

1. Demonstrate a quick 5 - min creation of visualisation. Demo only, students observe
 - a. Data set: SuperStoreUS_2015 → All the Transactions for a store in US.
 - b. Q. What are the most profitable and least profitable states according to this dataset? And also plot us a map to show how the states are performing.
 - c. Steps:
 - i. Open Tableau.
 - ii. Connect to a File → Excel → Select the File.
 - iii. On the left, chose "Orders" and drag it in to the white space. You will see a preview of the sheet.
 - iv. Click on the orange sheet at the bottom which says "Sheet 1".
 - v. Drag Country into the white space.
 - vi. Drag State or Province on to the map.
 - vii. Drag Profit on to Color.
 - viii. Drag Profit on to Label.
 - ix. Click label and change font size to 12.
 - d. Inference → Least profitable state is North Carolina; Most profitable state is California. According to map, southern states are not doing great except perhaps Georgia and Northern and western states doing good except Montana.
2. Challenge: It is End of Financial Year. The store operates in three regions and only the top performing employee in each region qualifies for a bonus. Find out which three employees are eligible to get bonuses for this year. Employees are measured on total sales (\$\$ value).
 - a. Data set: OfficeSupplies → Transactions: Region, representative, what heshe sold, number of units sold by him/her and unit price.
 - b. Connect → A csv file is considered a Text file.
 - c. Connections → Folder is selected and shows all the existing files of the same type in that folder.
 - d. You can drag more than one files and Tableau tries to connect them. The data that we deal with in Tableau need not come from one File, it can come from multiple files, or multiple tabs in one file as in Excel.
 - e. Click on Sheet 1 to go to Dashboard.
 - f. Data Connections on Left and working area on right.
 - g. Data is always broken down into two sections: Dimensions & Measures. Theses are two different roles that any data element can take. Tableau puts any type of numerical values in Measures and puts Categorical and qualitative data into Dimensions. That's by default. But we can drag them and move into each other.
 - h. Another way of looking at it is: Dimensions are Independent variables and Measures are dependent variables.
 - i. Drag Region to worksheet. Then Drag Units to 2nd column of Region. Tableau automatically puts regions in rows and it aggregates the units by summing them up.
 - j. If we are not happy with Sum Units in rows then drag SUM(Units) to Columns. Now we get a bar chart. We can expand it a bit, resize, ...
 - k. Some of the options in Show Me are greyed out as for them we need specific type of data. Say for Area chart we need to have at least one Date type.
 - l. Clear Sheet → Clears the entire sheet.
 - m. On Mac, the layout may be different.
 - n. Let's start answering the question. Bring Rep to Columns and Units to Rows.
 - o. Let's break it down by region. By the current we can't say who is the best of each region but only overall.

- p. Drag Region to columns but put it before Rep. This way we can tell who is the best in Sales in each of the regions.
- q. We can sort the data → See next to Units on Y axis.
- r. We get the number of items sold, but the Rep performance is measured as per the \$\$ value. So we need to find out the \$\$ value. There is no actual \$\$ value here. So we need to multiply the total units sold and the unit price.
- s. Create calculate fields → Right click on measure and create calculated field. Name it as Total Sales. Drag Units and Unit Price and put * between them. It will appear on the left as Total Sales. We see an = before it, it means it is a calculated field.
- t. Drag Total Sales to Rows and drop exactly over Units. Now sort and see.
- u. Color: The main thing to take into account is the end user / viewer. Colors should assist them in seeing the insights your chart is portraying.
- v. Colors → Go to colors and play around with it. Then Drag Rep and drag it onto color. It will give an unique color to each rep and gives you a color legend. Even you can drag Rep from Columns by pressing ctrl and drop on Colors.
- w. Let's do it another way. Drag SUM(Total Sales) onto Color. Now we see a continuous color.
- x. Let's do another way. Drag Regions on to the Region in Color. This gives a distinct color scheme for regions.
- y. Label → adds textual info. Drag SUM(Total Sales) onto Label. Drag Rep and Region onto the Label. But that's repetitive.
- z. Edit Label further. Click on Label → Sales: . If some labels not showing then right click → Mark label → always show.
- aa. Formatting → Right click on SUM(Total Sales) under Marks and click on Format.
- bb. Change Numbers to Currency. Currency custom → \$. Change the number of decimal points to 1 and display units to Thousands.
- cc. Now change the axis. Right click on Matthew and change the font. Right click on Region / Rep on Top and click Hide Field labels for columns as this is intuitive.
- dd. Right click on Y-Axis (Total Sales) → Edit. Also Y-Axis Format → Change numbers to Currency (custom) to \$. And make It consistent to the data.
- ee. Export worksheet. Worksheet → Export → Image. Another way, Right click on visualisation → copy → Image. Open a word document and paste the image. You will see Sheet 1 written on top left. Again, Right click on visualisation → copy → Image. And uncheck Title. Title is the name of the tab. If you want to add title to your worksheet then change the name of your worksheet and then in the top menu go to Worksheet→Show title. You can format the Title as well, by double clicking on it.

3. Time series, Aggregation, and Filters

- a. Data set → Long-term unemployment statistics
- b. Open the csv dataset and check. It's very different. Many duplicate entries in gender, period and all.
- c. Data Extract → Top right or Right Click on the Data and go to Extract. It creates an extract for Tableau to work with instead of live working with data. What will happen is if you make any changes to the original connected file still no change will happen in the Tableau. You will still have the Old Data in your Extract. It is a good thing and a bad thing. You can refresh it by right click on Data → Extract → Refresh
- d. We want to see how unemployment is changing as period changes.

- e. Double click on unemployed and double click period. Tableau is smart, Check the Y and X-axis.
 - f. Click on the right drop arrow on top Columns Period. And chose Month. Tableau creates a calculation and creates Month. Tableau always highlights Dimensions in Blue and Measures in Green. Blue ignores higher periods like year and treats months as category – just like gender; Green creates a proper timeline.
 - g. Now go and select the 2nd Month.
 - h. We need to decide if we want our data to a Dimension or a measure. In this case we want it to a Measure.
 - i. Aggregation & Granularity → These things govern how Tableau functions. Tableau showing us the Summed up Unemployed and Months. How does Tableau knows about it?
 - j. The answer is simple. Tableau will always aggregate measures at the level of Granularity of your worksheet. Since we have the Month on Columns, Tableau knows that we want to see the data per month or at the granularity of month.
 - k. Just drag out Months. And we will see Tableau shows only one dot. It has no clue now at level of granularity we need to see the data. And it assumes that we just want to see the data at the broadest level possible.
 - l. Generally, what happens is: Measures get aggregated and Dimensions specify the level of granularity.
 - m. Go to Analysis and uncheck Aggregate measures. You see jig-jag lines. For better seeing, change Marks from Automatic to Shapes.
 - n. Now we will introduce a dimension that will change the level of granularity of our dashboard and therefore it will affect the aggregation. Drag gender to Colors.
 - o. Drag Age to Shape. You see it introduces a new level of granularity.
 - p. Let's see what all aggregates we have. Click on the arrow of the SUM(Employed) → Measure (SUM) → Average. The graph did not change much but the axis changed.
 - q. Details → It means level of granularity of your chart. Drag Age to Details. What details does adds Dimensions and Measures to your chart without changing the visual representation of your chart but affecting the level of granularity.
 - r. What happens if you want to interrogate one of the genders more specifically and understating what happeingn there? Highlighting: Click on Male.
 - s. How to highlight Age? It is not represented on the chart, no color, no shape, nothing. Add Age to Shapes. Now it works. If it doesn't then on the top right of Age legend, chose the pencil. And now highlight.
 - t. Remove Age and everything and now show SUM and line. Drag Age to colors.
 - u. You will see if it is Line then check axis and make it area and check the y-axis. That happens because they are stacked up in Area graph and hence summed up.
 - v. Click Age, press ctrl and drop on label. Now a label will be added.
 - w. Filter: Let's add gender as a filter. Drag and drop gender into Filter. Edit Filter!
 - x. Quick filter: Right click on filter option and chose Show filter.
 - y. Change different types of quick filters.
 - z. Format the axis.
4. Maps, Scatterplots, and First Dashboard
 - a. Three tabs in Dataset. 1st Sheet → Each order ID is unique, 2nd sheet → multiple entry/each order is broken down/order ID NOT unique. We join the two sheets.
 - b. Delete the auto hierarchy. Make a new hierarchy for Country → State → City.
 - c. Drag Order date to filter, chose year and chose 2012.

- d. Drag Sales to Size. Change the border and size of the bubbles.
- e. Create Calculated field of Profit Margin. Right click on Profit → Create → Calculated Field. $SUM([Profit])/SUM([Sales])$. Drag Profit Margin to Color.
- f. Scatterplot: Create 2nd worksheet. Check if your year has all info of same year or multiple years. We want to look at same year data across multiple worksheets. We will apply filters that work across the worksheets.
- g. Drag Customer Name to Details.
- h. Drag Sales to column and Profit to Rows. Try remove aggregate.
- i. Right click on the filter → Apply to worksheets. Add a quick filter. Drag profit Margin to color.
- j. Dashboard: Click on bottom 2nd bottom. Drag both worksheets to the space.
- k. Delete all the filter and legend.
- l. How to add new filter to dashboard? Add it from drop down button of the map.
- m. Making a dashboard interactive: If user clicks on a dot on map, then the relevant scatter plot should show. In order to do that we need to chose action: Filter and Highlight.
- n. Top menu Dashboard → Action. Instead of adding actions here, we will add automatic actions first.
- o. Right click on drop down arrow of map and click Use as filter.
- p. Now lets go back to the Dashboard → Action and check it. Now let's change it from Select to Hover. Try the Menu option too.
- q. Explore the Action window for 2nd part.
- r. Multiple selection feature of Tableau → Rectangle selection or use ctrl+click
- s. Highlight: Dashboard → Actions → Highlight. Nothing happens! It's not same as filter.
- t. Filtering filters your dataset and but Highlight doesnot removes/filters the unwanted dataset. Open and check the excel dataset.
- u. Go back to scatter plot, and add State as detail. Then check the Highlight.

5. **Table Calculations: Advanced Dashboards and Storytelling**

- a. We can't create map here!
- b. But we know region is a location data. Tableau does not recognise geographical data. Set region as geographical role. Right click on region → geographical role → state. Drag Region to area. Fix the error! 4 unknown errors at bottom right. Click there go to edit and change the country name to UK.
- c. Then change Automatic to map.
- d. Add random colors to Map. Select Region + ctrl and drop to Colors.
- e. Add total number of customers. We don't have that info! But Tableau generates the number of records filed. We use it to our advantage. Drag and drop it to label. Format it a bit.
- f. On a separate worksheet, Drag gender to Rows and Number of Records to the table of gender. Create a pie chart.
- g. Now lets create a table calculation. Click on drop down arrow of Number of records → Quick Table calculations
- h. New worksheet, drag Age to Columns and right click to change it to Dimension. Then drag number of records to rows. But it is not what we are looking for! What if the age is given in float? Let's create Bins.
- i. Right click on Age → Create → Bins. Now Age in Dimension too. Drag that to columns to replace previous age. Drag Number of records to colors.

- j. Q: Create a distribution of balance by making a bin.
 - k. Right Click on measures and Create a parameter. Create Balance Groups, Integer, 10 000, 5 000, 25 000, 500.
 - l. Right click on Parameters → Show parameter control. Now nothing will happen as parameter is not linked to bins. Right click on Balance bin in Dimensions → Edit → Size of Bins.
 - m. Tree Map: Drag Job Classification to workspace and number of records to workspace. Show me → Tree map. Take Job Classification and drop on colors.
 - n. Create Dashboard: Add quick filter by Drop down arrow of each → Use as filter.
 - o. Use rectangle selection by dragging on bars.
 - p. Handle the popups: go to the individual worksheet, then worksheet top menu → Tooltip → Uncheck show tool tip.
 - q. Analyzing:
 - r. Creating a storyline: bottom 3rd button to create storyline. We can drag only one item/worksheet.
6. Likert Scale Chart
- a. Visualise the restaurant performance.
 - b. Data prep:
 - i. 2 rows of header
 - ii. Create lookups sheet in excel of the questions.
 - iii. Then delete the top row, replace questions with question id.
 - c. Open the excel in tableau. Select 6 questions and click pivot.
 - d. Rename pivot field name to QuestionID and score.
 - e. Bring in lookup sheet to tableau workspace and join on questionID
 - f. If join does not work, convert the question id from string to number/integer.
 - g. Base calculations for Likert scale.
 - i. Category → Rows
 - ii. Score onto the 2nd column. And change SUM to AVERAGE
 - iii. Create a calculated field of case study.
 - 1. Case [Score]
 - a. When 1 then 'Highly Dissatisfied'
 - b. When 2 then 'Dissatisfied'
 - c. When 3 then 'Satisfied'
 - d. When 4 then 'Highly Satisfied'
 - iv. Drag Answer nest to Category on Rows.
 - v. Sort the Answers. Answers → Default Properties → Sort
 - h. Q: Count how many negative counts?
 - i. Create calculated field for Negative Count. if [Score] < 3 then 1 else 0 end
 - ii. Drag Negative Count to workspace
 - i. Create calculated field of Total Negative Count. TOTAL(SUM([Negative Count]))
 - j. Gantt Bar