often representing magnitude. They are great for showing relative sizes of values and clusters of similar items.
- **How to Create:**
  1. **Drag a Dimension to Detail:**
     Each unique value becomes a bubble.
  2. **Drag a Measure to Size:**
     This determines the bubble size based on the measure's value.
  3. **Drag a Dimension to Color:**
     Use this to differentiate bubbles by category.
  4. **Customize:**
     - Adjust the size settings on the Marks card.
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3. **Set the Mark Type:**
   Tableau automatically sets the mark type to "Map" when it recognizes geographic data.
4. **Customize the Map:**
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1. Understanding Joins and Relationships

Relationships vs. Joins

- **Relationships:**
  - **Definition:** A relationship in Tableau defines a logical connection between two tables.

    - **How It Works:** Relationships allow Tableau to keep data at its native level of detail. Tableau uses these relationships to dynamically combine data only when needed for a specific visualization.
    - **Use Case:** They are ideal when you have tables with different granularities and you want Tableau to manage the join automatically in the background.
- **Joins:**
    - **Definition:** Joins physically combine data from two or more tables into one table based on common fields.
    - **How It Works:** When you join tables, you specify the join condition and type, and Tableau creates a new dataset that merges the rows from the original tables.
    - **Use Case:** Joins are useful when you need a single, combined dataset for your analysis, and you know how the data should be matched.

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2. Creating and Configuring Joins

How to Open the Join Dialog

1. **Data Source Tab:**
   Open your data source in Tableau.
2. **Drag Tables to the Canvas:**
   When you drag multiple tables into the canvas area, Tableau will automatically show the join icon (a Venn diagram-like symbol).
3. **Click the Join Icon:**
   Click the join icon or drop-down arrow next to a table to open the join configuration options.

Join Types and Their Usage

- **Inner Join:**
    - **What It Does:**
      Returns only the rows where there is a match in both tables based on the join condition.
    - **When to Use:**
      Use an inner join when you want to analyze only the common records between tables.
    - **Tip:**
      If there are records in one table without a matching record in the other, those

rows will be excluded, which might result in missing data if those unmatched rows are important.

- **Left Join (Left Outer Join):**
    - **What It Does:**
      Returns all the rows from the left table and the matched rows from the right table. If there is no match, the result is NULL for the right table's fields.
    - **When to Use:**
      Use a left join when you want to keep all the data from the primary (left) table, even if there is no corresponding match in the secondary (right) table.
    - **Tip:**
      This join ensures that you don't miss out on primary data, but be aware that the unmatched data from the right table won't contribute any additional information.
- **Right Join:**
    - **What It Does:**
      Returns all the rows from the right table and the matched rows from the left table. Similar in concept to a left join, but the roles are reversed.
    - **When to Use:**
      Use this if the right table holds the primary dataset you need to keep intact.
- **Full Outer Join:**
    - **What It Does:**
      Returns all rows when there is a match in one of the tables. If there is no match, the missing side will have NULL values.
    - **When to Use:**
      Use a full outer join when you need to ensure that no data is missed from either table, even if there are unmatched rows.
    - **Tip:**
      This join can lead to a dataset with a lot of NULLs if the tables have many unmatched rows, so use it with caution.

Adding a New Join Clause

- **Why Add a New Join Clause:**
  In some cases, you might need to join tables on more than one condition or field. This can help refine the join and ensure data is matched correctly.

- **How to Add a New Join Clause:**

1. **Join Dialog:**
   In the join configuration area, look for an option to add another clause—usually indicated by a plus sign or "Add new join clause."
2. **Select Additional Fields:**
   Once you add a new join clause, select the additional field from each table that will serve as a secondary join condition.
3. **Review the Join Logic:**
   Tableau will combine your join clauses using an AND logic by default. This means that a row will only be included if it meets all the join conditions.

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3. Important Considerations When Using Joins

- **Missing Data:**
  - **Caution:**
    If there are no matching values between tables for the join keys you selected, some data may be dropped (especially with inner joins).
  - **Best Practice:**
    Check your join results in the data preview pane. If you see unexpected NULLs or missing rows, revisit your join conditions or consider using a different join type.
- **Performance:**
  - **Complex Joins:**
    Joining very large tables or using multiple join clauses can affect performance.
  - **Optimization:**
    Where possible, filter data before joining or use relationships if the join logic is complex.

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4. Using Joined Data for Visualizations

- **Unified Data Source:**
  Once you've defined your joins (or relationships), the data from the different tables appears as a single data source in the Data pane.
- **Building Visualizations:**
  - You can now drag fields from any of the joined tables onto your worksheets.

    - Tableau handles the join in the background, allowing you to create visualizations that combine data from all the tables.
- **Consistency Check:**
  Always verify that your visualizations make sense. Check for any NULL values or discrepancies that might indicate issues with the join conditions.