VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANA SANGAMA, BELGAVI-590018, KARNATAKA

A J INSTITUTE OF ENGINEERING & TECHNOLOGY

(A unit of Laxmi Memorial Education Trust. (R))
NH - 66, Kottara Chowki, Kodical Cross -
575006

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE ENGINEERING

(Accredited by NBA)

MASTER MANUAL

Course: DATA VISUALIZATION LAB

Course Code:

BAIL504

V-SEMESTER

Prepared by:

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Assistant Professor

Department of Artificial Intelligence & Data Science Engineering

ACADEMIC YEAR: 2025-26

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in Artificial Intelligence & Data Science Engineering

Scheme of Teaching and Examinations 2022

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2022 - 23)

Professional Core Course Laboratory (PCCL)

Course: DATA VISUALIZATION LAB

Course Code: BAIL504

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VISION OF THE INSTITUTE

"To produce top-quality engineers who are groomed for attaining excellence in their profession and competitive enough to help in the growth of nation and global society."

MISSION OF THE INSTITUTE

M1: To offer affordable high-quality graduate program in engineering with value education and make the students socially responsible.

M2: To support and enhance the institutional environment to attain research excellence in both faculty and students and to inspire them to push the boundaries of knowledge base.

M3: To identify the common areas of interest amongst the individuals for the effective industry-institute partnership in a sustainable way by systematically working together.

M4: To promote the entrepreneurial attitude and inculcate innovative ideas among the engineering professionals.

VISION OF THE DEPARTMENT

"To be a center of excellence in Information Science & Engineering education, research and training to meet the growing needs of the industry and society."

MISSION OF THE DEPARTMENT

M1: To impart theoretical and practical knowledge through the concepts and technologies in Information Science and Engineering.

M2: To foster research, collaboration and higher education with premier institutions and industries.

M3: Promote innovation and entrepreneurship to fulfill the needs of the society and industry

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

After 4 years of graduation, graduates will be able to

PEO1: Analyse, design and implement solutions to the real-world problems in the field of Information Science and Engineering with multidisciplinary setup.

PEO2: Keep abreast with the technology, innovation and pursue higher education with high standards of social and professional ethics

PEO3: Develop professional and entrepreneurship skills to work effectively as an individual and in a team to meet the ever-changing goals of the organization

PROGRAM OUTCOMES (POs)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

At the end of the program, graduates will be able to

PSO1: Design, implement and maintain the information systems that fulfill the current needs of the industry and society.

PSO2: Apply computational theory, storage and networking concepts to solve the dayto day problems of the world.

GENERAL LAB GUIDELINES

Do's

1. Maintain discipline in the Laboratory.
2. Before entering the Laboratory, keep the footwear on the shoe rack.
3. Proper dress code has to be maintained while entering the Laboratory.
4. Students should carry a lab observation book, student manual and record book completed in all aspects.
5. Read and understand the logic of the program thoroughly before coming to the laboratory.
6. Enter the login book before switching on the computer.
7. Enter your batch member names and other details in the slips for hardware kits.
8. Students should be at their concerned places; unnecessary movement is restricted.
9. Students should maintain the same computer until the end of the semester.
10. Report any problems in computers/hardware kits to the faculty member in- charge/laboratory technician immediately.
11. The practical result should be noted down into their observation and the result must be shown to the faculty member in-charge for verification.
12. After completing the experiments, students should switch off the computers, enter logout time, return the hardware kits and keep the chairs properly.

Don'ts

1. Do not come late to the Laboratory.
2. Do not enter the laboratory without an ID card, lab dress code, observation book and record.
3. Do not leave the laboratory without the permission of the faculty in-charge.
4. Never eat, drink while working in the laboratory.
5. Do not handle any equipment before reading the instructions/instruction manuals.
6. Do not exchange the computers with others and hardware kits also.
7. Do not misbehave in the laboratory.
8. Do not alter computer settings/software settings.
9. External Disk/drives should not be connected to computers without permission, doing so will attract fines.
10. Do not remove anything from the kits/experimental set up without permission. Doing so will attract fines.
11. Do not mishandle the equipment / Computers.
12. Do not leave the laboratory without verification of hardware kits by the lab instructor.
13. Usage of Mobile phones, tablets and other portable devices are not allowed in restricted places.

INSTRUCTIONS TO STUDENTS

- Students must bring Observation book, record and manual along with pen, pencil, and eraser etc., no borrowing from others.
- Students must handle the trainer kit and other components carefully, as they are expensive.
- Before switch on the trainer kit, must show the connections to one of the faculties or instructors.
- After the completion of the experiment should return the components to the respective lab instructors.
- Before leaving the lab, should check whether they have switch off the power supplies and keep their chairs properly.
- Be regular to the Lab Do not come late to the Lab
- Do not throw connecting wires on the Floor
- Wear your College ID card Do not operate the IC trainer kits without permission
- Avoid unnecessary talking while doing the experiment
- Avoid loose connection and short circuits
- Take the signature of the lab in charge before taking the components
- Do not interchange the ICs while doing the experiment
- Handle the trainer kit properly
- Do not panic if you do not get the output
- Keep your work area clean after completing the experiment.
- After completion of the experiment switch off the power and return the components
- Arrange your chairs and tables before leaving.

RULES FOR MAINTAINING LABORATORY RECORD

- Put your name, USN and subject on the outside front cover of the record.
  Put that same information on the first page inside.
- Update Table of Contents every time you start each new experiment or topic.
- Always use pen and write neatly and clearly
- Start each new topic (experiment, notes, calculation, etc.) on a right-side
  (odd numbered) page
- Obvious care should be taken to make it readable, even if you have bad handwriting
- Date to be written every page on the top right side corner
- On each right-side page
  - Title of experiment
  - Theory
  - Procedure described clearly in steps
- On each left side page
  - Output
- Use labels and captions for figures and tables
- Attach printouts and plots of data as needed. Stick printouts (A4 Size) on
  the right side of the lab record
- Strictly observe the instructions given by the Teacher/ Lab Instructor.

SYLLABUS

DATA VISUALIZATION LAB		Semester	V
Course Code	**BAIL504**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Credits	01	Exam Hours	100
Examination type (SEE)	Practical		

Course objectives:

- Understand the Importance of data Visualization for business intelligence and decision making.
- Learn different approaches to understand the importance of visual perception.
- Learn different data visualization techniques and tools.
- Gain knowledge of effective data visuals to solve workplace problems.

Sl.NO	Experiments
1	**Getting Started -** Tableau Workspace, Tableau terminologies, basic functionalities.
2	**Connecting to Data Source –** Connecting to Database, Different types of Tableau Joins.
3	**Creating a View -** formatting charts, adding filters, creating calculated fields and defining parameters.
4	**Dashboard Design and Storytelling –** Components of Dashboard, Understanding how to place worksheets in Containers, Action filters and its types.
5	**Introducing Power BI –**Components and the flow of work. Power BI Desktop Interface-The Report has five main areas.
6	**Querying Data from CSV -** Query Editor, Connecting the data from the Excel Source, Clean, Transform the data.
7	**Creating Reports & Visualizations -** Different types of charts, Formatting charts with Title, Colors.
8	**Dashboards -** Filters in Power BI, Formatting dashboards.
9	Analysis of revenue in sales dataset: i) Create a choropleth map (fill the map) to spot the special trends to show the state which has the highest revenue. ii) Create a line chart to show the revenue based on the month of the year. iii) Create a bin of size 10 for the age measure to create a new dimension to show the revenue. iv) Create a donut chart view to show the percentage of revenue per region by creating zero access in the calculated field. v) Create a butterfly chart by reversing the bar chart to compare female & male revenue based on product category. vi) Create a calculated field to show the average revenue per state & display profitable & non-profitable state. vii) Build a dashboard.
10	Analysis of GDP dataset: i) Visualize the countries data given in the dataset with respect to latitude and longitude along with country name using symbol maps. ii) Create a bar graph to compare GDP of Belgium between 2006 – 2026. iii) Using pie chart, visualize the GDP of India, Nepal, Romania, South Asia, Singapore by the year 2010. iv) Visualize the countries Bhutan & Costa Rica competing in terms of GDP.

	v) Create a scatter plot or circle views of GDP of Mexico, Algeria, Fiji, Estonia from 2004 to 2006. vi) Build an interactive dashboard.
11	Analysis of HR Dataset: i) Create KPI to show employee count, attrition count, attrition rate, attrition count, active employees, and average age. ii) Create a Lollipop Chart to show the attrition rate based on gender category. iii) Create a pie chart to show the attrition percentage based on Department Category- Drag department into colours and change automatic to pie. Entire view, Drag attrition count to angle. Label attrition count, change to percent, add total also, edit label. iv) Create a bar chart to display the number of employees by Age group, v) Create a highlight table to show the Job Satisfaction Rating for each job role based on employee count. vi) Create a horizontal bar chart to show the attrition count for each Education field Education field wise attrition – drag education field to rows, sum attrition count to col, vii) Create multiple donut chart to show the Attrition Rate by Gender for different Age group.
12	Analysis of Amazon Prime Dataset: i) Create a Donut chart to show the percentage of movie and tv shows ii) Create a area chart to shows by release year and type iii) Create a horizontal bar chart to show Top 10 genre iv) Create a map to display total shows by country v) Create a text sheet to show the description of any movie/movies. vi) Build an interactive Dashboard.
Course outcomes (Course Skill Set): At the end of the course the student will be able to: 1. Design the experiment to create basic charts and graphs using Tableau and Power BI. 2. Develop the solution for the given real world problem. 3. Analyze the results and produce substantial written documentation.	

Mapping of Course Outcomes with POs & PSOs

Course Outcomes (COs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1														
CO2														
CO3														
Average														

ASSESSMENT DETAILS (BOTH CIE AND SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks) .
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

CONTINUOUS INTERNAL EVALUATION (CIE):

CIE marks for the practical course are **50 Marks**.
The split-up of CIE marks for record/ journal and test are in the ratio **50:50**.

- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

SPLIT-UP OF MARKS USED PRACTICAL SESSIONS

Split up of Marks	Practical Sessions- Continuation Evaluation (CE) Methodology / Process Steps per Experiment	Marks
#R1	Observation, Write up of Procedure / Algorithm/ Program and Execution of experiment	10
#R2	Record writing	10
#R3	Viva – Voce (Questions & Answers on relevant Experiment /Topic)	10
	Total Marks for each experiment	**30**
	Practical Sessions-Internal Assessment (IA)	
#R1	Write-up of Procedure/Program/Algorithm	20
#R2	Conduction/Execution	40
#R3	Viva-Voce	40
	Total Marks	**100**

SEMESTER END EXAMINATION(SEE):

- SEE marks for the practical course are 50 Marks.
- Rubrics for SEE are, writeup-20%, Conduction procedure and result in - 60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks.

RUBRICS FOR PRACTICAL SESSIONS

Course:	DATA VISUALIZATION LAB	Course Code:	BAIL504

Practical Sessions- Continuous Evaluation (CE)				
Evaluation Parameter	**Level of Achievement**			
#R1: Observation/ Conduction (10 Marks)	**Excellent (10-8)**	**Good (7-5)**	**Average (4-2)**	**Poor (1-0)**
	Observation neatly written. Handwriting is clear. Programs written with no mistakes. Programs executed with no errors	Observation neatly written. Handwriting is clear. Programs written with very few mistakes. Programs executed with very less errors	Observation is written in unclear manner. Handwriting is not very clear. Programs written with fewer mistakes. Programs executed with few errors	Observation is written in unclear manner. Handwriting is not clear, Programs written with lot of mistakes. Programs executed with a large number of errors.
#R2: Record (10 Marks)	**Excellent (10-8)**	**Good (7-5)**	**Average (4-2)**	**Poor (1-0)**
	Record is neatly written, handwriting is clear. Mistakes are covered and corrected properly and neatly. Record submitted on time	Record is neatly written, handwriting is clear. Most mistakes are covered and corrected properly and neatly. Record submitted with a delay of 1 - 3 days	Record is written in an unclear manner. Handwriting is not very clear. Mistakes are sometimes corrected properly. Record submitted with a delay of 4 to 5 days	Record is written in an unclear manner. Handwriting is not very clear. Mistakes are not corrected. Record submitted after a delay of 1 week
#R3: Viva (10 Marks)	**Excellent (10-8)**	**Good (7-5)**	**Average (4-2)**	**Poor (1-0)**

	Answered all questions with elaboration has excellent understanding of the topic.	Answered most of the questions Failed to elaborate some of the concepts	Answered a few questions. Subject knowledge is not adequate	Not able to answer any of the questions. Subject knowledge not adequate

Practical Sessions- Internal Assessment (IA)				
#R1: Write-Up (20 Marks)	**Excellent (20-16)**	**Good (15-11)**	**Average (10-6)**	**Poor (5-1)**
	Program neatly written. Handwriting is clear. Programs written with no mistakes.	Program neatly written. Handwriting is clear. Programs written with very few mistakes.	Program is written in unclear manner. Handwriting is not very clear. Programs written with fewer mistakes.	Program is written in unclear manner. Handwriting is not clear, Programs written with lot of mistakes.
#R2: Conduction/Execution (40 Marks)	**Excellent (40-30)**	**Good (29-19)**	**Average (18-8)**	**Poor (7-0)**
	Execution of the program done as per the procedure. Programs had less than 10 errors. The errors were debugged without any help. The Result was tabulated for all the cases.	Execution of the program done as per the procedure. Programs had less than 20 errors. The errors were debugged with a little help. The Result was tabulated for almost all the cases	Execution of the program done as per the procedure. Programs had more than 20 errors. The errors were debugged with the help of instructor. The Result was tabulated for few of the cases	Execution of the program was not done as per the procedure. Programs was full of syntax and logical error. The errors were resolved by the instructor. The Result was tabulated only for 1 or 2 Cases
#R3: Viva (40 Marks)	**Excellent (40-30)**	**Good (29-19)**	**Average (18-8)**	**Poor (7-0)**
	Answered all questions with elaboration has excellent understanding of the topic.	Answered most of the questions Failed to elaborate some of the concepts	Answered a few questions. Subject knowledge is not adequate	Not able to answer any of the questions. Subject knowledge not adequate

Course Instructor **Domain Co-Ordinator** **Head of Department**

LIST OF MAJOR EQUIPMENT

Name of the Laboratory: DATA PROCESSING LABORATORY

Sl. No.	Name of the Equipment	Specialization	Quantity
1	Desktop	Intel(R) Core (TM) i3-4170,4.00 GB RAM, 1TBB/500GB HDD, 64-bit operating system,18.5”ACER Monitor, Keyboard and Mouse	35
2	UPS	20KVA	1
3	Switches	24 Port Gigabytes	1
4	Internet	150 mbps	1
5	Projector	EPSON Projector with HDMI Port	1

Room Number : **A-308**

Total Area of the laboratory : 115 Sq. Meters

Total Amount Spent : Rs. 9,55,688.00/-

Name of the HOD : Dr.

Name of the lab in charge : Mr.

Name of the lab instructor : Mrs.

LIST OF EXPERIMENT/PROGRAM

Sl.NO	Experiments
1	**Getting Started -** Tableau Workspace, Tableau terminologies, basic functionalities.
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Introduction to Various Data Visualization tools

Data visualization is the practice of translating information into a visual context, such as a map or graph, to make data easier for the human brain to understand and pull insights from. It is the representation of information and data through use of common graphics, such as charts, plots, infographics, and animations. Data visualization is a powerful way for people, especially data professionals, to display data so that it can be interpreted easily.

Data Visualization enables decision-makers of any enterprise or industry to look into analytical reports and understand concepts that might otherwise be difficult to grasp.

Benefits of Data Visualization:

1. It is easy to understand the information with graphics
2. It made data to be represented in attractive way
3. Shows complex relationships
4. Helps to process large datasets
5. Useful for identifying trends
6. Minimizes ambiguity

Data visualization tools provide the ability to see and understand data trends, outliers, and patterns in an easy, intuitive way. There are various data visualization tools available. One must choose the tool based on various factors such as its ease of use, types of graphical representations the tool can produce, size of the dataset the tool can handle etc. some of Data Visualization tools are Tableau, Power BI, Google Charts, Jupyter, Grafana etc.

The following are some common types of data visualizations:

1. **Table:** A table is data displayed in rows and columns, which can be easily created in a Word document or Excel spreadsheet.
2. **Chart or graph:** Information is presented in tabular form with data displayed along an x and y axis, usually with bars, points, or lines, to represent data in comparison.
3. **Geospatial visualization:** Data is depicted in map form with shapes and colours that illustrate the relationship between specific locations, such as a choropleth or heat map.
4. **Dashboard:** Data and visualizations are displayed, usually for business purposes, to help analysts understand and present data.

Introduction to Tableau and Installation

Tableau is a data visualization tool that provides pictorial and graphical representations of data. It is used for data analytics and business intelligence. Tableau provides limitless data exploration without interrupting flow of analysis.

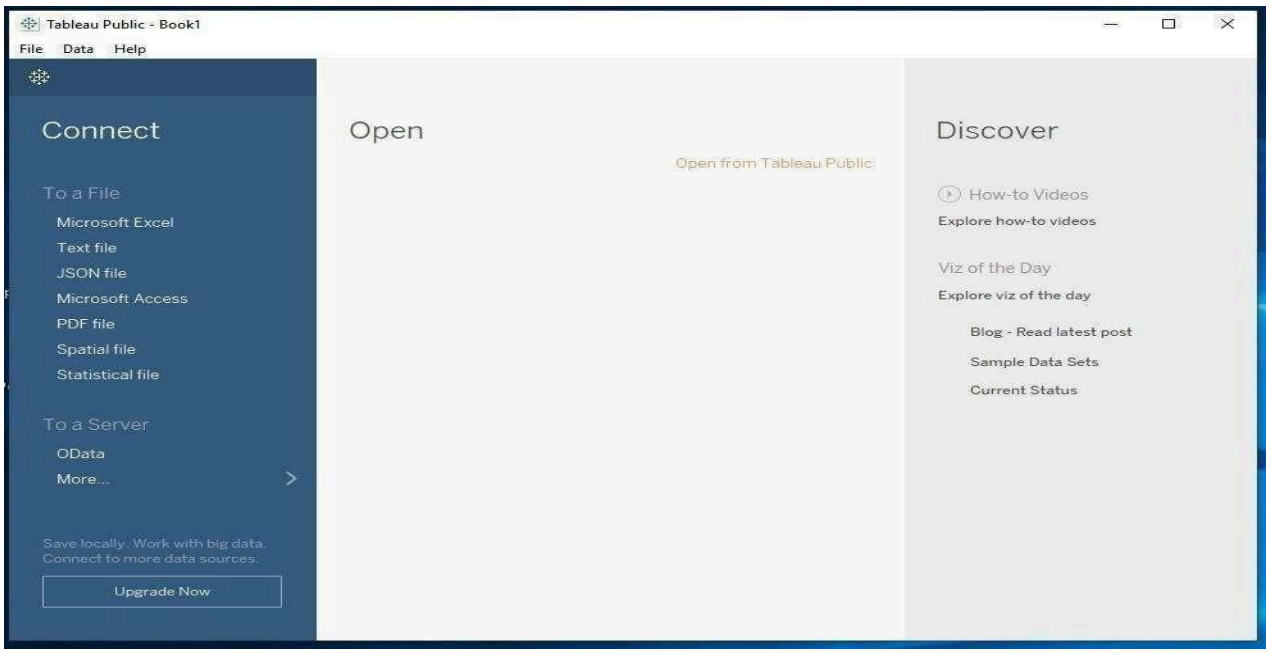
With an intuitive drag and drop interface, user can uncover hidden insights in data and make smarter decisions faster.

Tableau is a Business Intelligence tool for visually analyzing the data. Users can create and distribute an interactive and shareable dashboard, which depict the trends, variations, and density of the data in the form of graphs and charts. Tableau can connect to files, relational and Big Data sources to acquire and process data. The software allows data blending and real-time collaboration, which makes it very unique. It is used by businesses, academic researchers, and many government organizations for visual data analysis. It is also positioned as a leader Business Intelligence and Analytics Platform in Gartner Magic Quadrant.

As a leading data visualization tool, Tableau has many desirable and unique features. Its powerful data discovery and exploration application allows you to answer important questions in seconds. You can use Tableau's drag and drop interface to visualize any data, explore different views, and even combine multiple databases easily. It does not require any complex scripting. Anyone who understands the business problems can address it with a visualization of the relevant data. After analysis, sharing with others is as easy as publishing to Tableau Server.

Tableau Features

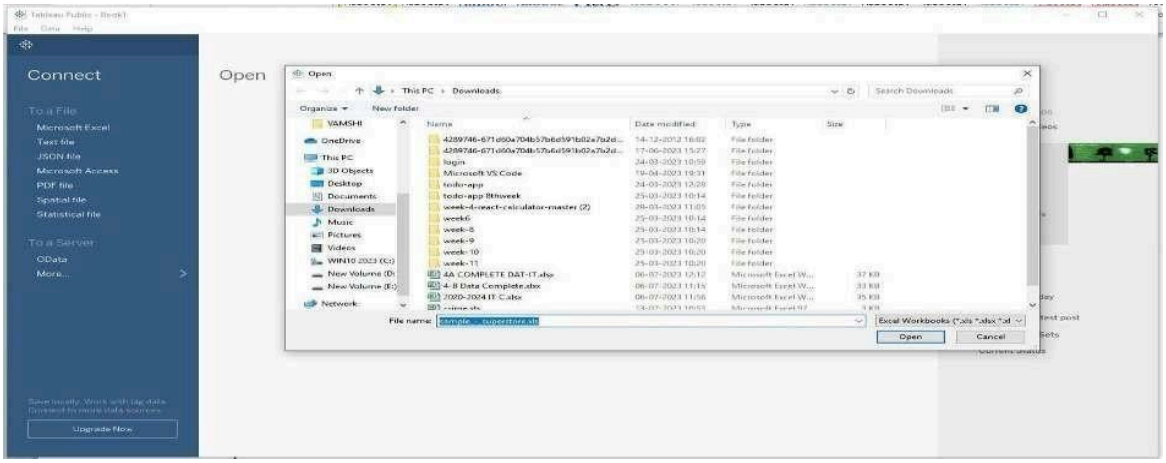
- **Speed of Analysis** − As it does not require high level of programming expertise, any user with access to data can start using it to derive value from the data.
- **Self-Reliant** − Tableau does not need a complex software setup. The desktop version which is used by most users is easily installed and contains all the features needed to start and complete data analysis.
- **Visual Discovery** − The user explores and analyzes the data by using visual tools like colors, trend lines, charts, and graphs. There is very little script to be written as nearly everything is done by drag and drop.
- **Blend Diverse Data Sets** − Tableau allows you to blend different relational, semi structured and raw data sources in real time, without expensive up-front integration costs. The users don’t need to know the details of how data is stored.
- **Architecture Agnostic** − Tableau works in all kinds of devices where data flows. Hence, the user need not worry about specific hardware or software requirements to use Tableau.
- **Real-Time Collaboration** − Tableau can filter, sort, and discuss data on the fly and embed a live dashboard in portals like SharePoint site or Salesforce. You can save your view of data and allow colleagues to subscribe to your interactive dashboards so they see the very latest data just by refreshing their web browser.
- **Centralized Data** − Tableau server provides a centralized location to manage all of the organization’s published data sources. You can delete, change permissions, add tags, and manage schedules in one convenient location. It’s easy to schedule extract refreshes and manage them in the data server. Administrators can centrally define a schedule for extracts on the server for both incremental and full refreshes.



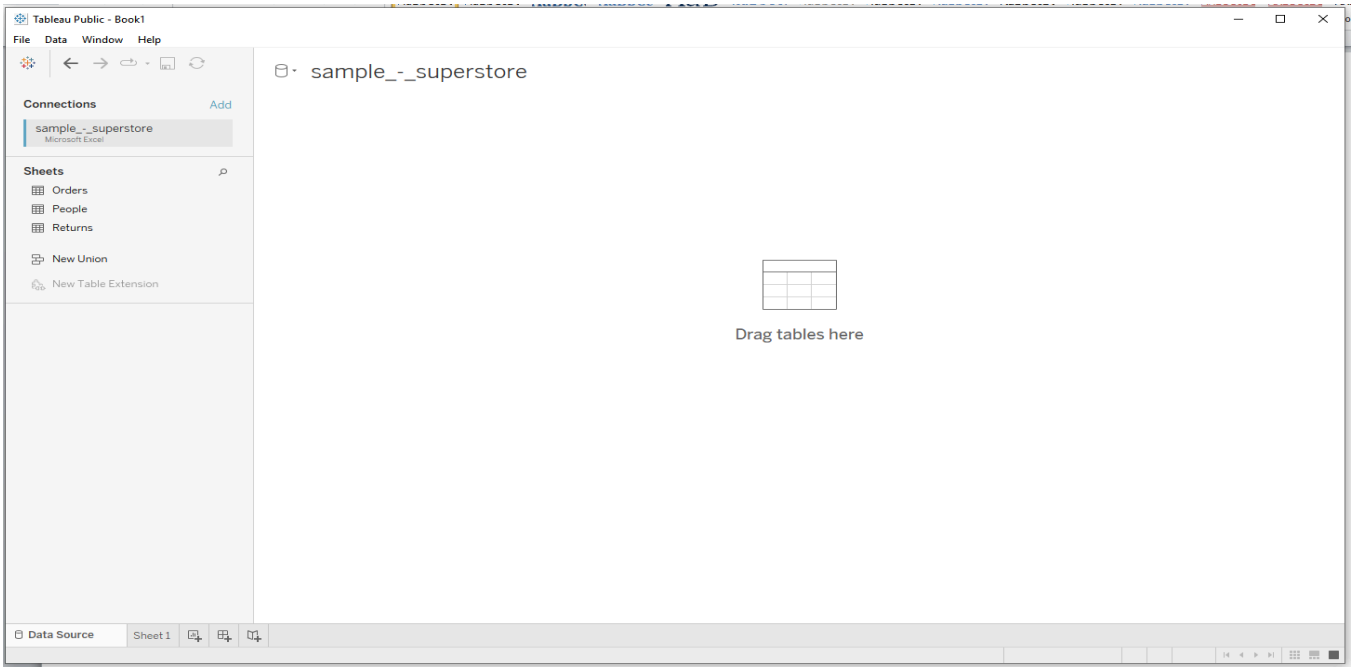
Connecting to Data and preparing data for visualization in Tableau

Tableau supports connecting to a wide variety of data, stored in a variety of places. For example, data might be stored on computer in a spread sheet or a text file, or in a big data, relational, or cube (multidimensional) database on a server in enterprise or the data can be from a public domain available on the web.

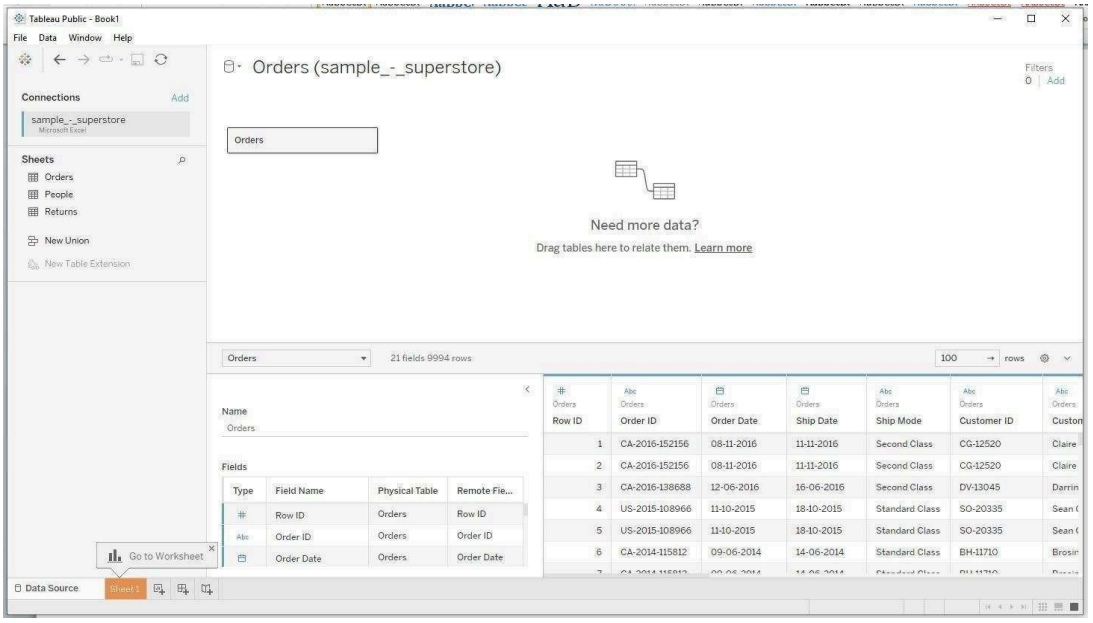
Data can be imported in Tableau Public from Connect panel on left side. For example, an Excel sample dataset was loaded into Tableau as follows:



After clicking on open, screen is as follows:

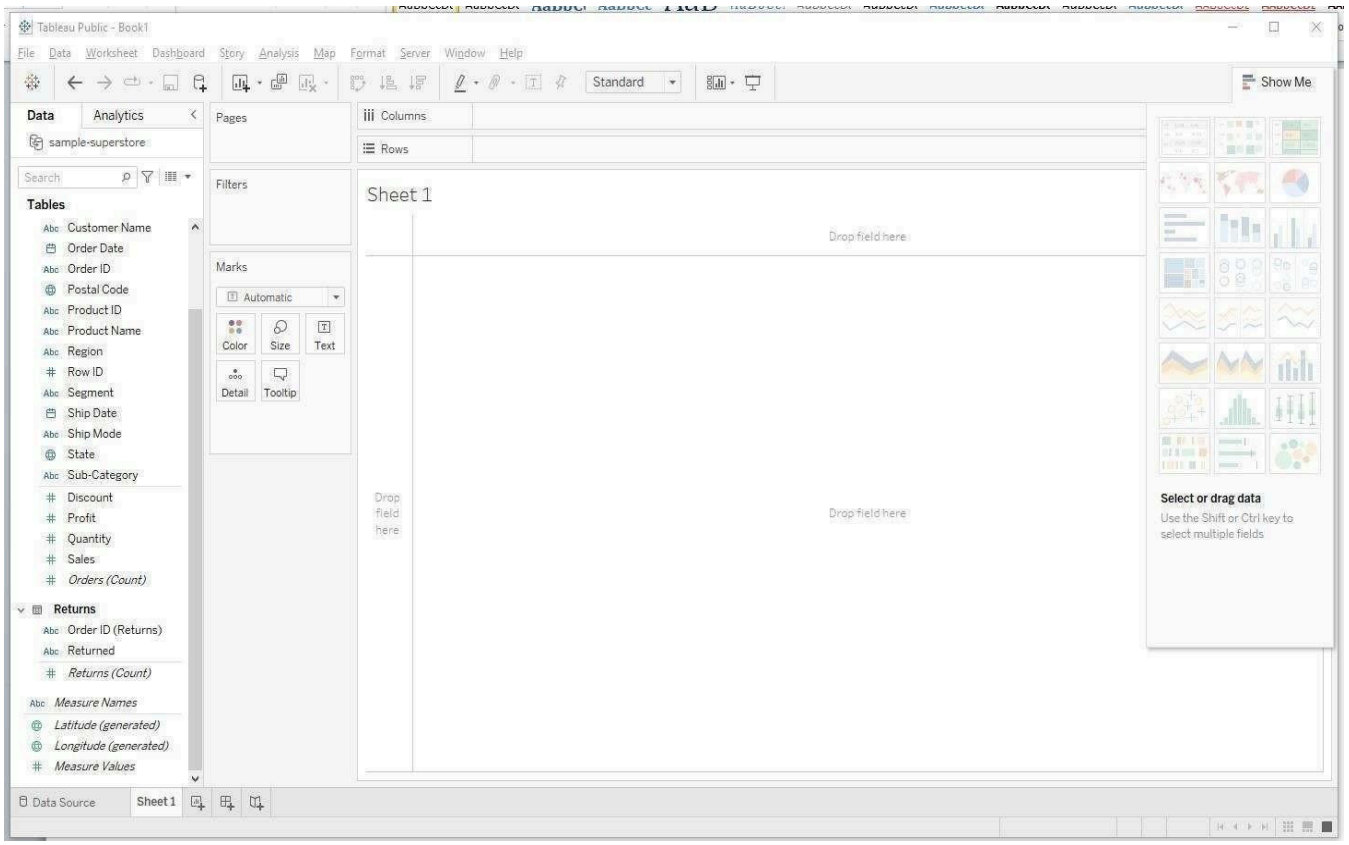


The data store page appears as above. The left pan shows that above dataset consists of 3 worksheets. If we drag orders table, screen appears as follows: Tableau automatically identifies the data type of each column.



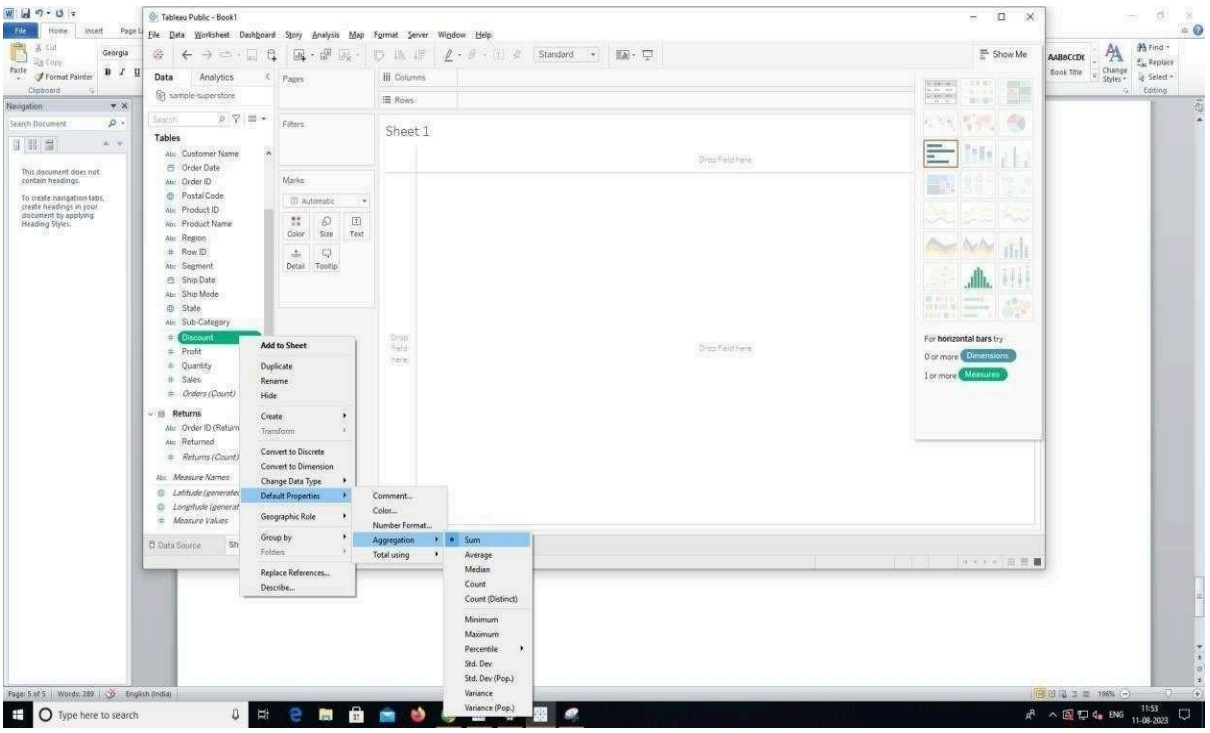
Now drag Returns table onto the Canvas to the right of Orders table. This shows the relation between the two tables Orders and Returns.

If we click on the link between Orders and Returns table names at the top gives the summary of the relationship between the tables. Now rename the data store and click on Sheet1 at the bottom left to proceed. This step creates a data extract which improves query performance.

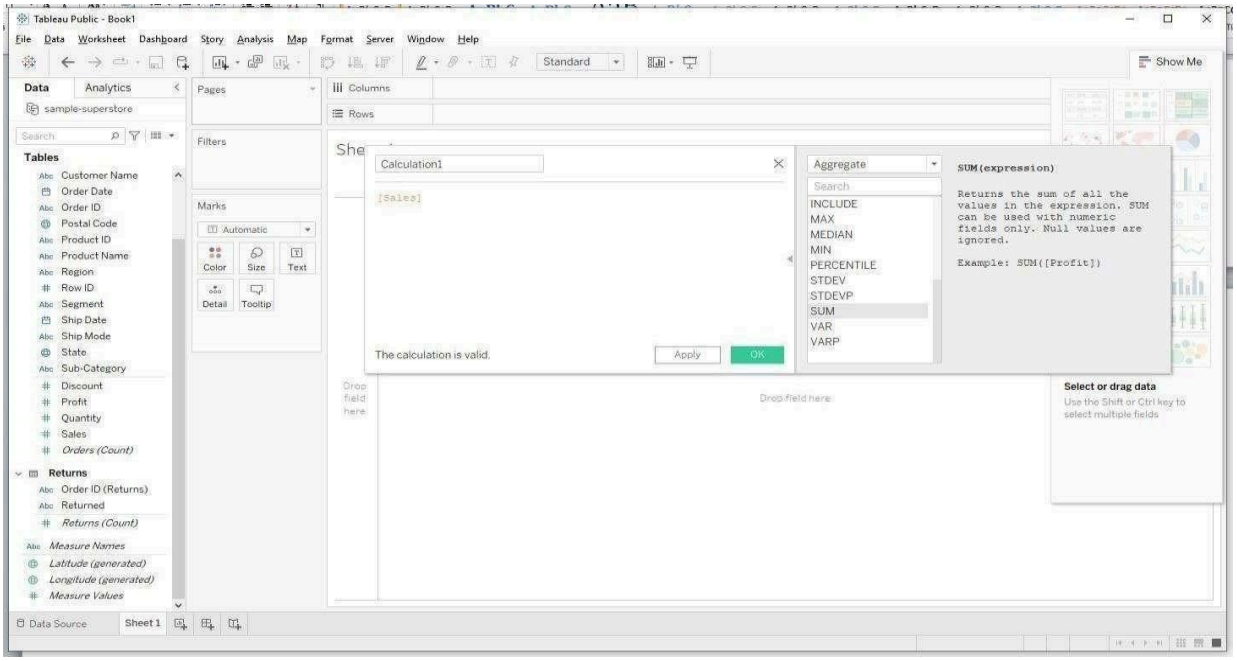


Data aggregation and statistical functions

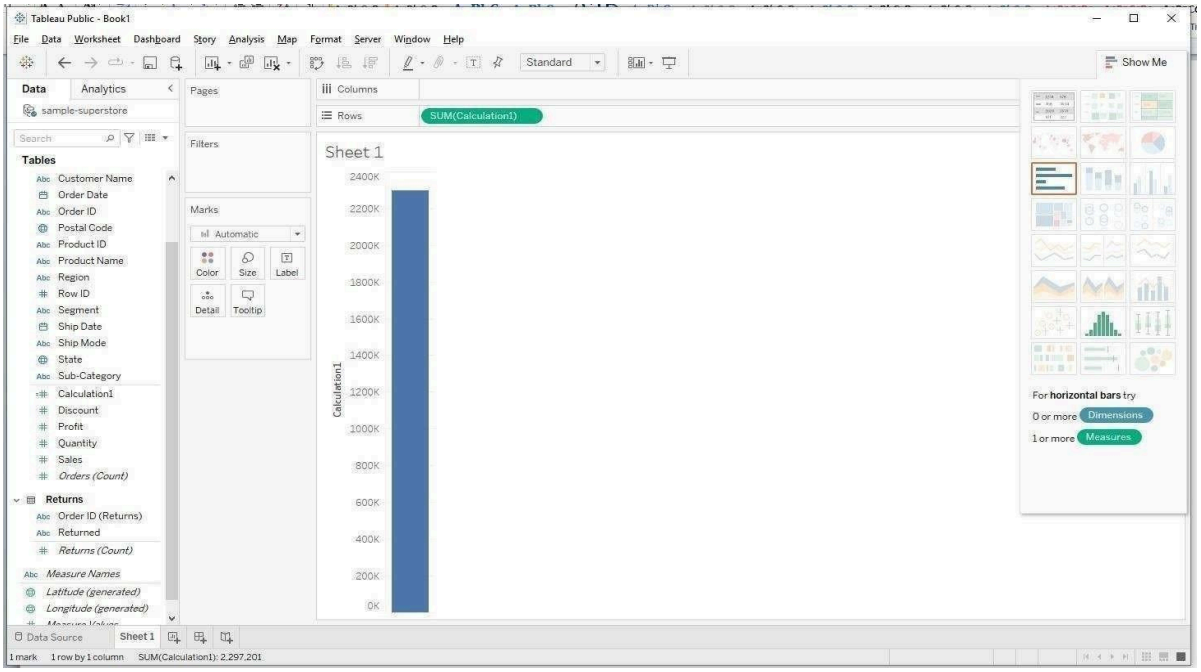
We can apply various aggregation and statistical functions on data such as count, minimum, maximum, standard deviation, variance etc. This is shown below. This can be done by right clicking on the required field of dataset, click on Default properties and click on aggregation.



Or the above operation can be done by creating a calculated field as shown below. To create a calculated field, click on the down arrow button beside search tab above Tables panel, drag a field to that calculated field window.



Then click on apply and results are shown below:



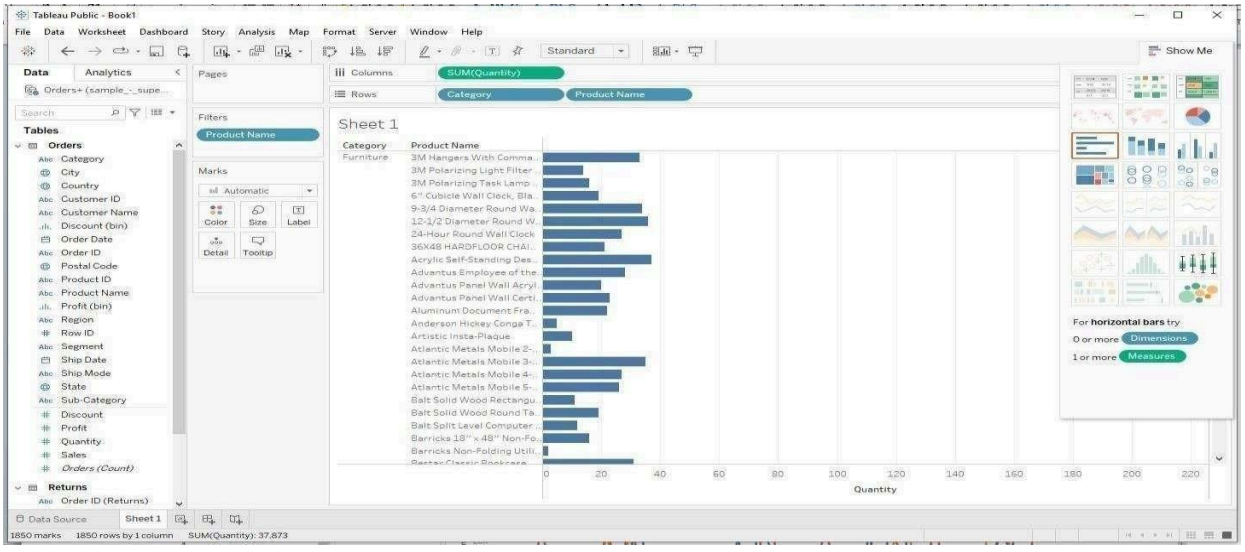
In the same way we can apply any aggregate or statistical function on data with the help of calculated fields.

Data Visualization

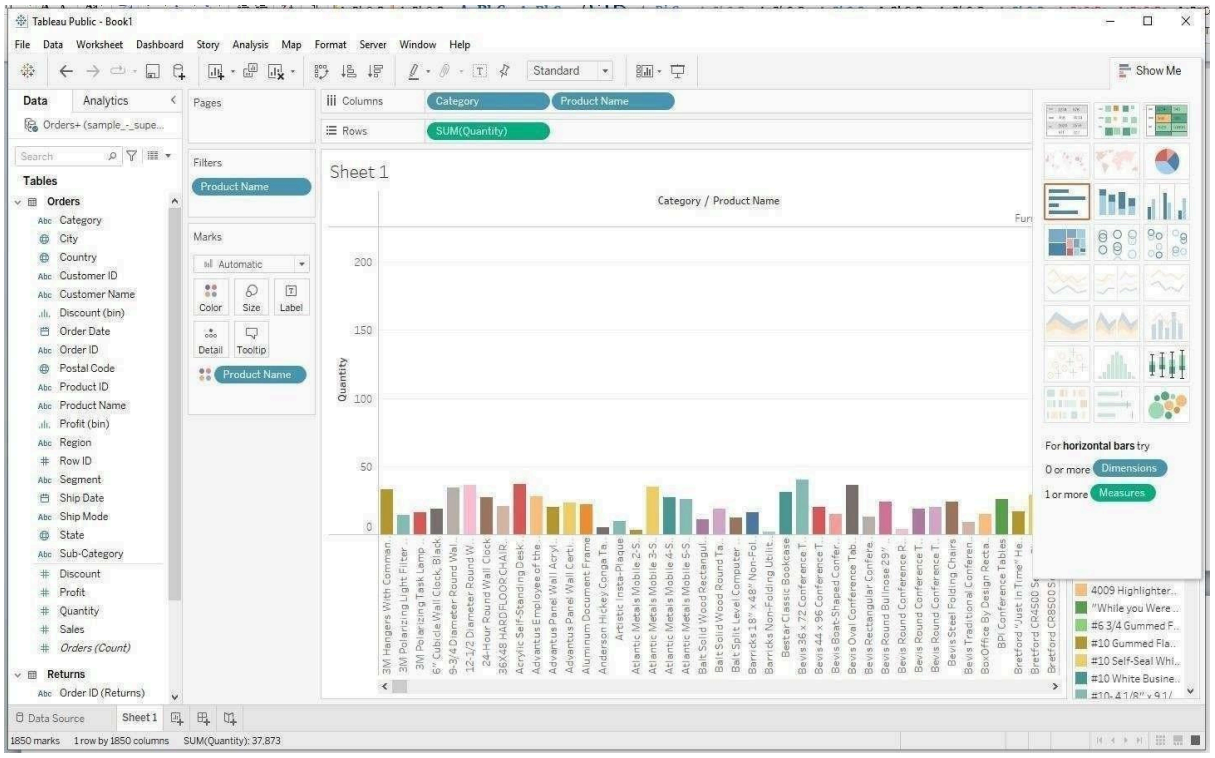
we can perform various visualization operations on data in Tableau. Some of them are bar cart, histogram, bubble chart, gantt chart, scatter plot, heat map etc.

Bar chart:

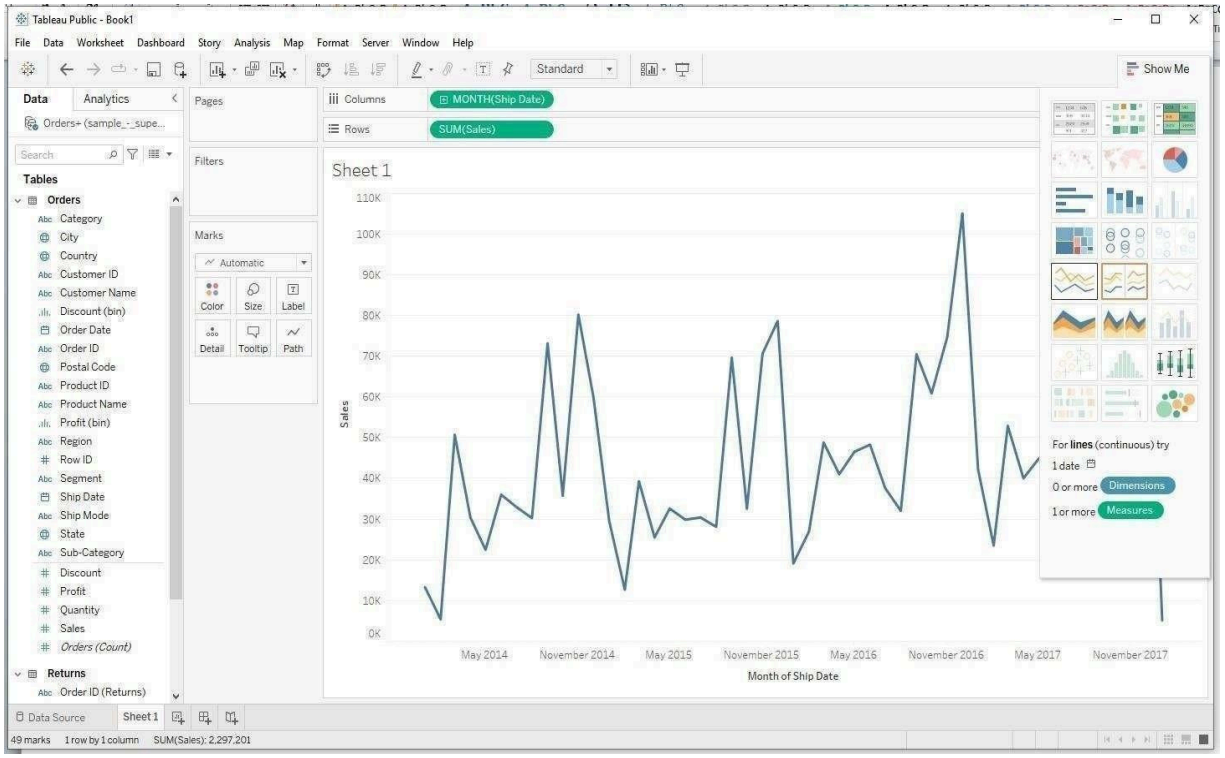
Bar charts can be created in 3 variations in Tableau: Horizontal bars, stacked bars, side- by-side bars. Horizontal bars can be created by selecting that type of chart from Show Me menu on right hand side of Canvas. The type of chart in box on right hand side represents horizontal bar graph.



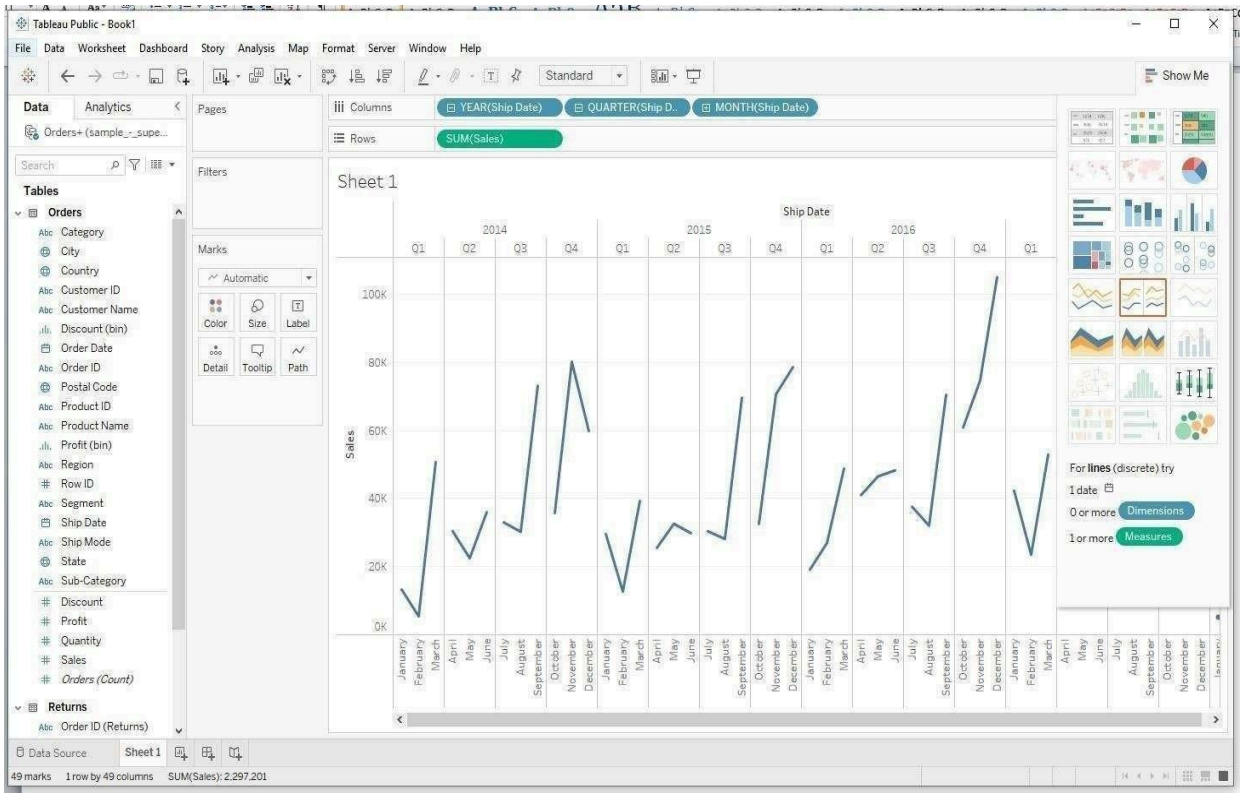
Side-by-side bar chart can be created in following way.



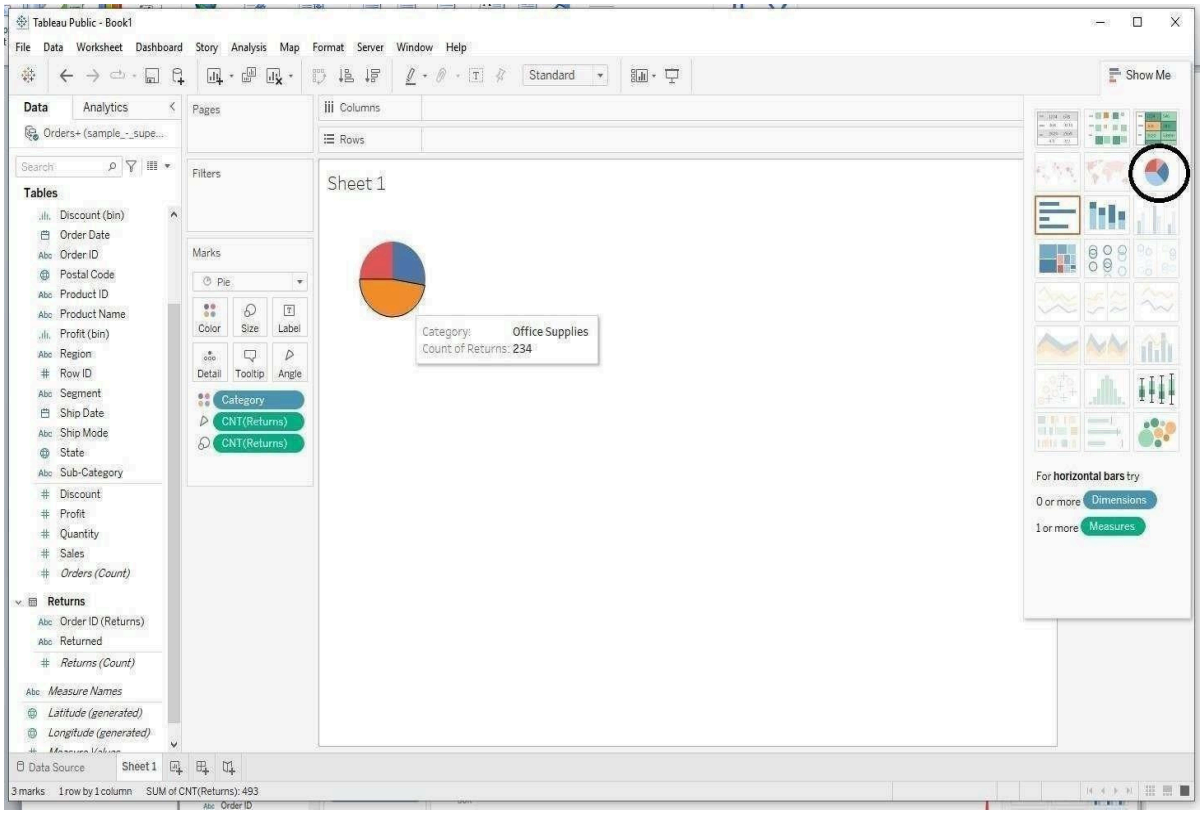
Line graph: Line graph can be continuous or discrete



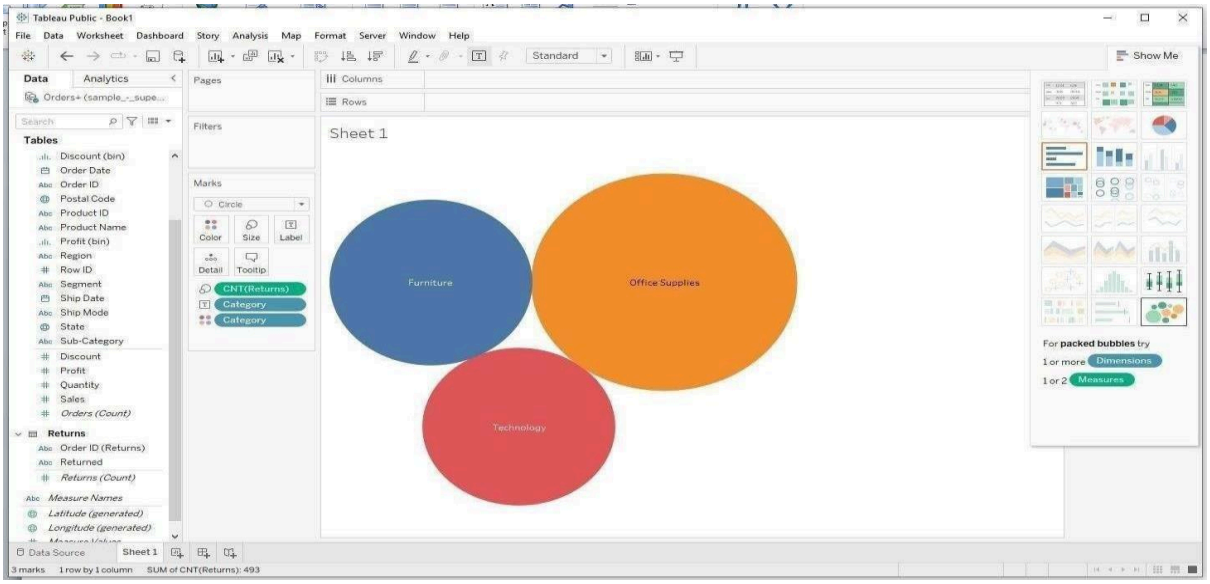
Discrete line graph is shown below:



Pie chart:



Bubble chart:



Dashboards

Dashboard is a way of displaying various types of visual data in one place. Usually, a dashboard is intended to convey different, but related information in an easy-to-digest form. And oftentimes, this includes things like key performance indicators (KPI)s or other important business metrics that stakeholders need to see and understand at a glance.

Dashboards are useful across different industries and verticals because they're highly customizable. They can include data of all sorts with varying date ranges to help you understand: what happened, why it happened, what may happen, and what action should be taken.

POWER BI

What is Power BI?

Power BI is a business intelligence tool that allows you to connect to various data sources, visualize the data in reports and dashboards, and then share them with anyone you want.
Power BI is a Data Visualization and Business Intelligence tool that converts data from different data sources to interactive dashboards and BI reports.

What is Power BI Used For

Power BI is a tool in the category of Business Intelligence (BI). The purpose of BI is to track Key Performance Indicators (KPIs) and uncover insights in business data so as to better inform decision-making across the organization.
Power BI is used in different ways depending on the role of the individual, from developers, analysts, managers, and directors, to everyone in between.

How Does Power BI Compare to Other Tools Like Tableau and Excel?

Power BI and Tableau are both business intelligence tools and have a lot of overlap in terms of their capabilities. There are 2 key differences between Power BI and Tableau:

1. Power BI only works on Windows, whereas Tableau supports both Windows and Mac OS.
2. Pricing options differ between Power BI and Tableau. However, Tableau is generally the more expensive option.

Why Power BI?

"DATA "Analysis and Decision Making

Organizations need a tool that can help them understand the large amount of data that they are collecting. It is a powerful data visualization and analysis tool that allows **businesses to turn raw data into actionable insights and reports.**

Microsoft Power BI comes with a **free** or **paid version**. The free version only provides Power BI tools like **Power BI Desktop** and **Power Q&A** to dashboards. Whereas, in the Pro version they provide services like **live report sharing**, **Power View**, and more Power BI apps.

Key Differences Between Power BI and Tableau

Power BI	Tableau
Power BI uses DAX for measuring and calculating columns.	Tableau deploys MDX for dimensions and measures.
Power BI is best for a limited volume of data.	Tableau can handle huge columns of data and still offer better performance.
Power BI offers many data points for data visualization.	Tableau has better data visualization.

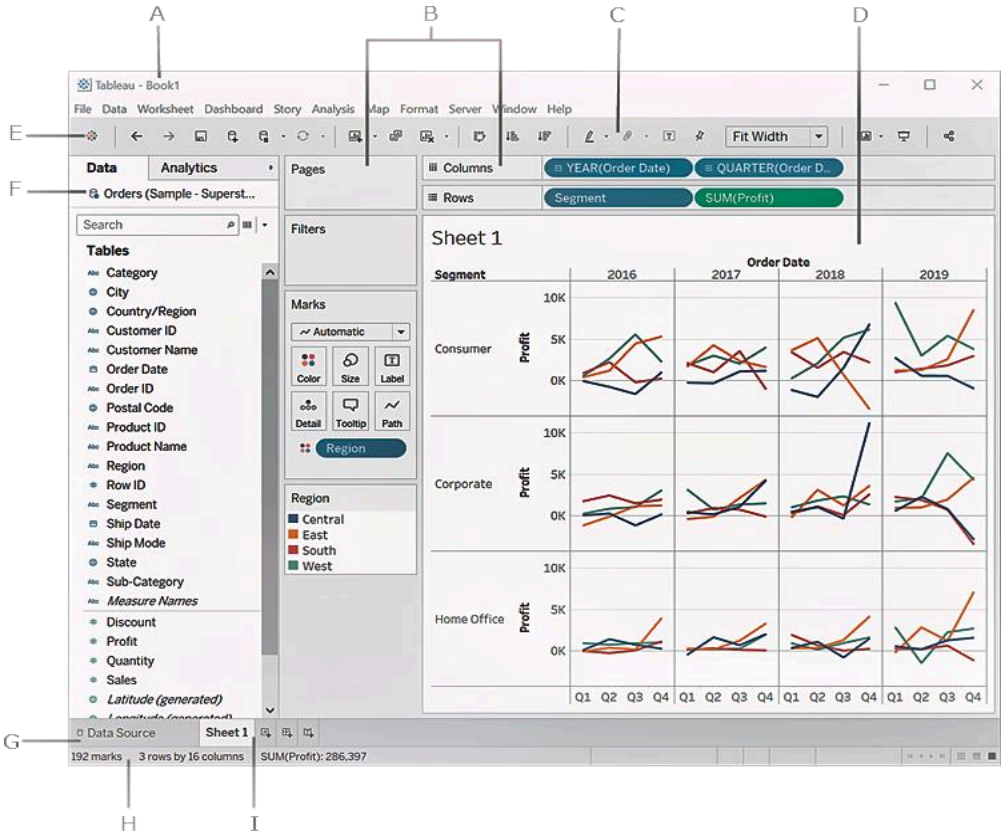
PROGRAM 1

Getting Started - Tableau Workspace, Tableau terminologies, basic functionalities.

- Data Visualization helps translate information into visuals like charts, graphs, and maps, making it easier to understand and analyze complex data.
- Tableau is a tool for data visualization that allows users to create visual representations of data, making it simple to explore and interpret information.
- Tableau's drag-and-drop interface helps users uncover insights quickly and make better decisions based on data.
- Users can create interactive dashboards in Tableau, which show trends and patterns through graphs and charts, and share them easily.
- Tableau connects to many data sources (files, databases, etc.), allowing for real-time collaboration and data blending, making it useful for businesses, researchers, and government organizations.

Tableau Workspace

The Tableau workspace consists of menus, a toolbar, the Data pane, cards and shelves, and one or more sheets. Sheets can be worksheets, dashboards, or stories.



A. Workbook name. A workbook contains sheets. A sheet can be a worksheet, a dashboard, or a story.
B. Cards and shelves - Drag fields to the cards and shelves in the workspace to add data to your view.
C. Toolbar - Use the toolbar to access commands and analysis and navigation tools.
D. View - This is the canvas in the workspace where you create a visualization.
E. Click this icon to go to the Start page, where you can connect to data.
F. Side Bar - In a worksheet, the side bar area contains the Data pane and the Analytics pane.
G. Click this tab to go to the Data Source page and view your data.
H. Status bar - Displays information about the current view.
I. Sheet tabs - Tabs represent each sheet in your workbook. This can include worksheets, dashboards, and stories.

Tableau terminologies

Terminologies	Description
Cross-tab	Another name for a text table or a table of numbers.
Dashboard	A collection of views shown in a single location where you can compare and monitor a variety of data simultaneously.
Data source	The underlying data that Tableau Reader is connected to. You can't change the data source in Tableau Reader.
Filter	A control on a view that limits the data shown in a view. For example, a filter on region that only includes the West.
Marks	A visual representation of one or more rows in a data source. Mark types can be bar, line, square, and so on.
Packaged workbook	A type of workbook created in either Tableau Desktop or Tableau Server. These files contain both the workbook as well as copies of the referenced local file data sources and background images.
Pane	The row and columns areas in a view.
Repository	A folder located in your My Documents folder that stores workbooks.
View	The visual representation of your data in a worksheet or dashboard.
Workbook	A collection of one or more worksheets and dashboards.
Worksheet	A single view of data. Each worksheet can be connected to a single data source.

Basic Functionalities

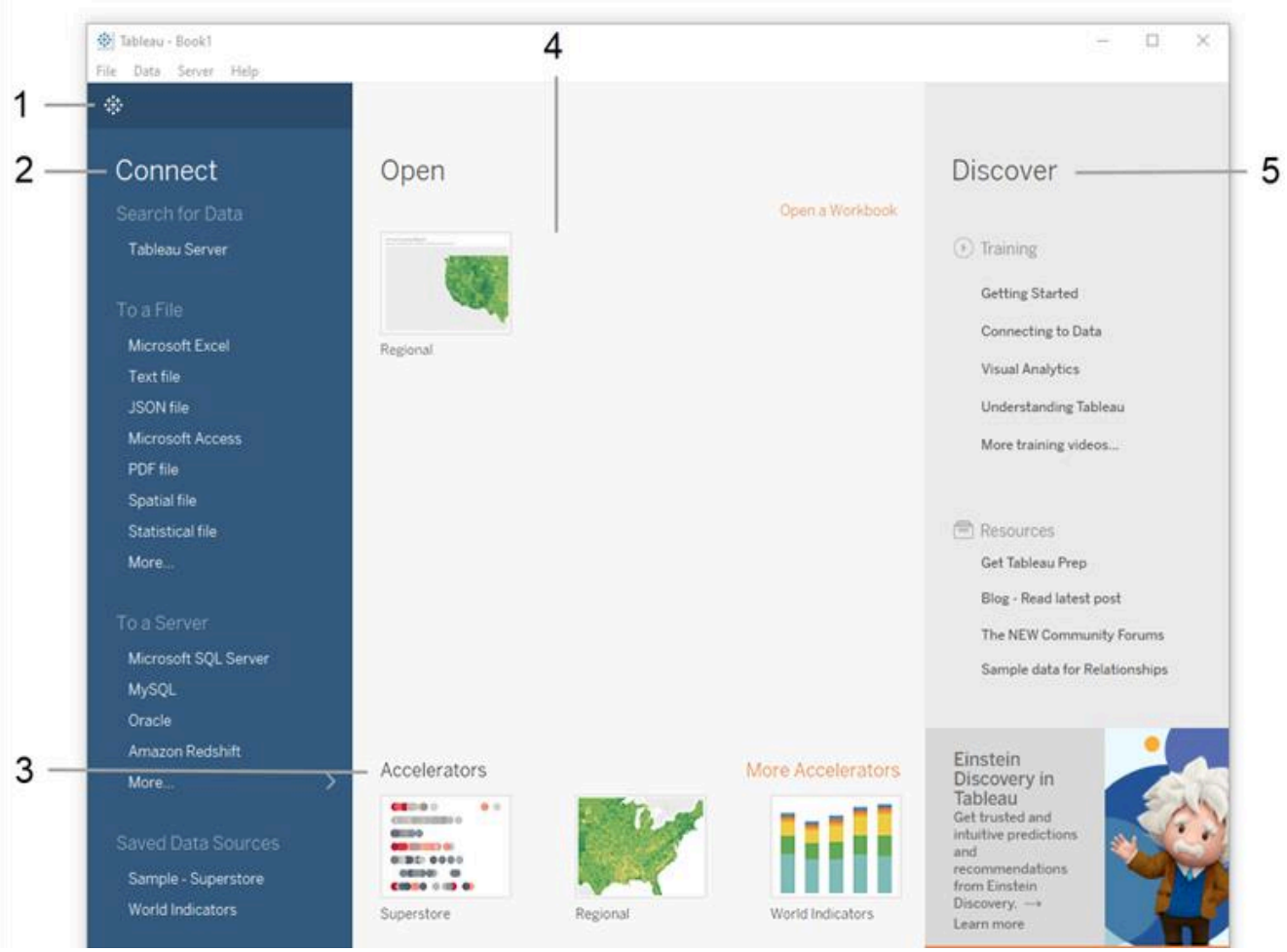
Functionality	Description
Data visualization	Tableau can transform raw data into charts, graphs, and maps that are easy to understand. It offers a variety of charts, including bar charts, pie charts, line charts, scatterplots, histograms, and more.
Data analysis	Tableau can help you explore and analyze large datasets to find patterns, trends, and anomalies.
Dashboard creation	Tableau can help you create interactive dashboards that provide an at- a-glance view of key performance indicators (KPIs).
Operational reporting	Tableau can help you generate visually appealing reports that communicate data-driven insights.
Connecting to data sources	Tableau can connect to multiple data sources, including Excel, SQL Server, Web Connectors, and Google Analytics.
Data grouping	Tableau can help you group data points to simplify analysis.
Data functions	Tableau has a variety of functions, including number functions, string functions, date functions, type conversion aggregate functions, and logical functions.

Getting Started:

Step 1: Connect to your data

Open Tableau Desktop and begin

The first thing you see after you open Tableau Desktop is the Start page(Link opens in a new window). Here, you select the connector (how you will connect to your data) that you want to use.



The start page gives you several options to choose from:

1. Tableau icon. Click  in the upper left corner of any page to toggle between the start page and the authoring workspace.

2. Connect pane. Under Connect, you can:
   - Connect to data that is stored in a file, such as Microsoft Excel, PDF, Spatial files, and more.
   - Connect to data that is stored on Tableau Server, Microsoft SQL Server, Google Analytics, or another server.
   - Connect to a data source that you've connected to before.

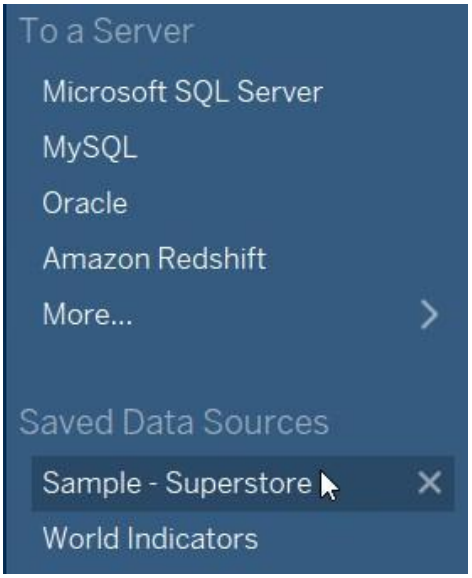
   Tableau supports the ability to connect to a wide variety of data stored in a wide variety of places. The Connect pane lists the most common places that you might want to connect to, or click the More links to see more options. For more on connecting to data sources, see the Learning Library for this tutorial.

3. Under Accelerators, see a selection of Accelerators and the sample workbooks that come with Tableau Desktop. Prior to 2023.2, these were only sample workbooks.

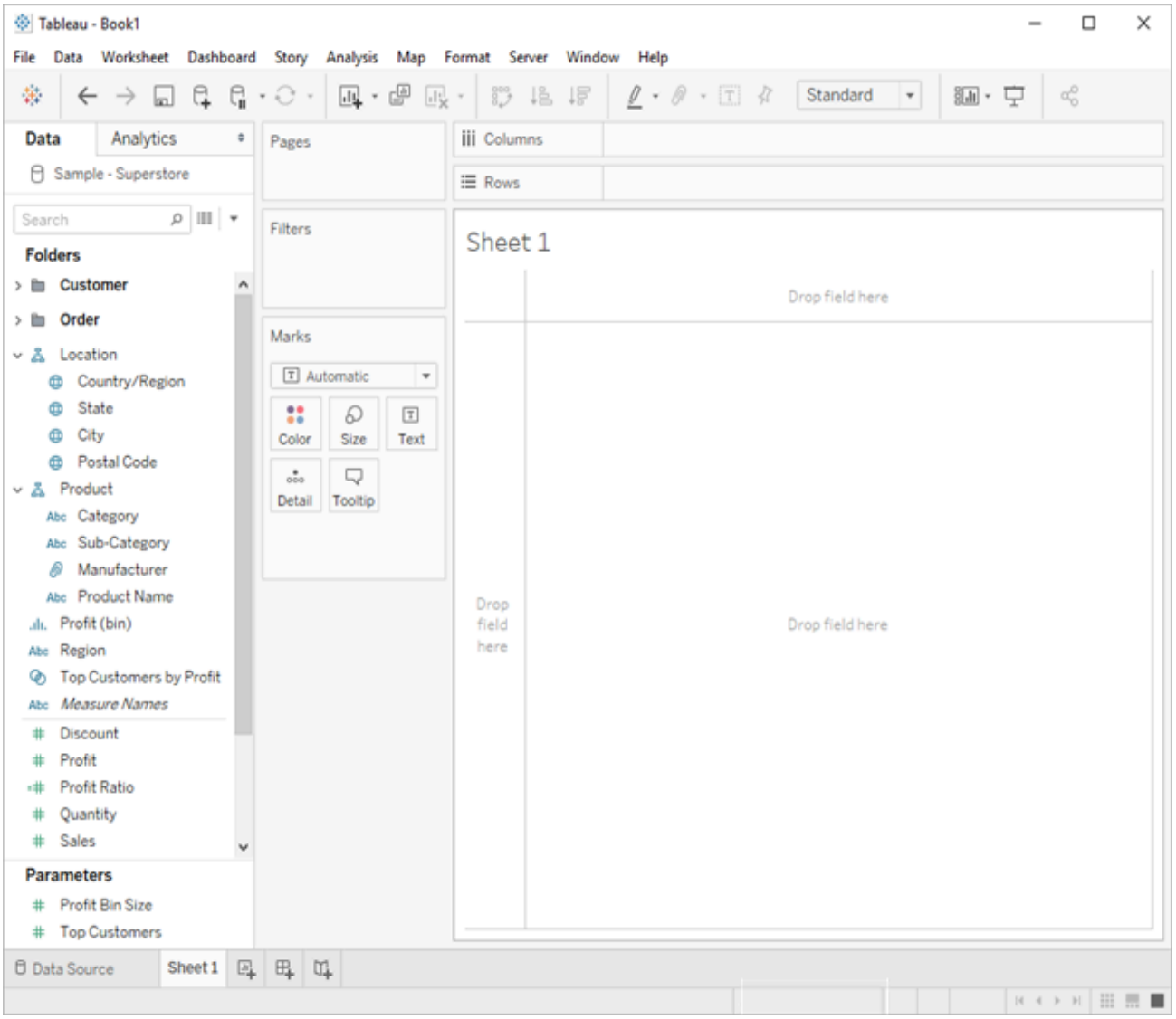
4. Under Open, you can open workbooks that you've already created.

5. Under Discover, find additional resources like video tutorials, forums, or the "Viz of the week" to get ideas about what you can build.

In the Connect pane, under Saved Data Sources, click Sample - Superstore to connect to the sample data set.



After you select Sample - Superstore, your screen will look something like this:



The Sample - Superstore data set comes with Tableau. It contains information about products, sales, profits, and so on that you can use to identify key areas for improvement within this fictitious company.

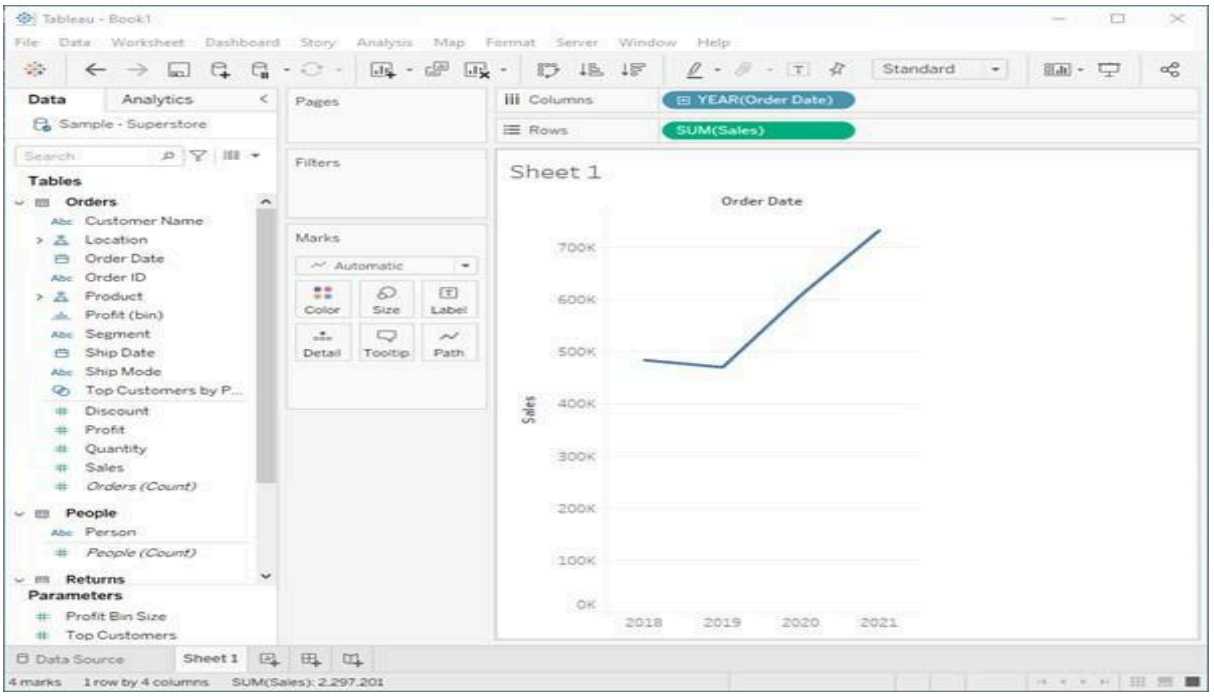
Step 2: Drag and drop to take a first look

Create a view

From the Data pane, drag Order Date to the Columns shelf.

From the Data pane, drag Sales to the Rows shelf.

Tableau generates the following chart with sales rolled up as a sum (aggregated). You can see total aggregated sales for each year by order date.



VIVA QUESTIONS:

1. **What are the main components of the Tableau workspace?**
   Tableau workspace includes the Menu Bar, Toolbar, Data Pane, Shelves (Rows, Columns, Filters), Card, Canvas, and Show Me panel.

2. **Explain the difference between a worksheet, dashboard, and story in Tableau.**
   A worksheet is for individual visualizations, a dashboard combines multiple worksheets, and a story narrates insights using worksheets and dashboard.

3. **What is a "Data source" in Tableau, and how does it differ from a "Workbook"?**
   A data source is the external data connected to Tableau, while a workbook contains visualizations and dashboards created from that data.

4. **What is the purpose of the "Filter" in Tableau visualizations?**
   Filters refine the data displayed in visualizations by including or excluding specific data points.

5. **How does Tableau's drag-and-drop functionality enhance data analysis and visualization?**
   It allows users to intuitively build visualizations by dragging dimensions and measures onto shelves without coding.

PROGRAM 2

Connecting to Data Source – Connecting to Database, Different types of Tableau Joins.

Dataset used: sample_superstore.xls (Contains 3 sheets: Orders, Returns, People)

- Connecting to Excel Files in Tableau:
  - ❖ Open Tableau and click on Connect in the le pane.
  - ❖ Under To a File, choose Microsoft Excel.
  - ❖ Browse and select your Excel file (sample_superstore.xls).
  - ❖ Tableau will display the sheets from the Excel file in the Data Source tab.
  - ❖ Drag the relevant sheets to the workspace.

- sample_superstore.xls Dataset: has three Excel sheets
- Orders:

  Row ID

  Order ID

  Order

  Date Ship

  Date Ship

  Mode
- Returns:

  Returned

  Order ID
- People

  :

  Person

  Region

From these, the sheets named as “Order” and “Returns” have a relationship based on the field “Order ID”, and you can join them using this field.

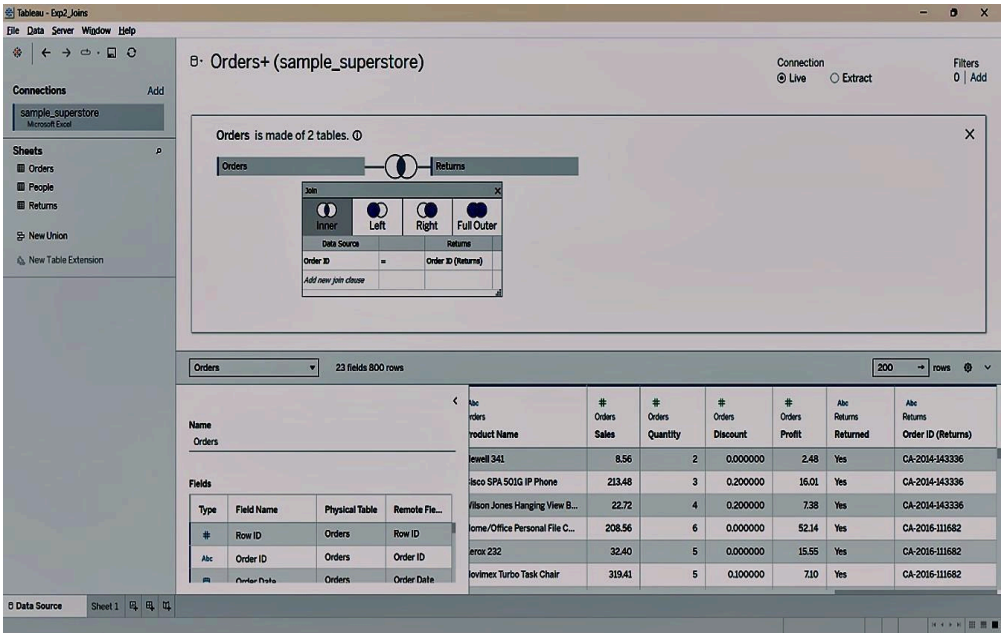
Types of Joins in Tableau:

a. Inner Join:

- Description: Returns only records where there is a match in both tables.
- How to Create in Tableau:

- Double click on the Sheet “Orders” to bring it to the Relationship Window & to view the contents of the sheet.
- Select “Orders” in the Relationship window, go to the drop-down menu in “Orders”, now click on “Open” in order to unlock the contents and to build a relation with other sheets.
- Now, check the other two sheets named as “People” & “Returns” for any common field that can be considered as the Primary Key to join both the sheets.
- As per this dataset, we have “Order ID” as the common field appearing in the sheets “Orders” & “Returns”. Hence, we can join these two sheets as follows;

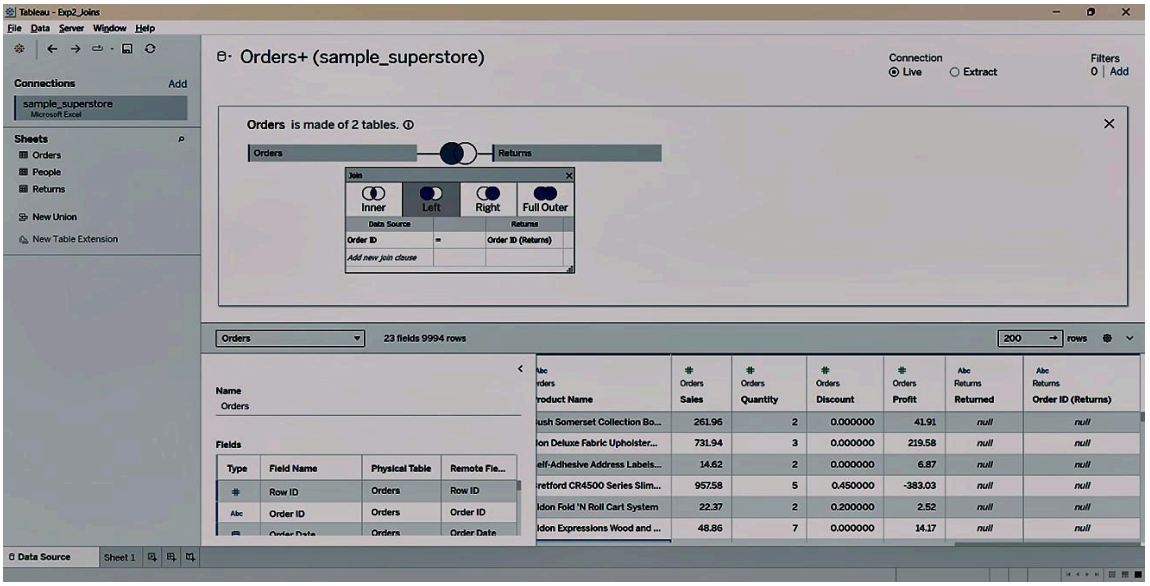
  Drag the sheet “Returns” to the relationship window near to “Orders”
- Now the sheets will be joined automatically by default as “Inner Join”. To check that, we can look into the picture shown in between the line that connects both the sheets
- Result: You will see only orders where “Order ID” matches in both “Orders” and “Returns” table.



b. Left Join:

- Description: Returns all records from the le table (Orders), and matched records from the right table (Returns). If there’s no match, NULL values are returned for fields from the right table.
- How to Create in Tableau:

  In the join settings, select Left Join.
- Result: All orders will be returned, even if data missing in Orders. Returns information will be NULL for those without a match.

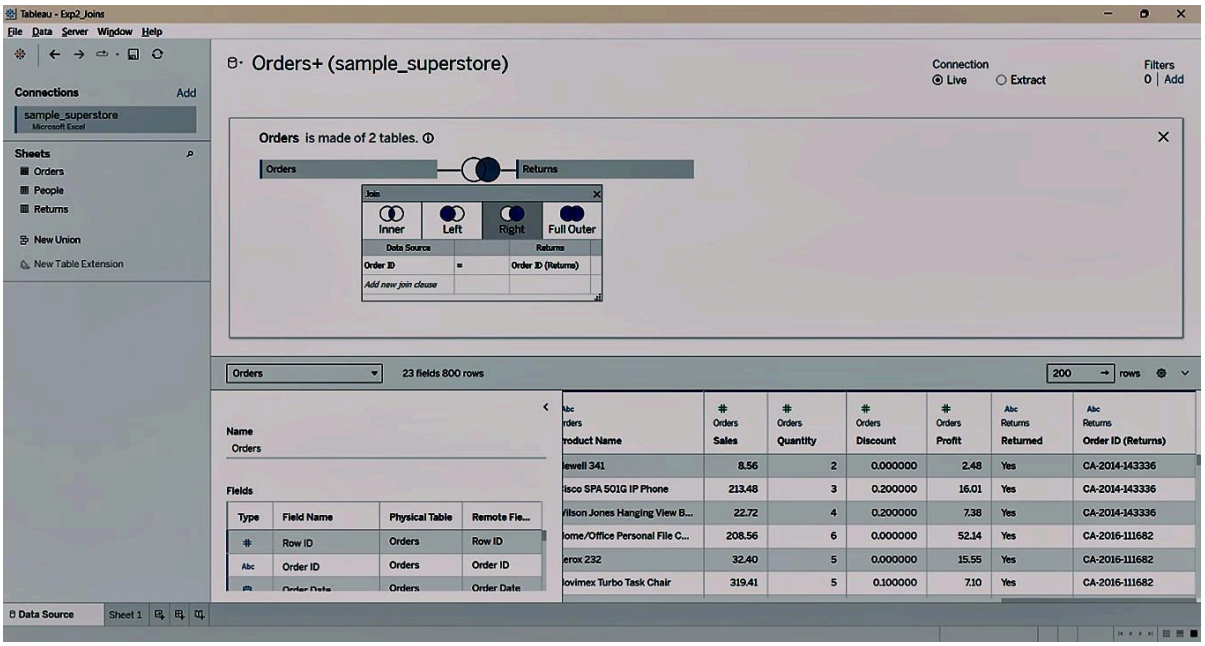


c. Right Join:

- Description: Returns all records from the right table (Returns), and matched records from the le table (Orders). If there's no match, NULL values are returned for fields from the le table.
- How to Create in

  Tableau: Select Right

  Join.
- Result: You will see all orders, even if they don't have :Order ID". Order information will be NULL for those orders with no matching Order ID.

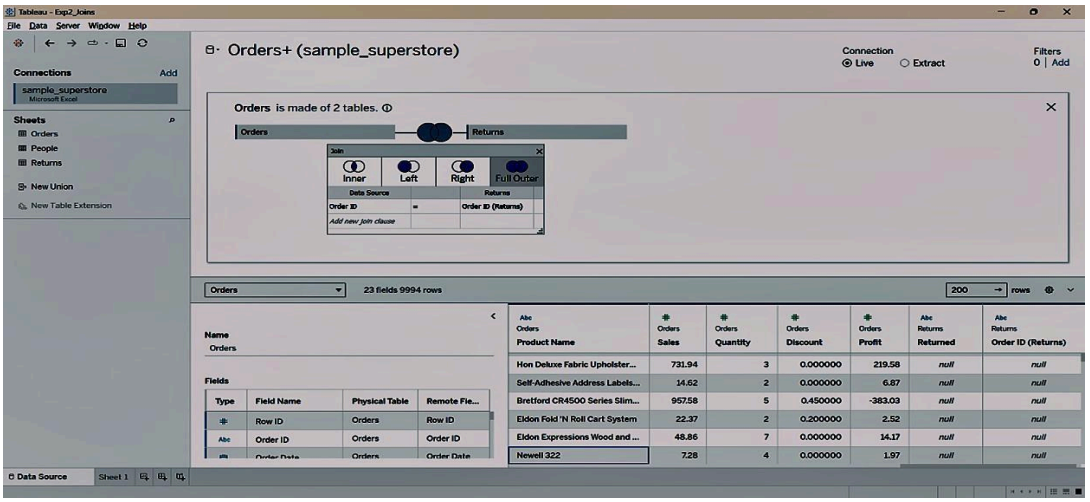


d. Full Outer Join:

- Description: Returns all records when there is a match in either the le (Orders) or right (Returns) table. If there's no match, NULL values are returned for the missing side.
- How to Create in Tableau:

Select Full Outer Join.

- Result: You will see all orders and all returns, even if they don't have a match in the other table. NULL values will appear where there's no corresponding record.



VIVA QUESTIONS:

1. **How do you connect an Excel file (e.g., sample_superstore.xls) to Tableau?**
   Open Tableau, click "Connect," select "Microsoft Excel," and choose the file (e.g., *sample_superstore.xls*).

2. **What is an Inner Join in Tableau, and when would you use it?**
   An Inner Join combines data from two tables where matching values exist in both; it is used when only common records are needed.

3. **Describe the difference between a Left Join and a Right Join in Tableau.**
   A Left Join keeps all rows from the left table and matching rows from the right, while a Right Join keeps all rows from the right table and matching rows from the left.

4. **What is the result of using a Full Outer Join in Tableau, and how do you create one?**
   A Full Outer Join combines all rows from both tables, keeping unmatched rows from both sides; create it by dragging and dropping tables, then selecting "Full Outer Join."

5. **In the sample_superstore.xls dataset, how would you join the "Orders" and "Returns" sheets in Tableau?**
   Drag both sheets to the canvas and use a common field (e.g., Order ID) to establish the join.

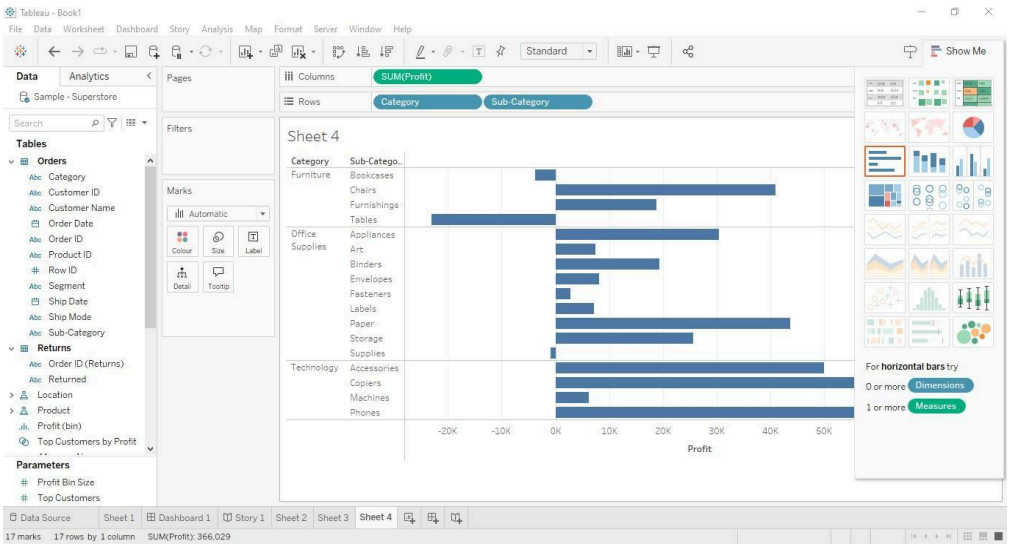
PROGRAM 3

Creating a View - formatting charts, adding filters, creating calculated fields and defining parameters.

Connect □sample superstore

Drag and drop profit in column shelf

Drag and drop category and sub-category in row shelf

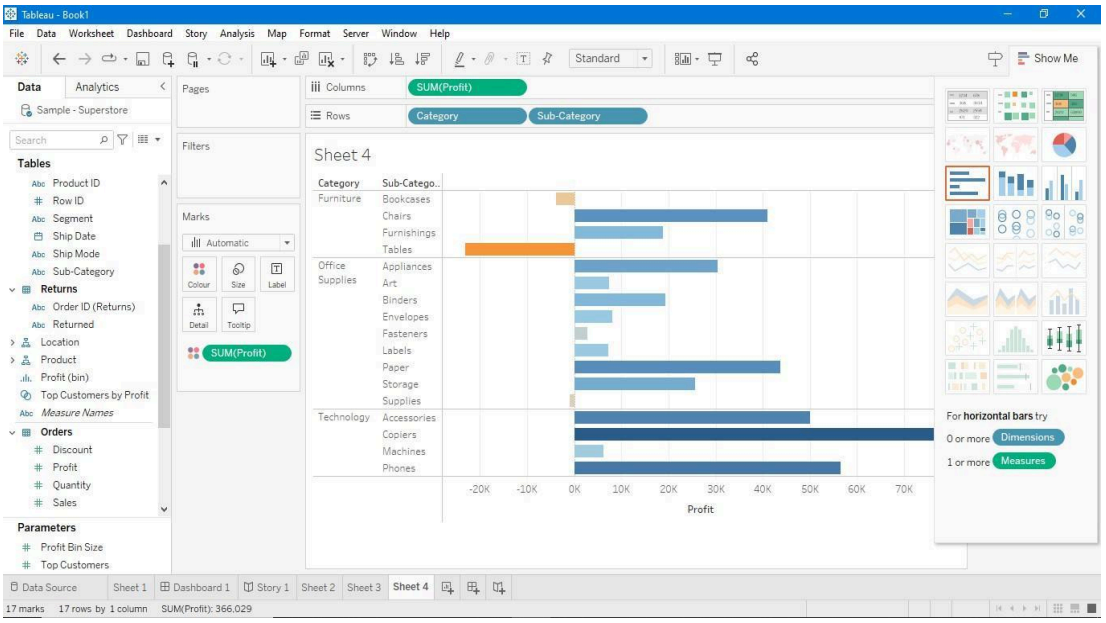


Formatting charts

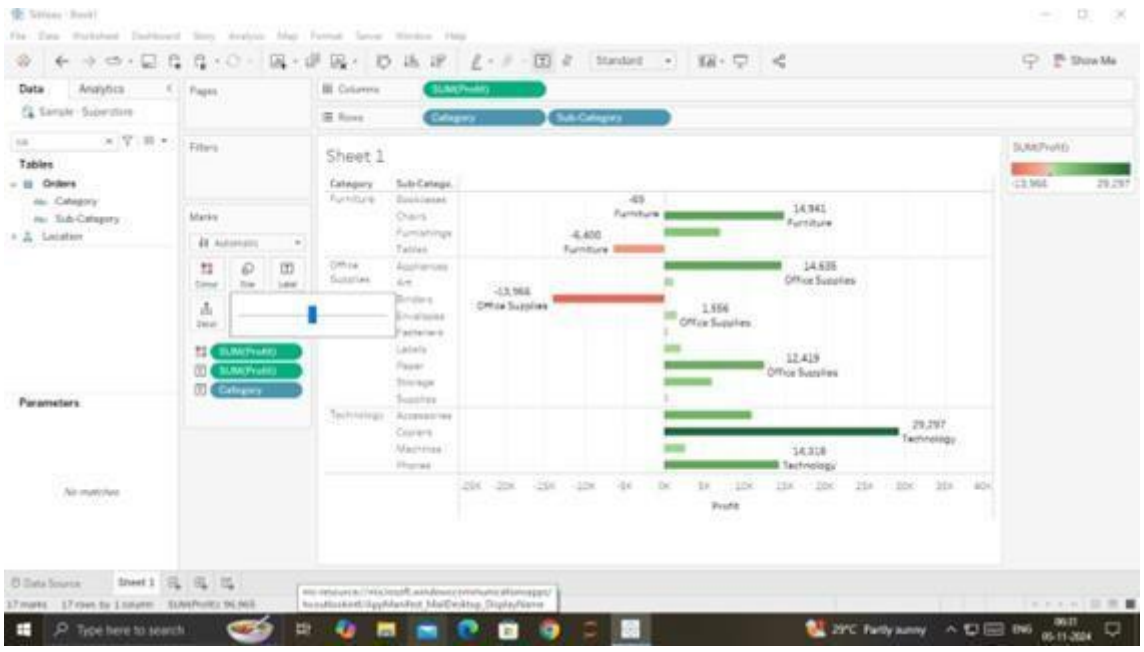
Formatting can be done using marks pane

Change the colour of profit bar by dragging the profit from data pane and drop it in colours option in the marks pane

Click on colours□edit then select red-green diverging



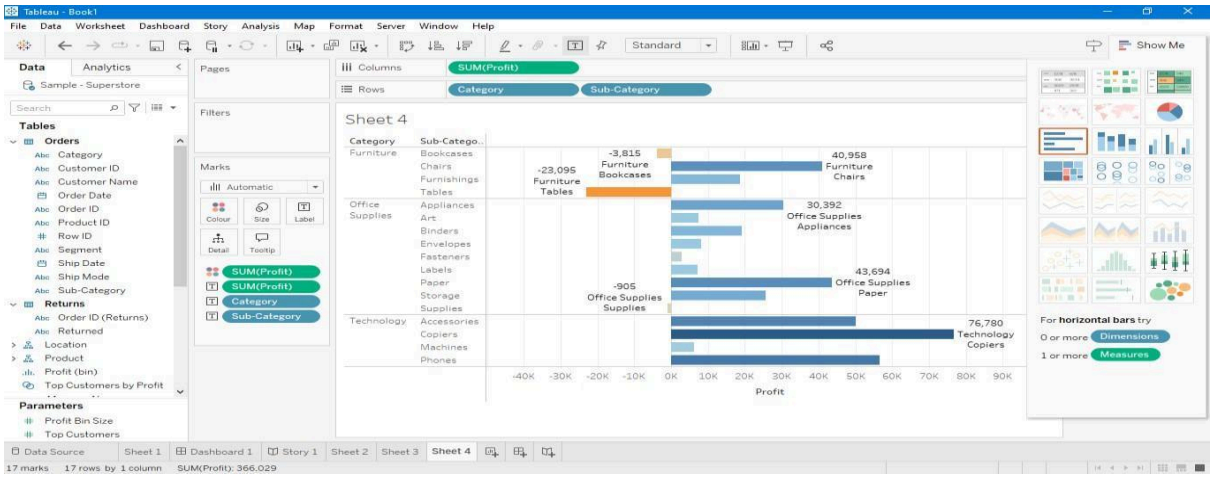
The size option in the marks pane helps to change the size of the bars



Drag and drop profit and category from the data pane to the label option the marks pane

Click on label and click on (…) near the text box

In the dialogue box, change the format of the label to the desired text click on apply and then

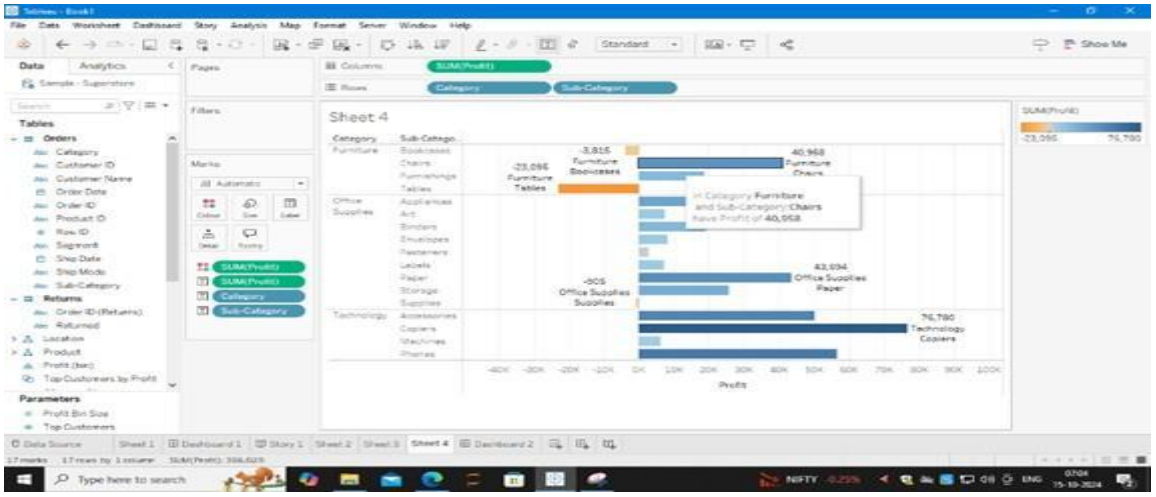


Click on the tooltip and edit the tooltip in the new window and click ok.

Example tooltip: **In the main category** <Category> **and sub-category <Sub-Category>, the profit is <SUM(Profit)>**

Right click on the headers and disable show headers to remove headers.

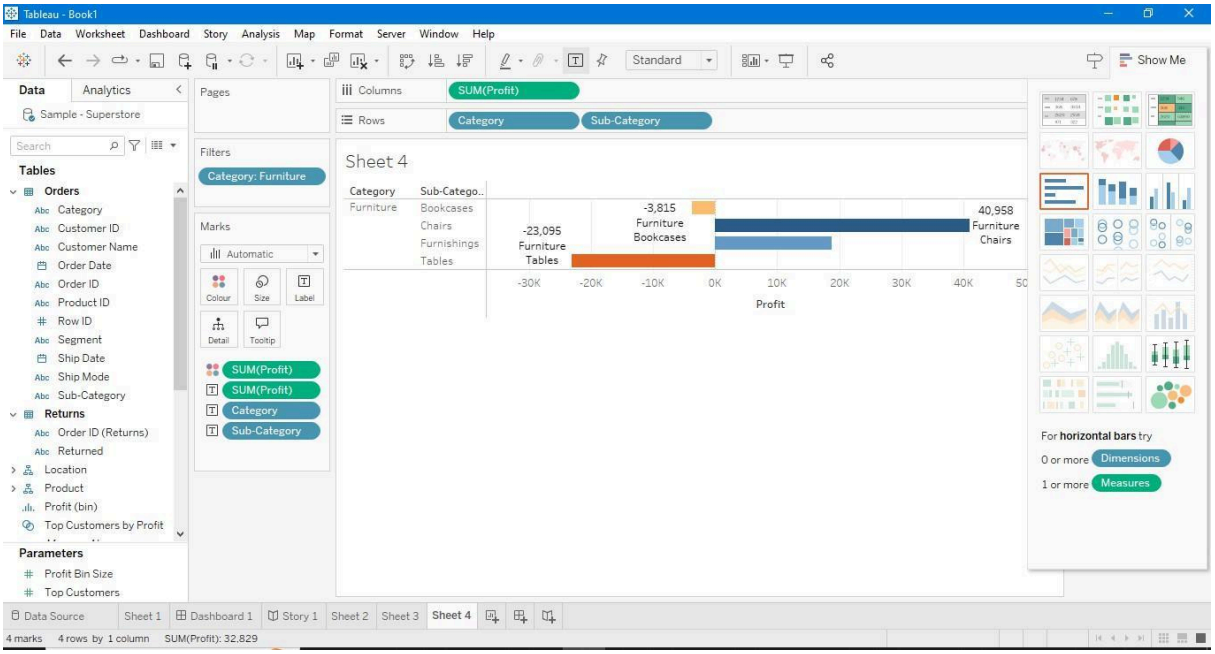
Click on the sheet and change the name.



Adding filters

Drag and drop category from data pane to filters pane.

Include and exclude the required categories.



Creating calculated fields

View data□calculated field

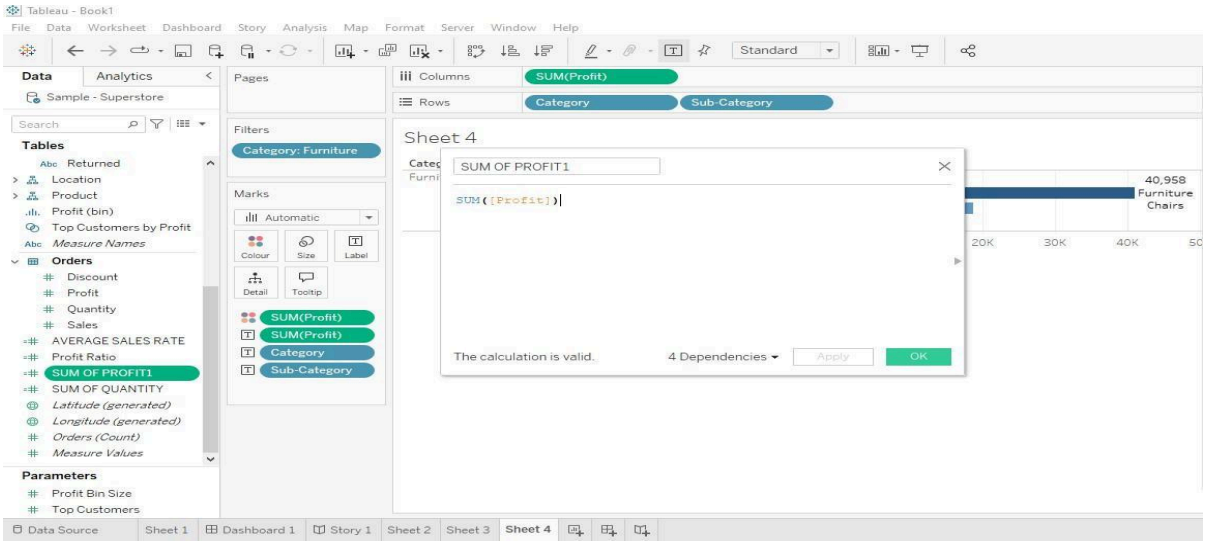
Analysis-> Create calculated field

Or

Click on #profit (Right click) , Create-> calculated filed

In the secondary window, give the name for calculated field i.e.,sum of profit

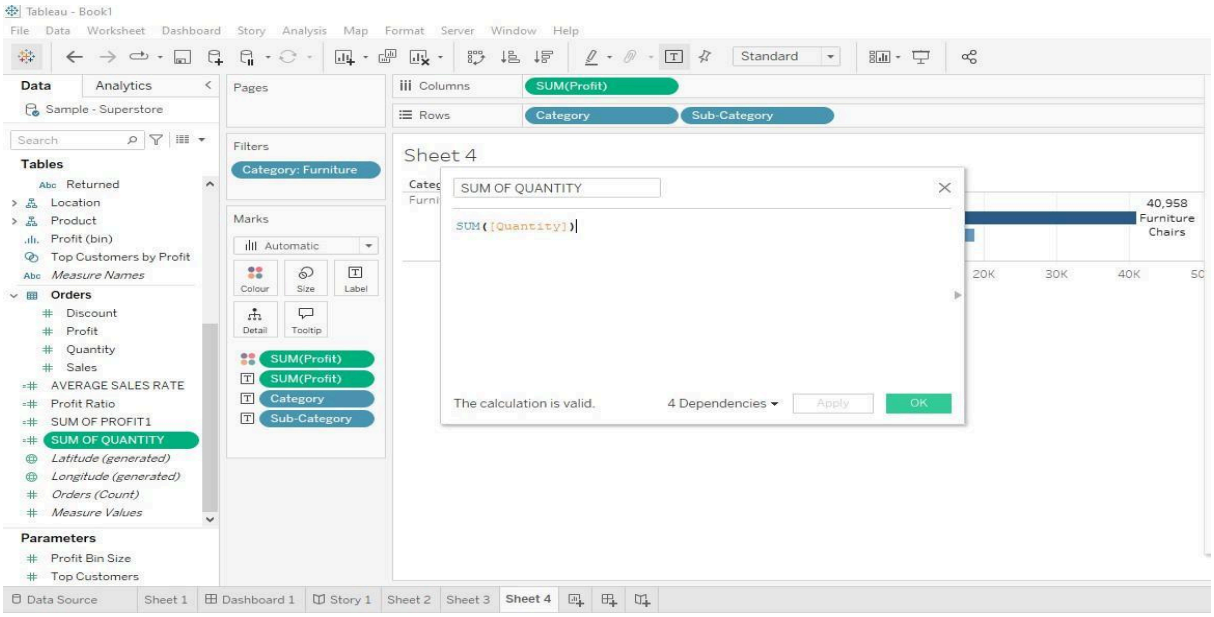
Type the expression sum([Profit]) and click on Apply and ok.



For calculating sum of quantity

In the secondary window, give the name for calculated field i.e.,sum of Quantity

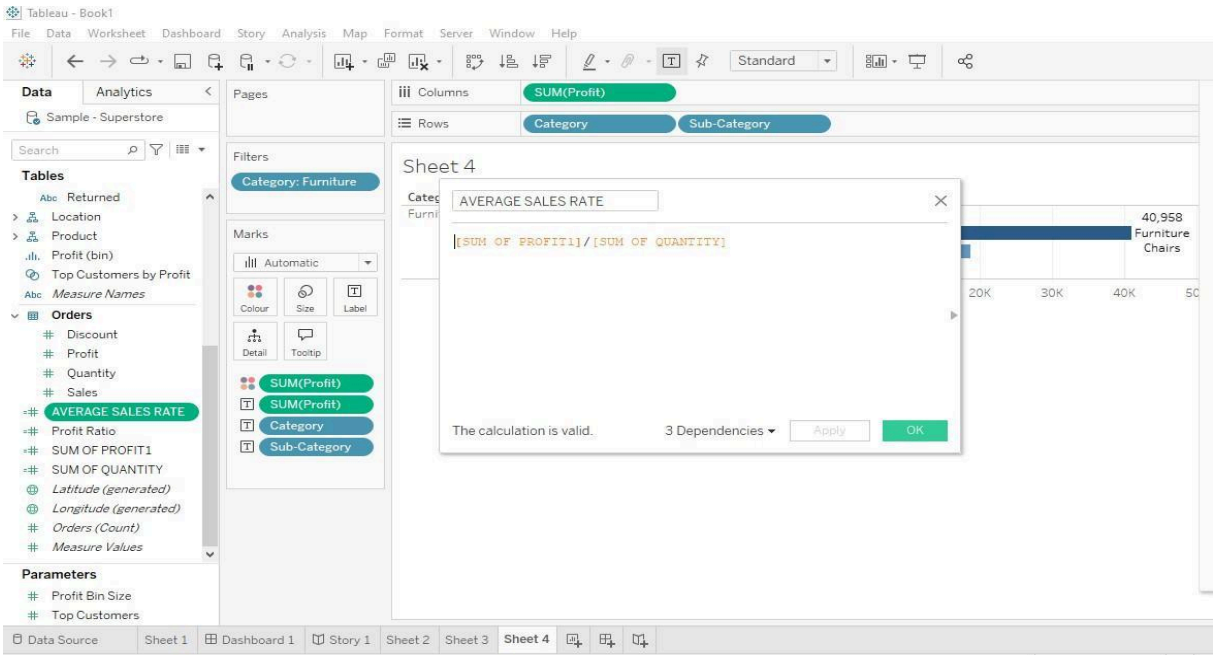
Type the expression sum([Quantity]) and click on Apply and ok.



For calculating Average sales price

In the secondary window, give the name for calculated field i.e.,Average sales price.

Type the expression [sum of profit]/[sum of quantity] and click on Apply and ok.



Drag and drop the category to column shelf and Average sales price to row shelf.

Defining parameters

Parameters with filters

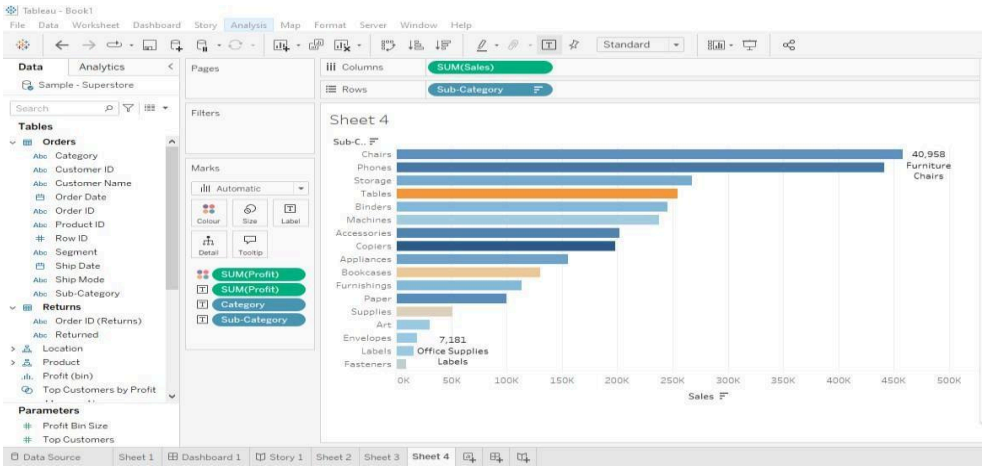
Drag and drop the sales to column shelf and sub-category to row shelf.

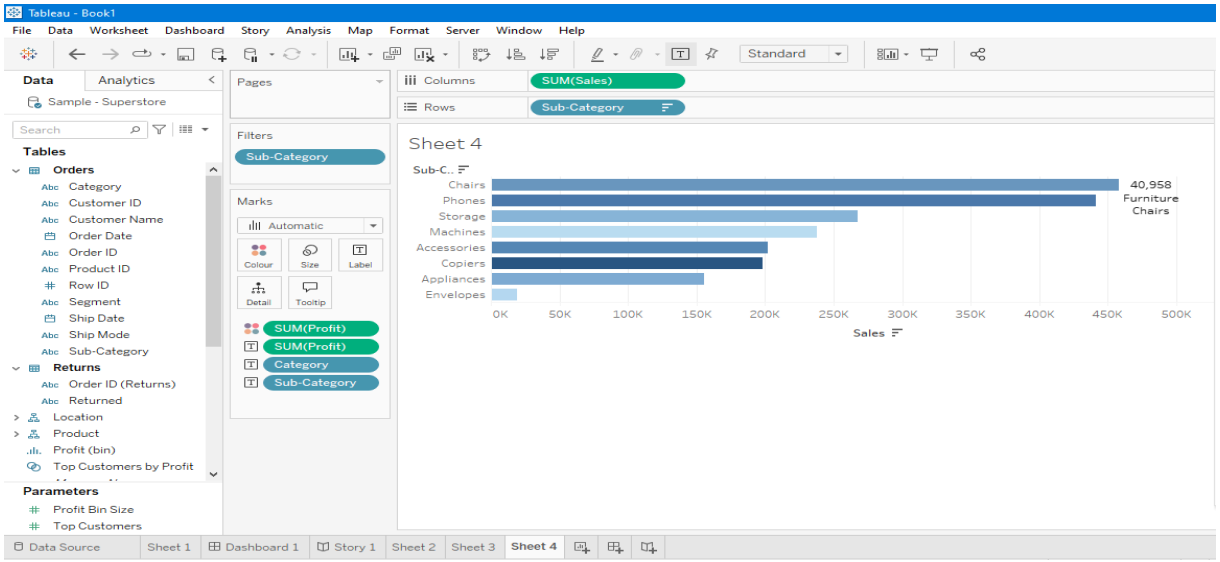
Sort the sub-category in the descending order (click on sort descending order button in pane)

Drag and drop sub-category to the filters pane.

In the dialogue box click on top tab

Under the Byfield option select number of top subcategories required i.e.,10





Instead of doing this every time,

Right-click sub-category in the filters pane.

In the dialogue box click on top tab

Under the Byfield option select create new parameter in the drop-down list box.

Create the parameter.

VIVA QUESTIONS:

1. **How do you format a chart in Tableau to change the color of the profit bars?**
   Click on the "Color" option in the Marks card, and select the desired color for the profit bar.
2. **What is the process to create a calculated field in Tableau, and how would you calculate the sum of profit?**
   Go to the "Analysis" menu, select "Create Calculated Field," name it, and enter SUM([Profit]) as the formula.
3. **How can you add and configure filters in Tableau to display specific categories from your dataset?**
   Drag the desired field (e.g., Category) to the Filters shelf, select the specific categories, and apply the filter.
4. **Explain the steps to create a parameter in Tableau and how it can be used with filters for dynamic data visualization.**
   Click "Create Parameter" in the Data pane, set the properties, and use it with a calculated field or filter for interactive visualization.
5. **What is the purpose of the tooltip in Tableau, and how can it be customized to display specific information such as profit and category?**
   The tooltip displays details about data points; customize it by editing the Tooltip option in the Marks card to include specific fields like Profit and Category.

PROGRAM 4

Dashboard Design and Storytelling – Components of Dashboard, Understanding how to place worksheets in Containers, Action filters and its types.

DASHBOARD

A dashboard is a collection of several views, letting you compare a variety of data simultaneously. For example, if you have a set of views that you review every day, you can create a dashboard that displays all the views at once, rather than navigate to separate worksheets.

Data in sheets and dashboards is connected; when you modify a sheet, any dashboards containing it change, and vice versa. Both sheets and dashboards update with the latest available data from the data source.

We have two types of Dashboards;

1. Tiled Dashboard
2. Floating Dashboard

The "Tiled" dashboard has to be placed in an exact position as per the requirement. Whereas the "Floating" dashboard can be placed anywhere in the window.

Components of a Tableau dashboard:

Layout containers: Horizontal and vertical containers that can hold additional objects

Text: A mini word processor for adding and formatting text

Images: An image from your computer can be added to the dashboard

Web pages: A web page can be embedded in the dashboard, but an internet connection is required to display it

Blank space: Blank space can be added to the dashboard to separate elements that are too close together

Headers: Headers are created when a dimension or discrete field is placed on the Rows or Columns shelves

Tags and notifications: A tagging and notification system can be used to send messages, updates, and tasks to users

To create the dashboard for performance, first create four sheets

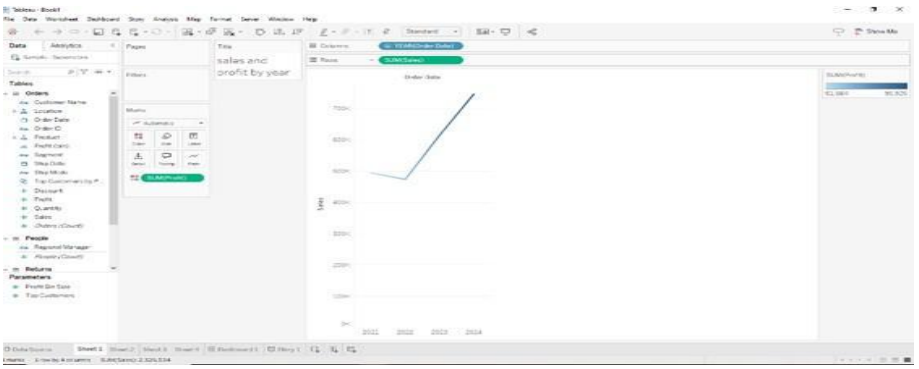
Create four sheets

i)Sales and profit by year

Drag and drop Sales to the rows shelf and order date to the columns shelf

Drag and drop profit to the colours option in the marks pane

Rename the sheet to Sales and profit by year

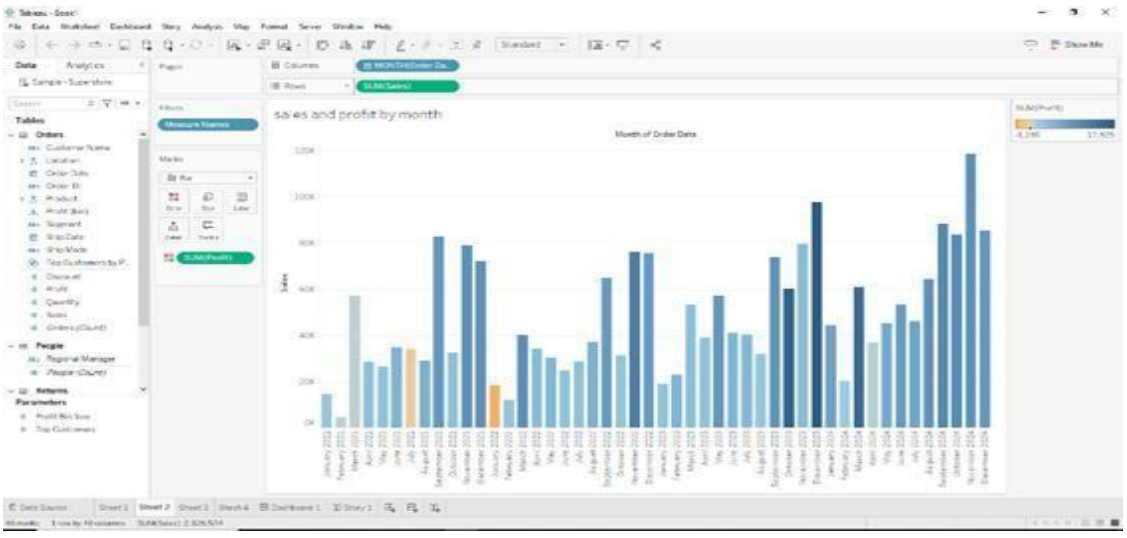


ii) Performance by month

Drag and drop Sales to the rows and order date (change to month) to column. Drag Profit to the colors shelf.

Drag and drop profit to colours option in the marks pane

Rename the sheet to Sales by month



iii) Sales by State

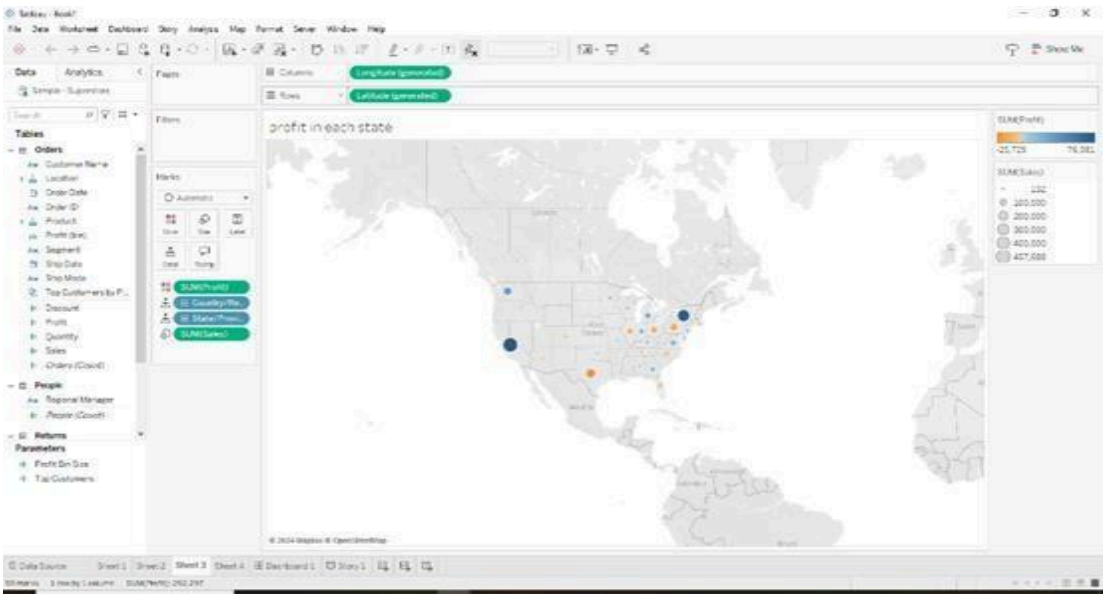
Drag and drop longitude in columns, latitude in rows.

Country and state into detail.

Drag and drop profit to the colours and size option in the marks pane.

Select show me and select dotted maps.

Rename the sheet to Sales by State.

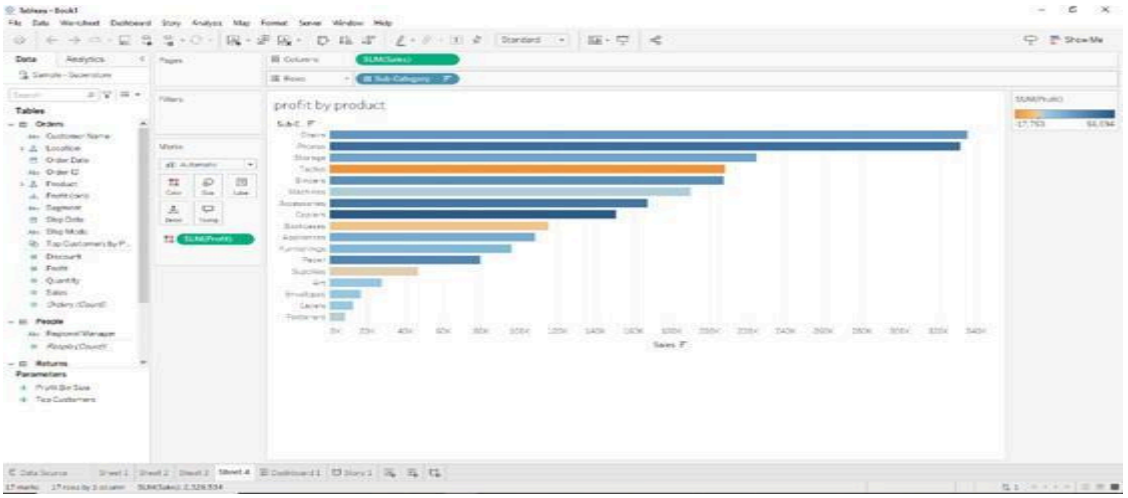


iv) sales and profit by product

Drag and drop sub_category to the rows shelf and sales to the columns shelf

Drag and drop profit to the colours option in the marks pane

Rename the sheet to sales and profit by product.



To create the dashboard for performance

Create new dashboard

Click on show dashboard title and give the title as Performance Sheet

To separate the title from dashboard ,drag and drop the blank below the title.

Change the height of blank to 10 pixel

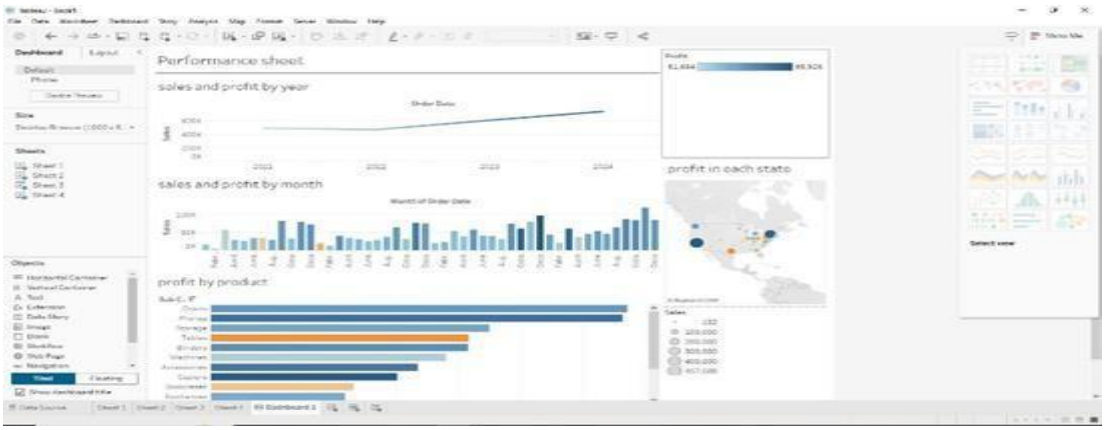
Drag the horizontal container and drop to work area

Drag and drop the first sheet into the container

Repeat the same for all sheets

For making the dashboard interactive, click on each sheet and select use as Filter

Now if you select any data in any of the sheets, all other sheets will display the result of that data



CREATING A STORY WITH TABLEAU

With Tableau, you are able to organize your data in order to tell a meaningful story.

This is beneficial when you are doing a presentation, creating an article, or uploading

to a website, as it helps your audience understand your data.

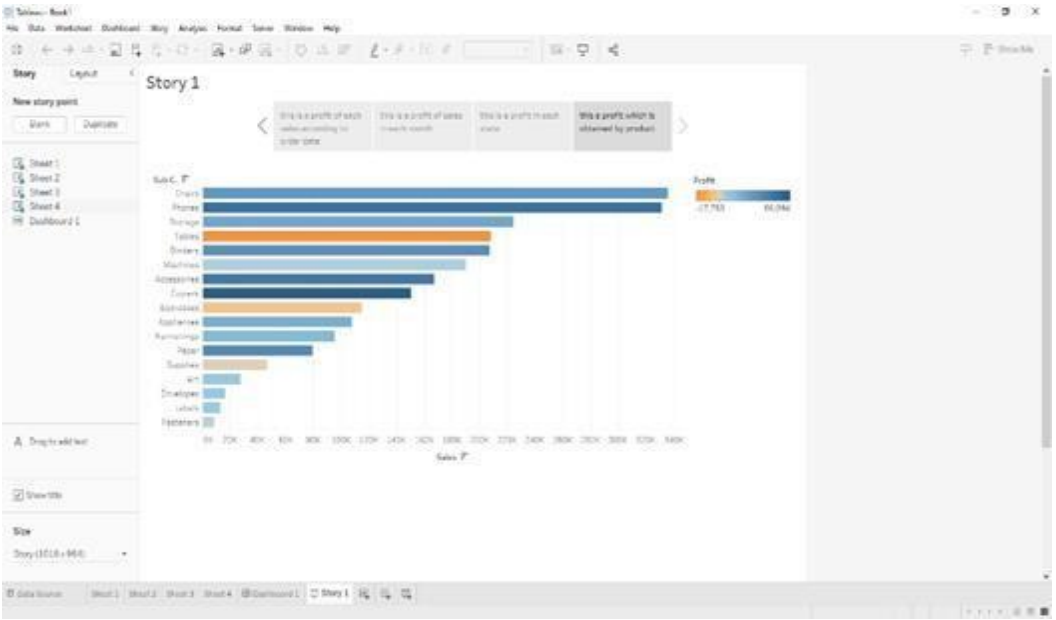
Stories are created through assembling the different worksheets and dashboards.

We can highlight important data points, add text box and pictures to help convey

our story. However, there are many different ways to tell a story.

To begin, select “New Story” at the bottom right of your screen.

Drag “Dashboard1” and “Dashboard2” on to “Drag a sheet here”. We can rename each storyboard by clicking “Add a caption”. Rename Sheet 1 to Dashboard-1.



VIVA QUESTIONS:

1. **What is the difference between a Tiled and Floating Dashboard in Tableau, and when would you use each type?**
   Tiled places items in a fixed grid, while Floating allows free positioning; use Tiled for structured layouts and Floating for overlapping or flexible designs.

2. **Explain the role of layout containers in Tableau dashboards and give examples of how horizontal and vertical containers are used.**
   Layout containers group elements; horizontal containers align items side by side, and vertical containers stack items vertically.

3. **How do you make a dashboard interactive in Tableau, and what is the purpose of using the "Use as Filter" option?**
   Make it interactive by enabling "Use as Filter" on a chart to filter data in other views based on user selection.

4. **What are the key components of a Tableau dashboard, and how can you incorporate images or web pages into the dashboard?**
   Key components include charts, filters, and legends; add images or web pages by dragging the "Image" or "Web Page" object into the dashboard.

5. **How can you create a story in Tableau, and what is the process for adding dashboards and captions to the story?**
   Create a story by clicking "New Story," drag dashboards into the story points, and add captions in the text box.

PROGRAM 5

Introducing Power BI –Components and the flow of work. Power BI Desktop Interface- The Report has five main areas.

Power BI includes the following components

Power Query Editor

It is the process of cleansing and transforming data and permits users to access datasets connecting from multiple sources. It is included on the Power BI desktop. Business users may view the data from distinct databases like MySQL, SQL servers, DB2, and many more.

Power View

It is a data visualization tool that assists users in developing stunning charts, and colourful maps, that turn data into a story.

Power Map

It is a 3D map visualization tool to identify geospatial data on Map visuals. It helps organizations to examine the maximum sales production geographically, visualizing the demographic populations of specific regions.

Power Pivot

It is a Data Modelling technique that is used to create relationships between datasets. It performs complex computations by utilizing DAX functions.

Power Q & A

When dealing with giant datasets, it becomes crucial to get to know the in-depth details of the data. Luckily, it is done through natural language where users may ask questions and obtain the answer through Power Q & A.

Flow of work

- A typical Power BI workflow involves more than one type of content.
- A Power BI designer (yellow in the diagram) collects data from semantic models, brings it into Power BI Desktop for analysis, and creates reports full of visualizations that highlight interesting facts and insights.
- The designer pins visualizations from reports to dashboards, and shares the reports and dashboards with business users like you (black in the diagram).

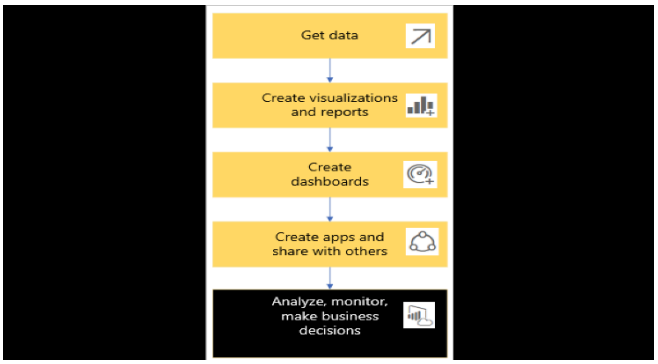


Fig. Flow of work

-  A visualization (or visual), is a type of chart built by Power BI designers. The visuals display the data from reports and semantic models. Because they're highly interactive, you can slice, filter, highlight, change, and even drill into visualizations.

-  A semantic model is a container of data. For example, it might be an Excel file from the World Health Organization. It might also be a company-owned database of customers, or it might be a Salesforce file. And it might be all three if the designer combines them into a single model. Designers manage semantic models. The data contained in semantic models is used to build reports, dashboards, and apps that designers share with you.

-  A dashboard is a single screen with tiles of interactive visuals, text, and graphics. A dashboard collects your most important metrics, or a focused set of metrics, on one screen, to tell a story or answer a question. The dashboard content comes from one or more reports and one or more semantic models.

-  A report is one or more pages of interactive visuals, text, and graphics that together make up a single report. Power BI bases a report on a single semantic model. Often, the designer organizes report pages to each address a central area of interest or answer a single question.

-  An app is a way for designers to bundle and share related dashboards, reports, and semantic models together. Business users receive some apps automatically but can go search for other apps created by colleagues or by the community. For example, out-of-the-box apps are available for external services you may already use, like Google Analytics and Microsoft Dynamics CRM**.**

Power BI Desktop Interface-The Report has five main areas.

Ribbon - the top ribbon contains most of the controls and options needed for building the report.

Views - this is made up of the report view, the data view, and the model view.

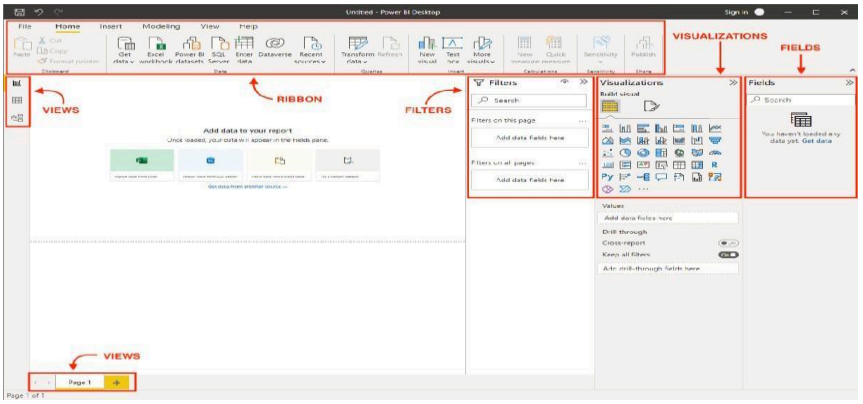
Canvas - this is the main design area where visualizations and other elements are added.

Page selector - for navigation to other pages in the report.

Filters - fields can be added here to filter the data.

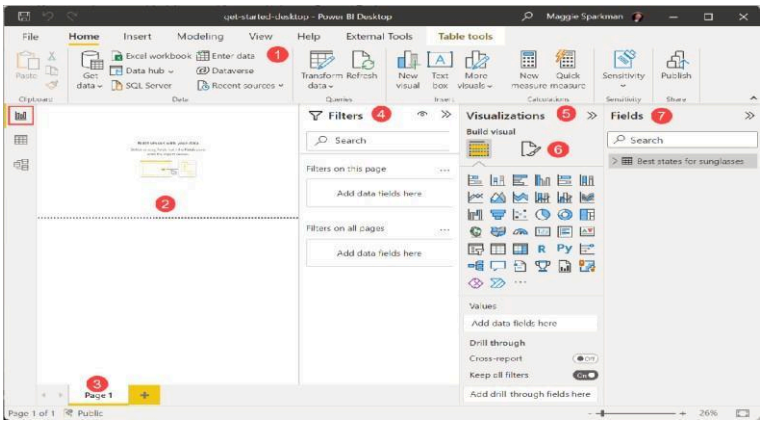
Visualizations - this contains the list of available visualizations.

Fields - this section contains the tables and fields that are available in the data model.

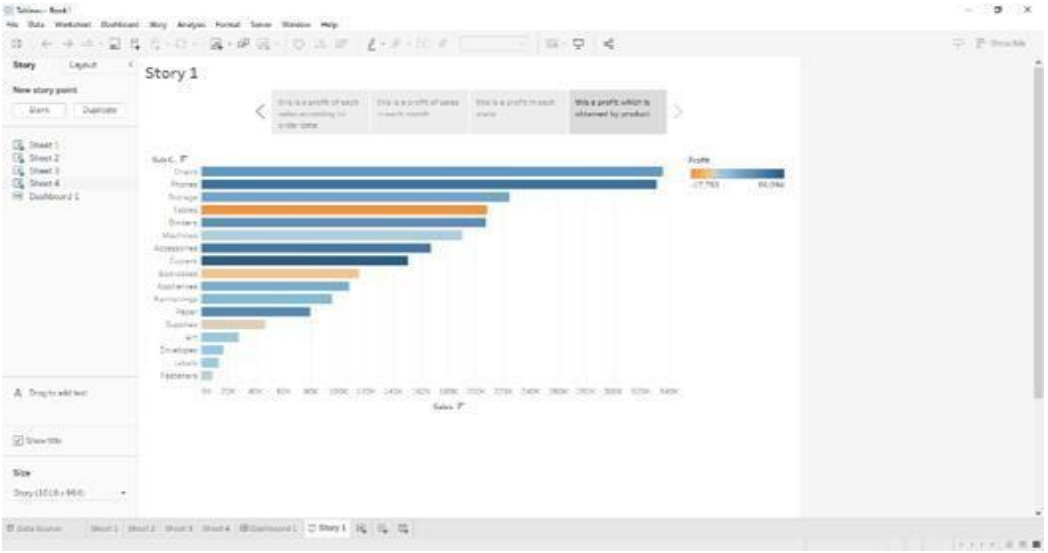


Build reports :

In Power BI Desktop Report view, you can build visualizations and reports. The Report view has six main areas:



- The ribbon at the top, which displays common tasks associated with reports and visualizations.
- The canvas area in the middle, where you create and arrange visualizations.
- The pages tab area at the bottom, which lets you select or add report pages.
- The Filters pane, where you can filter data visualizations.
- The Visualizations pane, where you can add, change, or customize visualizations, and apply drill through.
- The Format pane, where you design the report and visualizations.
- The Fields pane, which shows the available fields in your queries. You can drag these fields onto the canvas, the Filters pane, or the Visualizations pane to create or modify visualizations.



VIVA QUESTIONS:

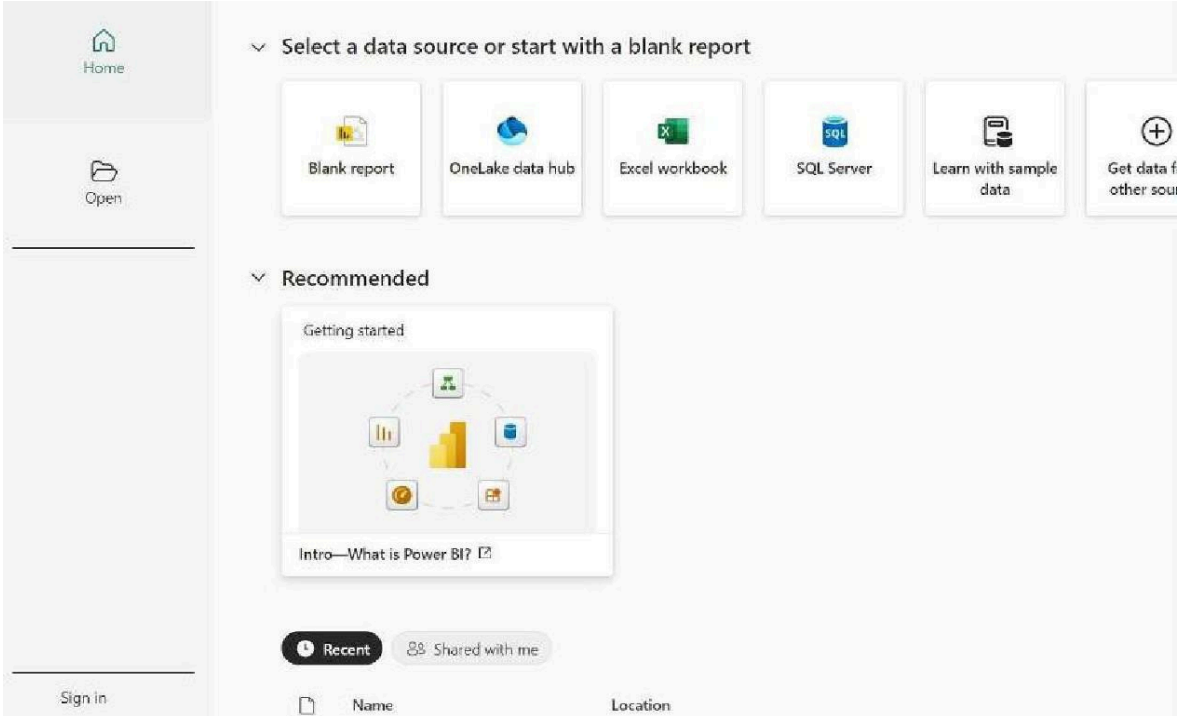
1. **What are the main components of Power BI, and how does Power Query Editor help in data transformation?**
   Power BI consists of Power BI Desktop, Power BI Service, and Power BI Mobile; Power Query Editor helps by cleaning, shaping, and transforming raw data before loading it into the model.
2. **What is the difference between Power View and Power Map in Power BI for data visualization?**
   Power View is used for interactive reports and dashboards, while Power Map is used for 3D geospatial data visualization.
3. **Explain the Power BI workflow from data collection to sharing reports and dashboards.**
   The workflow involves importing data, transforming it, creating visualizations, building reports, and sharing them through Power BI Service.
4. **What are the key areas of the Power BI Desktop interface, and what roles do the ribbon and canvas play?**
   The key areas are the ribbon (for tools and commands) and the canvas (for building and viewing visualizations).
5. **How does Power BI enable interaction with visualizations, and what is the role of filters and the Visualizations pane?**
   Power BI enables interaction through slicers and cross-filtering; filters refine data, and the Visualizations pane provides options for creating and modifying charts.

PROGRAM 6

Querying Data from CSV - Query Editor Connecting the data from the Excel Source, Clean, Transform the data

Power BI Desktop also includes the Power Query Editor, which opens in a separate window. In Power Query Editor, you can build queries and transform data, then load the refined data model into Power BI Desktop to create reports.

Once Power BI screen is opened click on blank Report



After clicking on blank Report the below screen appears .

NOW TO GET DATA FROM DIFFERENT SOURCES The steps

Step 1: Select Get Data in the Power BI Desktop Home tab, and in the Get Data window, scroll through the list of All data sources. (like Excel, CSV,Oracle….)Excel workbook.On the

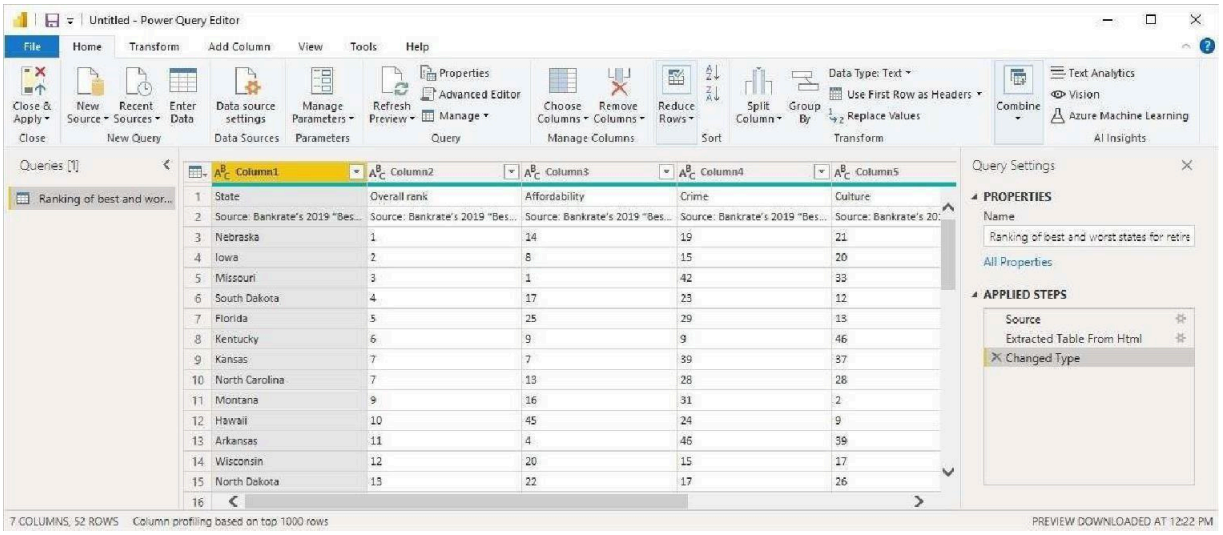
Power BI Desktop Home tab, select Get Data > Exc

Power BI Desktop Home tab, select Get Data > Exc

Click on the file you need and open the file, once you open the file below window with navigator appears, select the file

1. At this point you can select Load to load the table, or Transform data to make changes in the table before you load it.

2. When you select Transform data, Power Query Editor launches, with a representative view of the table. The Query Settings pane is on the right, or you can always show it by selecting Query Settings on the View tab of Power Query Editor.



	Column1	Column2	Column3	Column4	Column5
1	State	Overall rank	Affordability	Crime	Culture
2	Source: Bankrate's 2019 "Bes...	Source: Bankrate's 2019 "Bes...	Source: Bankrate's 2019 "Bes...	Source: Bankrate's 2019 "Bes...	Source: Bankrate's 20:
3	Nebraska	1	14	19	21
4	Iowa	2	8	15	20
5	Missouri	3	1	42	33
6	South Dakota	4	17	23	12
7	Florida	5	25	29	13
8	Kentucky	6	9	9	46
9	Kansas	7	7	39	37
10	North Carolina	7	13	28	28
11	Montana	9	16	31	2
12	Hawaii	10	45	24	9
13	Arkansas	11	4	46	39
14	Wisconsin	12	20	15	17
15	North Dakota	13	22	17	26
16					

Transforming the data: Once connected to a data source, you can adjust the data to meet your needs.

To transform the data, you provide Power Query Editor with step-by-step instructions for adjusting the data while loading and presenting it.

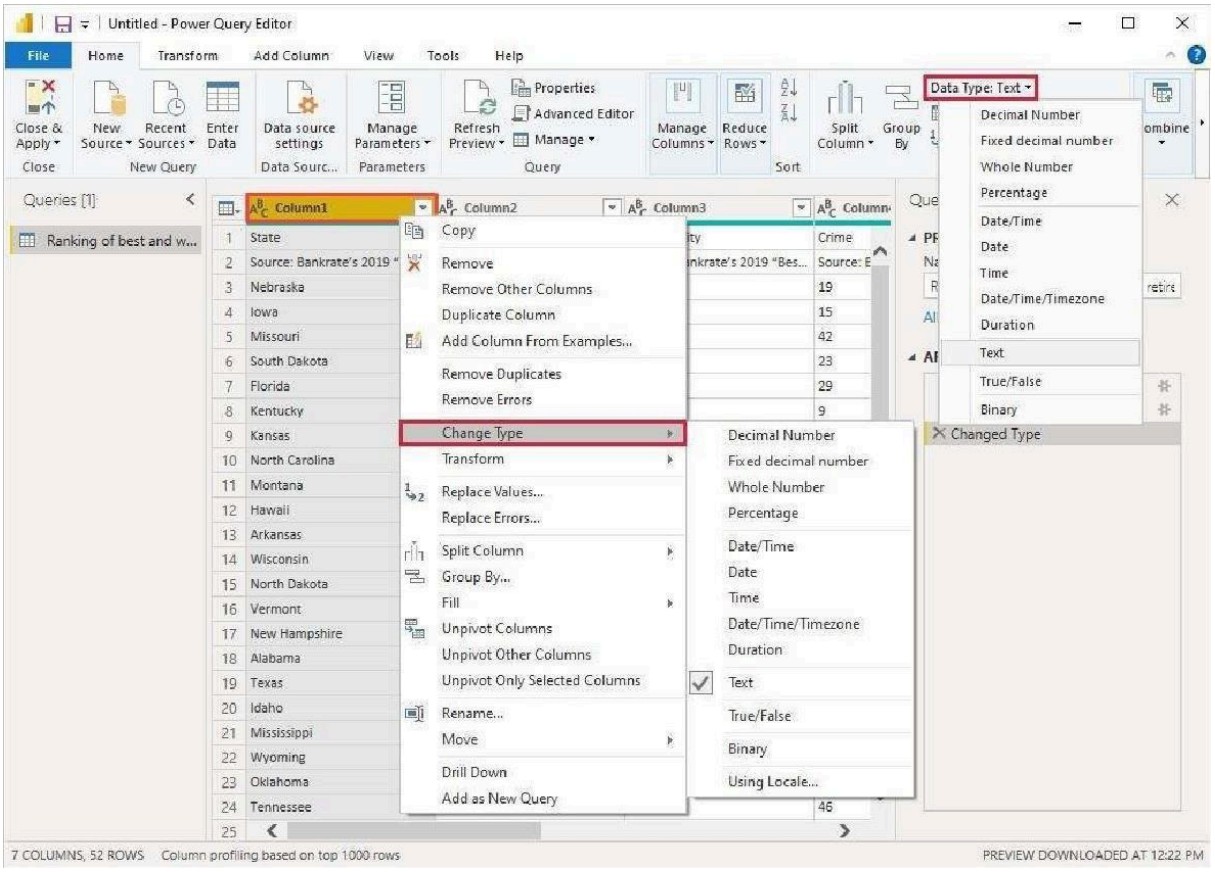
Transforming doesn't affect the original data source, only this particular view of the data.

Transforming the data, includes renaming columns or tables, removing rows or columns, or changing data types.

Power Query Editor captures these steps sequentially under Applied Steps in the Query Settings pane.

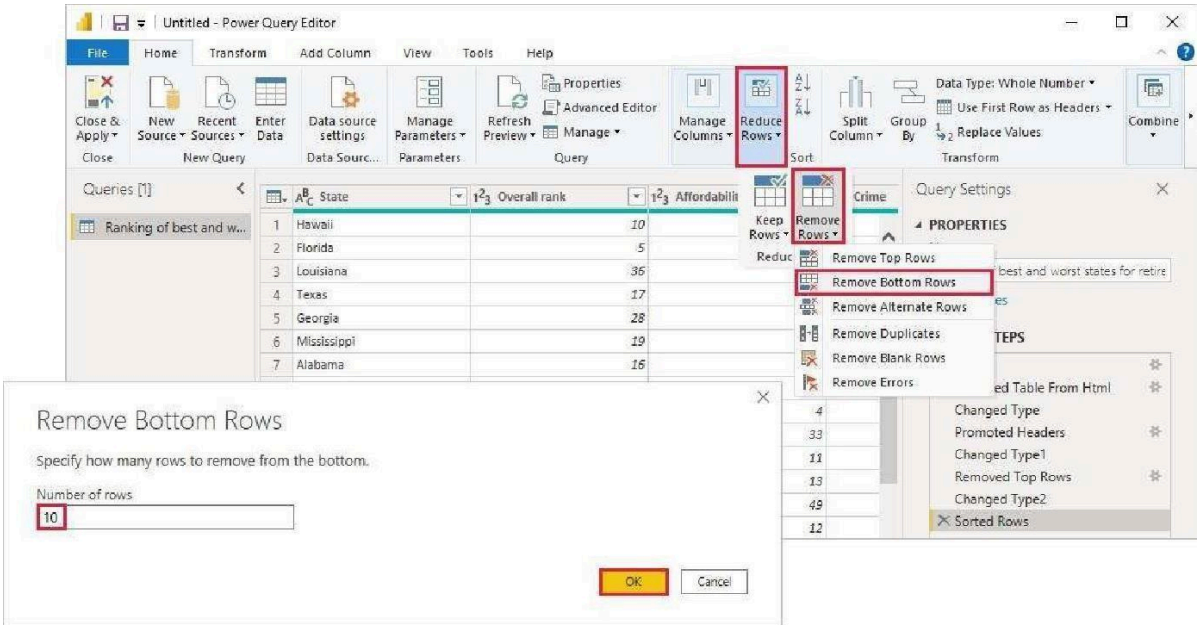
To Change a data type

- Select the column or columns to change.
- Hold down the Shift key to select several adjacent columns, or Ctrl to select non- adjacent columns.
- Either right-click a column header, select Change Type,
- choose a new data type from the menu, or drop down the list next to Data Type in the Transform group of the Home tab,
- select a new data type.



To Reduce/Delete the Rows

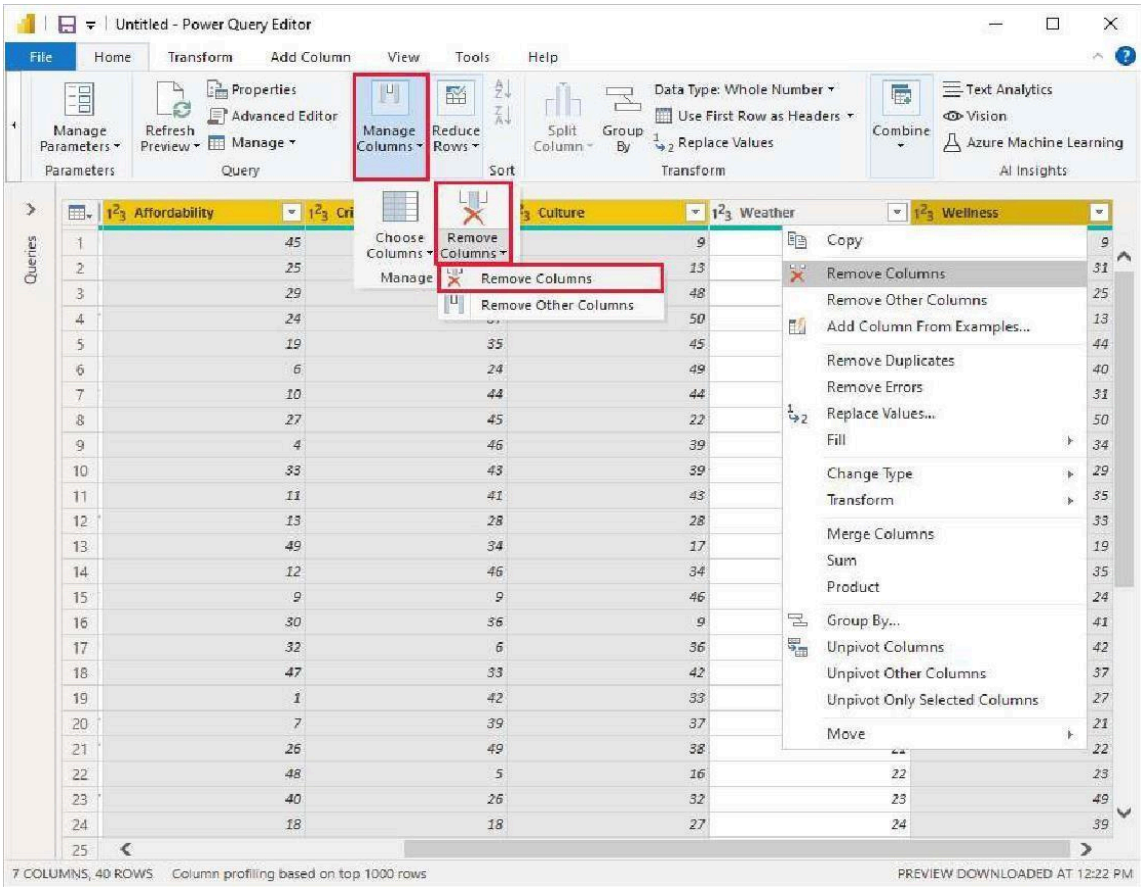
- From the Home tab select
- Reduce Rows > Remove Rows > Remove Bottom Rows.
- In the Remove Bottom Rows dialog box, enter *10*, and then select OK.



The bottom 10 worst rows are removed from the table, and the step Removed Bottom Rows appears in Applied Steps.

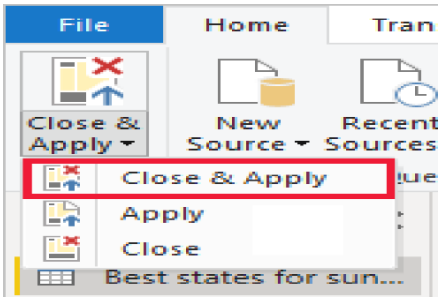
To Remove columns

- From Home Tab Select Manage Columns group select Remove Columns.
- You can also right-click one of the selected column headers and select Remove Columns from the menu.
- The selected columns are removed, and the step Removed Columns appears in Applied Steps.



Once all the required transformations are done the report should be created in the Power BI Desktop

- Apply the changes in Power Query Editor and load them into Power BI Desktop
- Selecting Close & Apply from the Home tab of the ribbon.
- You can also select just Apply to keep the query open in Power Query Editor while you work in Power BI Desktop.



To reopen Power Query Editor from Power BI Desktop Select Transform Data on the Home tab of the Power BI Desktop ribbon.

VIVA QUESTIONS:

1. **How do you connect to an Excel file in Power BI Desktop?**
   Select "Get Data" from the Home tab, choose "Excel," browse and select the file, then click "Open" to load the data.

2. **What does the "Transform Data" option do in Power BI?**
   The "Transform Data" option opens Power Query Editor, allowing you to clean and modify the data before loading it into Power BI.

3. **How can you change the data type of a column in Power Query Editor?**
   Right-click the column header, select "Change Type," and choose the new data type from the menu, or use the dropdown in the Transform group of the Home tab.

4. **How do you remove rows from the bottom of a table in Power Query Editor?**
   Go to the Home tab, select "Reduce Rows," then "Remove Bottom Rows," enter the number of rows to remove, and click "OK."

5. **How do you apply changes made in Power Query Editor and load them into Power BI Desktop?** Select "Close & Apply" from the Home tab in Power Query Editor to apply changes and load the transformed data into Power BI Desktop.

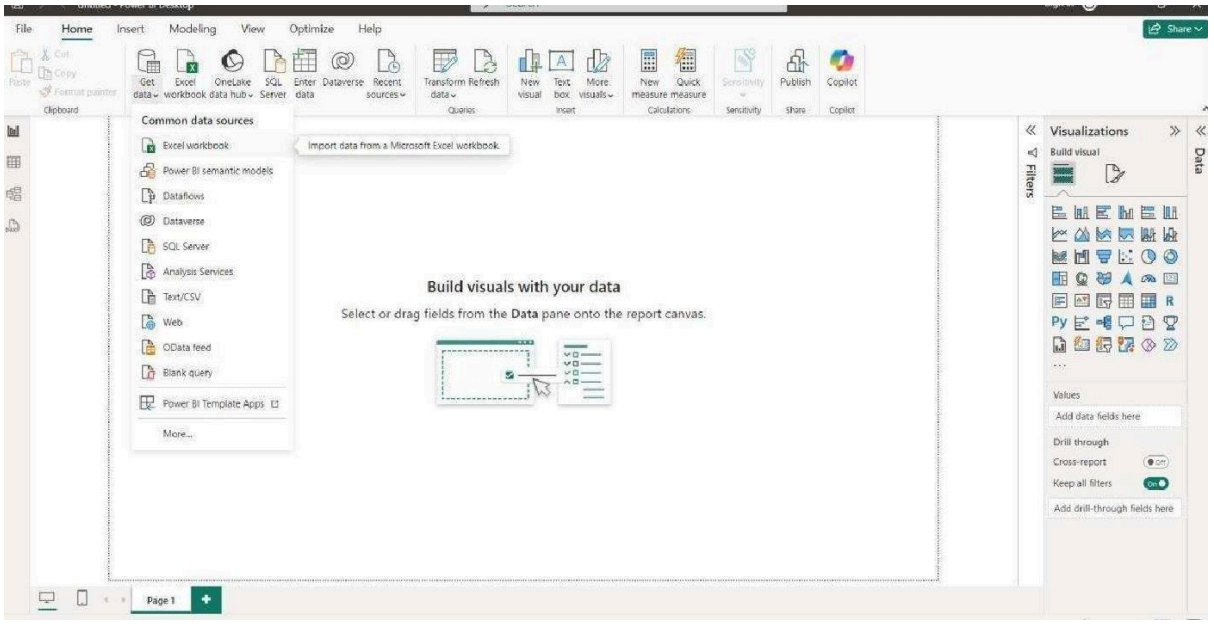
PROGRAM 7

Creating Reports & Visualizations – Different types of charts, Formatting charts with Title, Colors

17 Most Common Charts available in Power BI:

- Bar Chart
- Line Chart
- Scatterplot
- Sparkline
- Pie Chart
- Gauge
- Waterfall Chart
- Funnel Chart
- Heat Map / Matrix
- Histogram
- Box Plot
- Maps
- Tables
- Indicators
- Area Chart
- Radar or Spider Chart
- Tree Map

Open Power BI Desktop
Click on Get data in ribbon pane
Click on Excel worksheet option

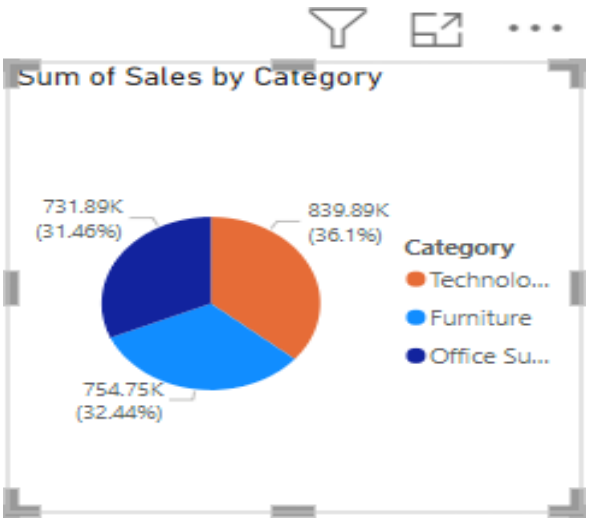


Connect to the data and select Load to load the table, or Transform data to make changes in the table before you load it.

You will be back on canvas area with table loaded in Data Pane (in right side).

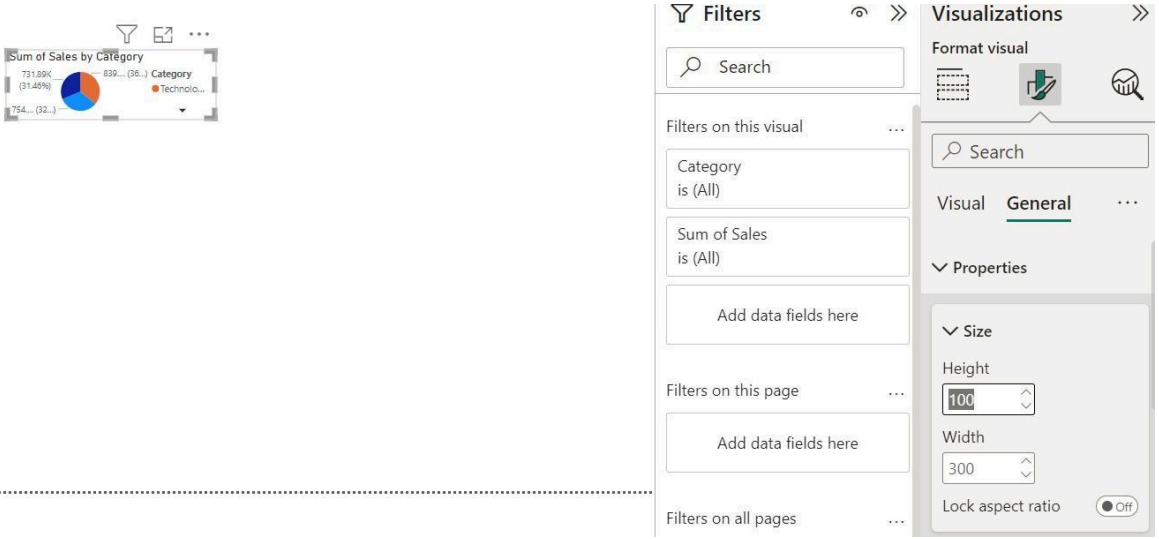
Formatting charts with Title, Colors:

Create pie chart for sales by category

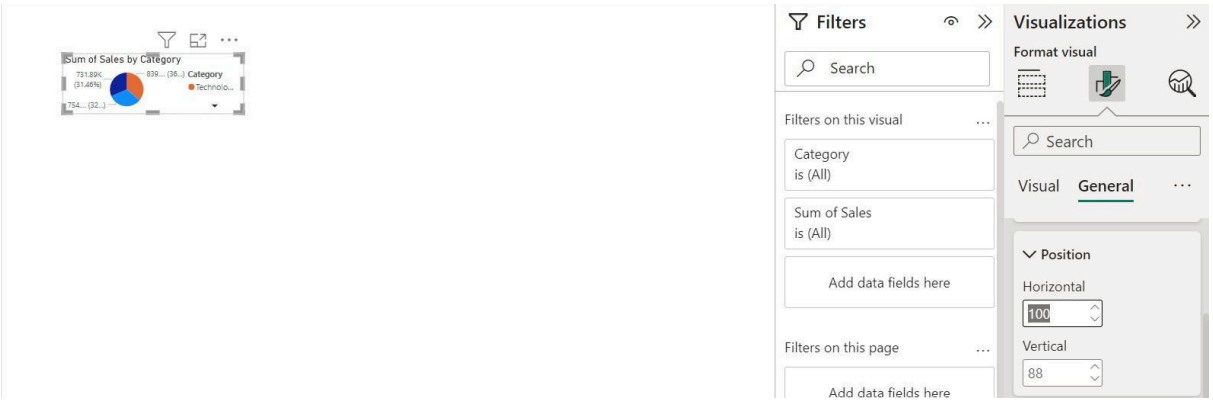


You can format the visual by clicking on Fomat visual option in the visualizations pane.

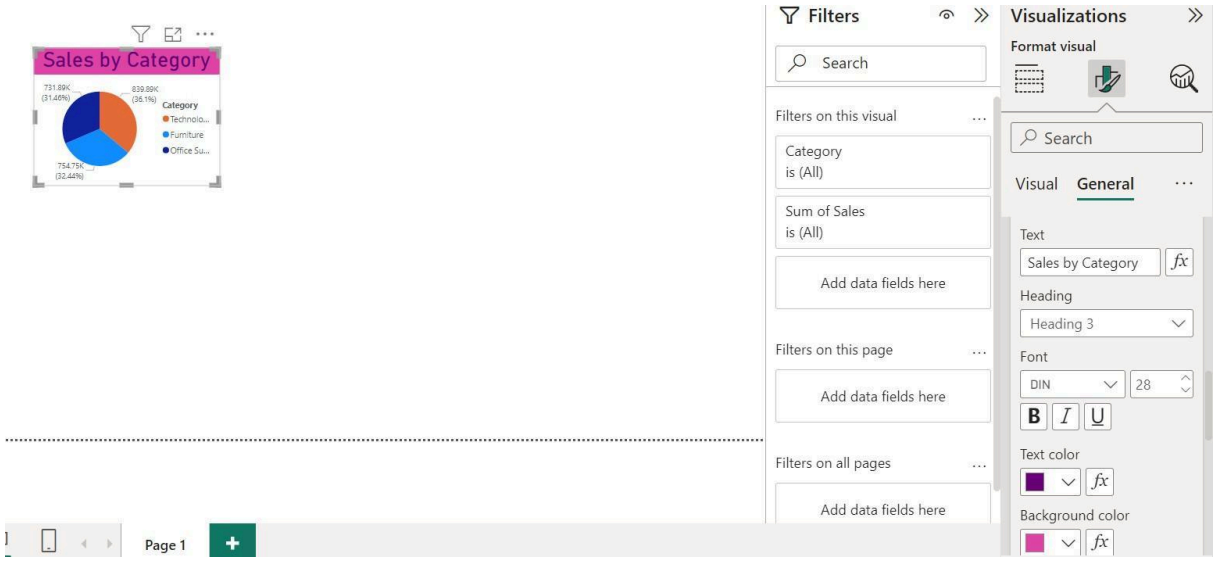
Under General option,Properties□size.You can change the height and width of the visual.



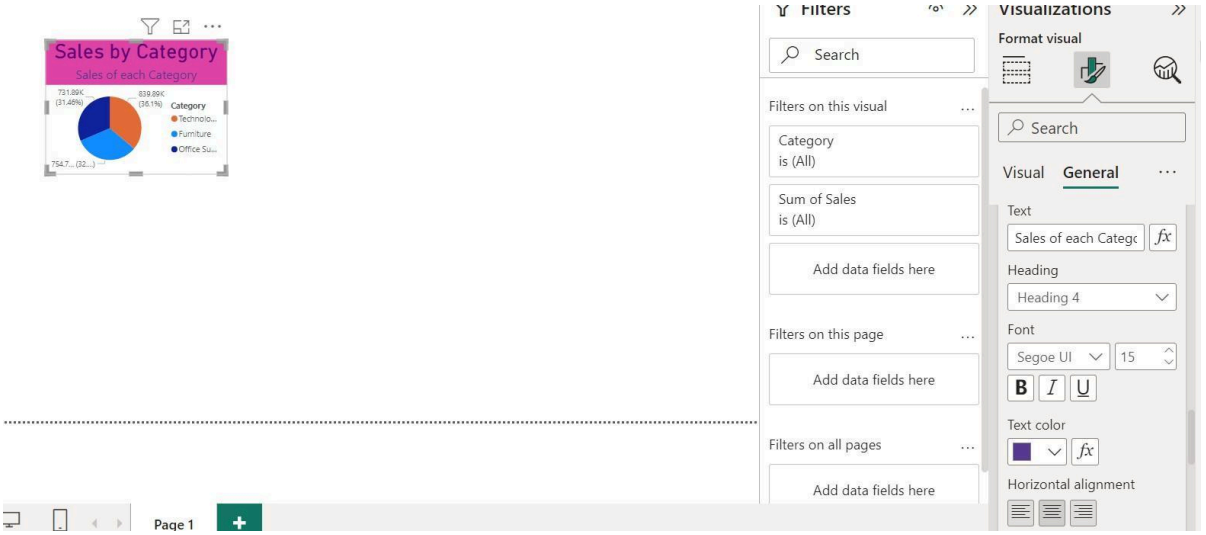
You can change the position of the visual horizontally and vertically under the position option



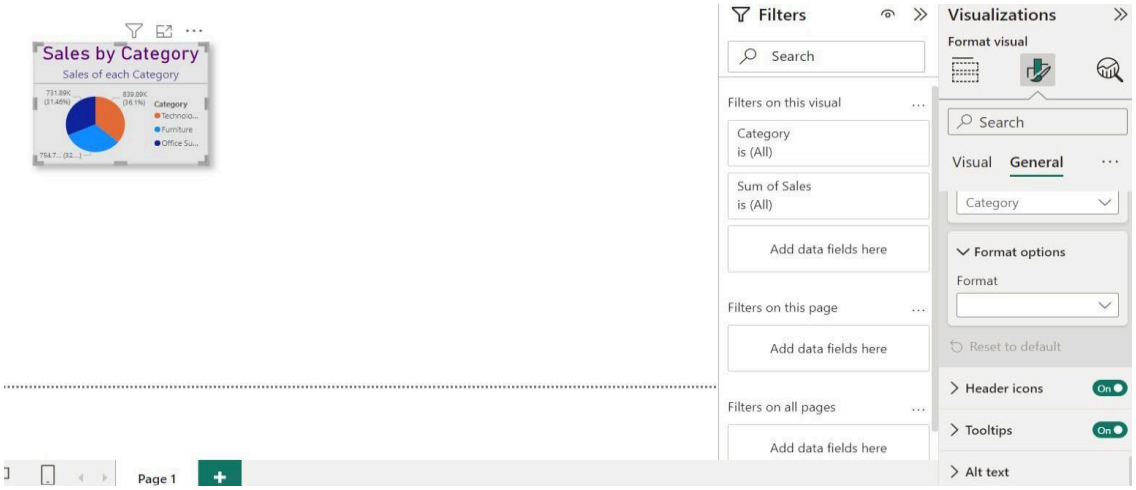
Under title option you can change and format the title of the visual



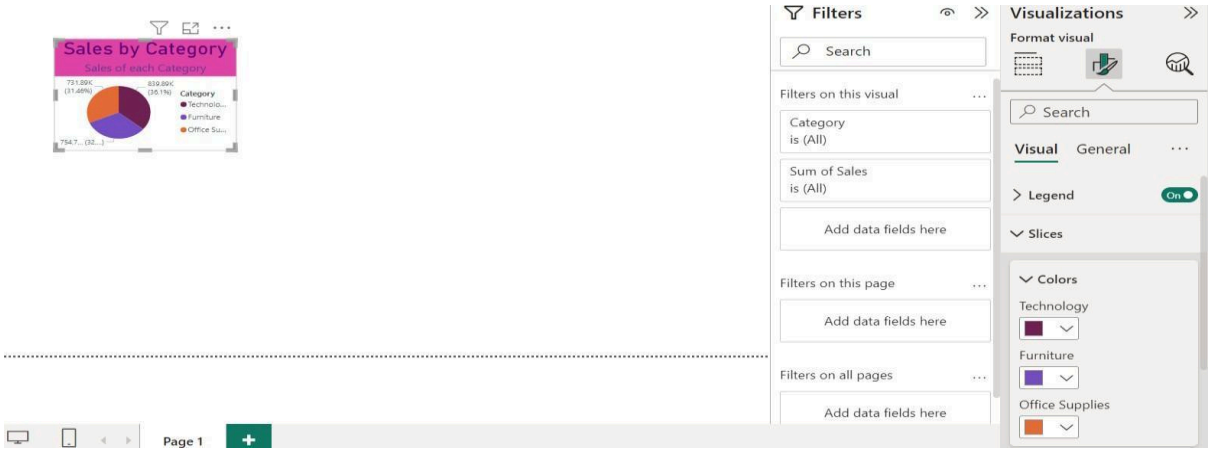
Under subtitle option you can change and format the subtitle of the visual



Under general option, you can draw a divider between title and visual. You can customize spacing, change background, create visual border and shadow and you can edit tooltip etc.



Under the visual option, YOU can change the color of the visual



Create Filled map for sales and state

Create Clustered column chart for sales by order date

Create funnel chart for sales by sub-category

Create donut for sales by region

Create table for Quantity, Sales, Discount and Profit.

VIVA QUESTIONS:

1. **How do you load data from an Excel file into Power BI Desktop?**
   Click "Get Data" from the ribbon, select "Excel," browse for the file, choose the table, and click "Load" to load the data into Power BI.

2. **What are the most common chart types available in Power BI?**
   Common chart types include Bar Chart, Line Chart, Scatterplot, Pie Chart, Waterfall Chart, Funnel Chart, Heat Map, Histogram, Box Plot, and Maps.

3. **How can you format a chart in Power BI, such as changing its title and colors?**
   Select the visual, click "Format" in the Visualizations pane, and adjust options for title, subtitle, colors, background, and position.

4. **How do you create a pie chart in Power BI for sales by category?**
   Select the Pie Chart visual, drag the "Category" field to the Legend and "Sales" field to the Values, and adjust the formatting in the Visualizations pane.

5. **How do you create a table in Power BI for showing quantity, sales, discount, and profit?**
   Select the "Table" visual, drag the "Quantity," "Sales," "Discount," and "Profit" fields to the Values section in the Visualizations pane.

PROGRAM 8

Dashboards - Filters in Power BI, Formatting dashboards

- Open Power BI Desktop
- Click on Get data in ribbon pane
- Click on Excel worksheet option
- Connect to the data and select Load to load the table, or Transform data to make changes in the table before you load it.
- You will be back on canvas area with table loaded in Data. Create Clustered column chart for sales by order date (after loading order date, Tick on order date in down arrow mark of order date (By default it will be on date hierarchy))
- Create funnel chart for sales by sub-category
- Create pie chart for sales by category
- Create donut for sales by region
- Create cards (new) for Quantity, Sales, Discount and Profit
- Click Insert □ Text box. The textbox will appear in the canvas area. Give the title for the Dashboard and you can format the title.
- Pane (in right side).

Creating Dashboard

Create a map for sales and state

Filter remove all but the data you want to focus on.

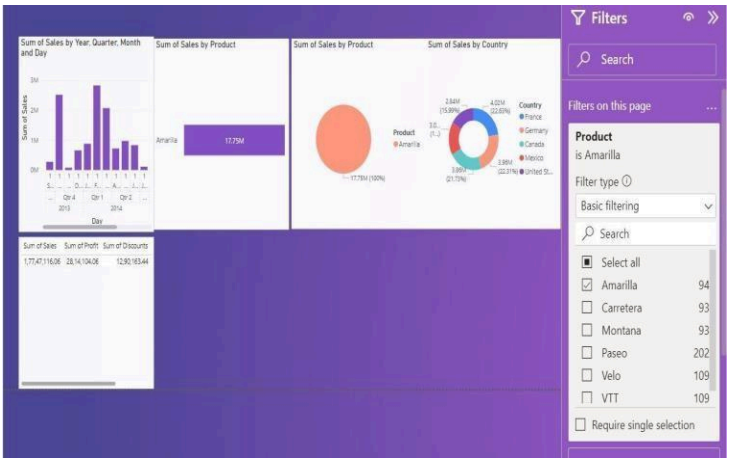
Filter Pane: You can apply filters in the Filters pane, or make selections in slicers directly on the report page itself. The Filters pane shows the fields in individual visuals and any other filters the report designer adds.There are four standard types of filters that you create in the Filters pane.

- Visual filter applies to a single visual on a report page. You see visual- level filters when you select a visual on the report canvas. Even if you can't edit a report, you can select a visual and filter it.
- Page filter applies to all the visuals on the report page.
- Report filter applies to all pages in the report.

- Drill through filter With drill through in the Power BI service and Power BI Desktop, you create a destination report page that focuses on a specific entity, such as entity and drill through to the focused

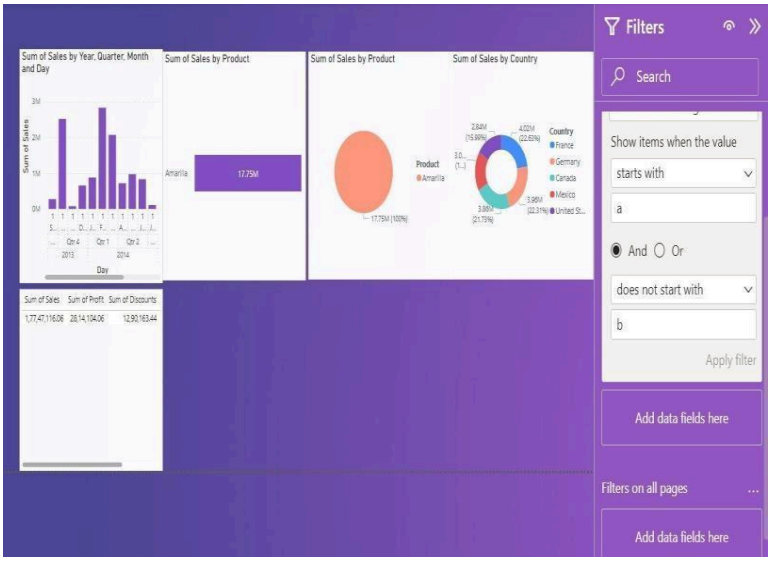
Let's apply filter for product (Particular visual).

1. Drag product from Data Pane to Filters on this page textbox. Basic Filtering



2. Select any one product say, VTT. Now, you can see, VTT is selected and only VTT data is visible, whereas, other product's data will not be shown.

In advanced filtering, you can appa supplier. From the other report pages, users can right-click a data point for that ly filter based on the keywords contain, does not contain, starts with, does not starts with and etc.



VIVA QUESTIONS:

1. **How do you create a clustered column chart in Power BI?**
   Load data, select "Clustered column chart," and plot sales by order date.

2. **How do you apply filters to a visual in Power BI?**
   Drag a field to "Filters on this page" and select the data (e.g., VTT).

3. **What's the difference between a visual-level and a page-level filter?**
   Visual-level filters apply to one visual, page-level filters apply to all visuals on the page.

4. **How do you format the title of a dashboard?**
   Insert a text box, type the title, and use the formatting options.

5. **What is a drill-through filter in Power BI?**
   It allows users to right-click on data and view focused details on a new report page.

PROGRAM 9

Analysis of Revenue in Sales dataset

i. Create a choropleth map (fill the map) to spot the special trends to show the state which has the highest revenue.
ii. Create a line chart to show the revenue based on the month of the year.
iii. Create a bin of size 10 for the age measure to create a new dimension to show the revenue.
iv. Create a donut chart view to show the percentage of revenue per region by creating zero access in the calculated field.
v. Create a butterfly chart by reversing the bar chart to compare female & male revenue based on product category.
vi. Create a calculated field to show the average revenue per state & display profitable & non-profitable state.
vii. Build a dashboard.

Solution:

Step1: Upload the revenue dataset

Step2: In the power query editor select Load to load the table, or Transform data to make changes in the table before you load it.

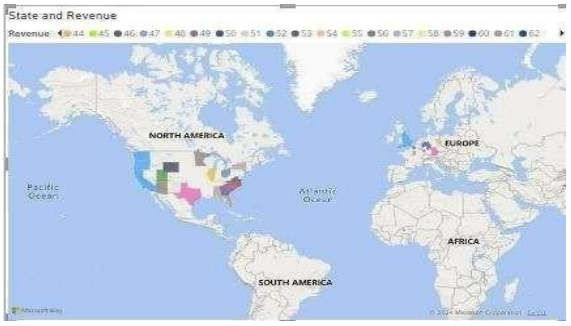
1: Create a choropleth map (fill the map) to spot the special trends to show the state which has the highest revenue.

Step1: Select the "Map" visualization from the Visualizations pane.(filled map)

Step2: Set Up the Map:

- Drag the state field to the "Location" field well.
- Drag the revenue field to the "Size" or "Values" field well.

Step3: Customize: In the "Format" pane, adjust settings such as color, size, and tooltips to enhance readability.



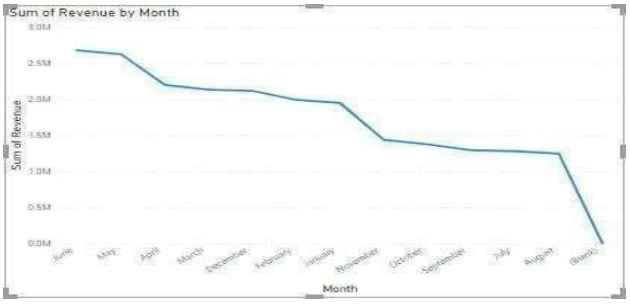
2: Create a line chart to show the revenue based on the month of the year.

Step1: Add a Line Chart: Select the "Line chart" visualization from the Visualizations pane.

Step2: Configure the Chart:

- Drag the month field to the "Axis" field well.
- Drag the revenue field to the "Values" field well.

Step3: Format: In the "Format" pane, you can customize the line color , axis titles, and other aspect to clearly present the revenue trend throughout the year.



3: Create a bin of size 10 for the age measure to create a new dimension to show the revenue.

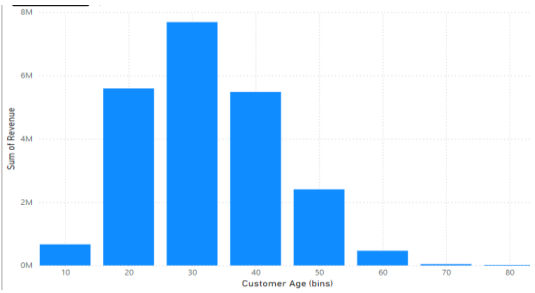
Step1: Create Bins for age

A bin is a single range of continuous values used to group values in a chart.

- Go to the "Data" view and select the age field.
- Right-click on the age field and choose "New group".
- In the "Group" window, select "Bin" and set the bin size to 10.

Step2: Add to Visualization:

- Create a new visualization (e.g., bar chart or column chart). Here we used Stacked column chart.
- Drag the new age bins field to the "X Axis" and the revenue field to the "Y axis".

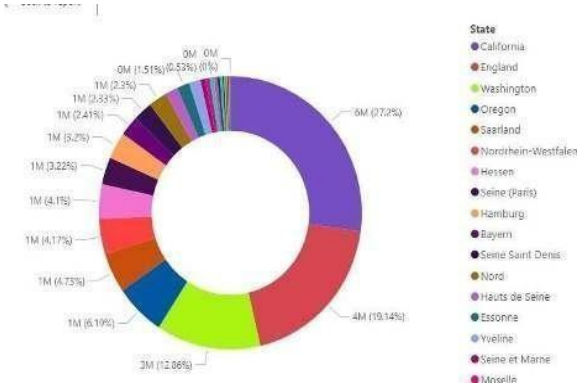


4: Create a donut chart view to show the percentage of revenue per region by creating zero access in the calculated field.

Step1: Add a Donut Chart: Select the "Donut chart" visualization from the Visualizations pane.

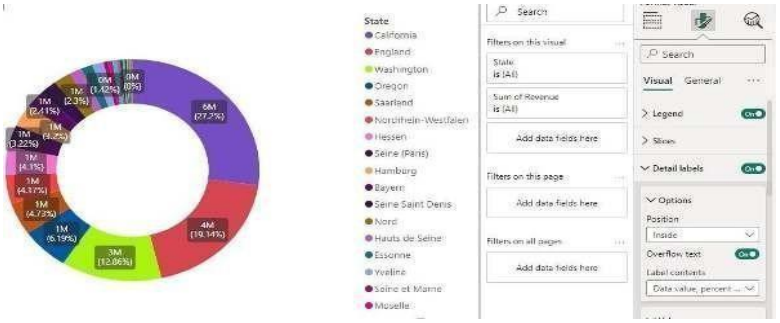
Step2: Set Up the Chart:

- Drag the region field to the "Legend" field well.
- Drag the revenue field to the "Values" field well.



Step3: Create Zero Access:

- Go to the "Format" pane, select "Detail labels", and set the "Label position" to "Inside" to create a zero access effect.
- Adjust the "Detail" and "Percentage" settings as needed.



5: Create a butterfly chart by reversing the bar chart to compare female & male revenue based on product category.

Steps are given below:

Step 1: Create the Measure for Male Revenue

1. Go to the Modelling tab in Power BI.
2. Click on New Measure and create the following measure for Male Revenue:

Male Revenue = SUMX(FILTER('sales_data', 'sales_data'[Customer_Gender] = "M"), 'sales_data'[Revenue])

This formula filters the data to include only rows where Customer_Gender is "M" (Male), and then sums the Revenue for those rows.

Measure for Female Revenue

Step 2: Create the Measure for Female Revenue

1. Similarly, create a New Measure for Female Revenue:

Female Revenue =

SUMX(

FILTER('sales_data', 'sales_data'[Customer_Gender] = "F"),

'sales_data'[Revenue]

)

This formula filters the data to include only rows where Customer_Gender is "F" (Female), and then sums the Revenue for those rows.

Step 3: Reverse the Male Revenue Measure

1. If you want to create the butterfly chart, you need to reverse the Male Revenue measure. To do that, create another New Measure for Reversed Male Revenue:

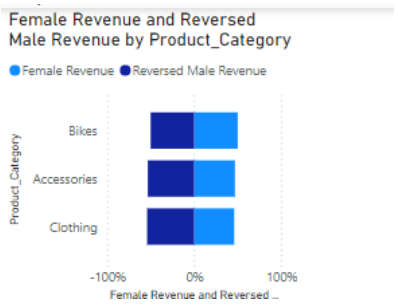
Reversed Male Revenue =

- [Male Revenue]

This measure multiplies the male revenue by -1 so that it will display as a negative value on the chart, creating the reversed bar effect.

Step 4: Create the Butterfly Chart

1. Create a Bar Chart:
    - Go to the Visualizations pane and add a Stacked Bar Chart or Clustered Bar Chart.
2. Set the Axis:
    - Drag Product Category (or the appropriate category field) to the Axis of the chart.
3. Set the Values:
    - Drag Reversed Male Revenue (the reversed male revenue measure) to the Values field.
    - Drag Female Revenue to the Values field as well.
    - Reversed Male Revenue will be shown as negative values, extending to the left, while Female Revenue will be positive, extending to the right.



6: Create a calculated field to show the average revenue per state & display profitable & non-profitable state.

Step1: Create a New Measure

- Go to the Modelling tab and select "New Measure".
- Create the Average Revenue Measure:
- Enter the following DAX formula to calculate the average revenue per state:

Average Revenue Per State = AVERAGEX(

VALUES(sales_data[State]), CALCULATE(SUM(sales_data[Revenue]))

)

Step2: Create a Calculated Column to Categorize States

Next, create a calculated column to classify states as profitable or non- profitable based on the average revenue.

1. Go to the Modelling tab and select "New

Column". Create the Profitability Column:

Enter the following DAX formula to create a column that categorizes states as profitable or non-profitable:

ProfitabilityStatus = IF(sales_data[AverageRevenuePerState] > 1000,

"Profitable", "Non- Profitable"

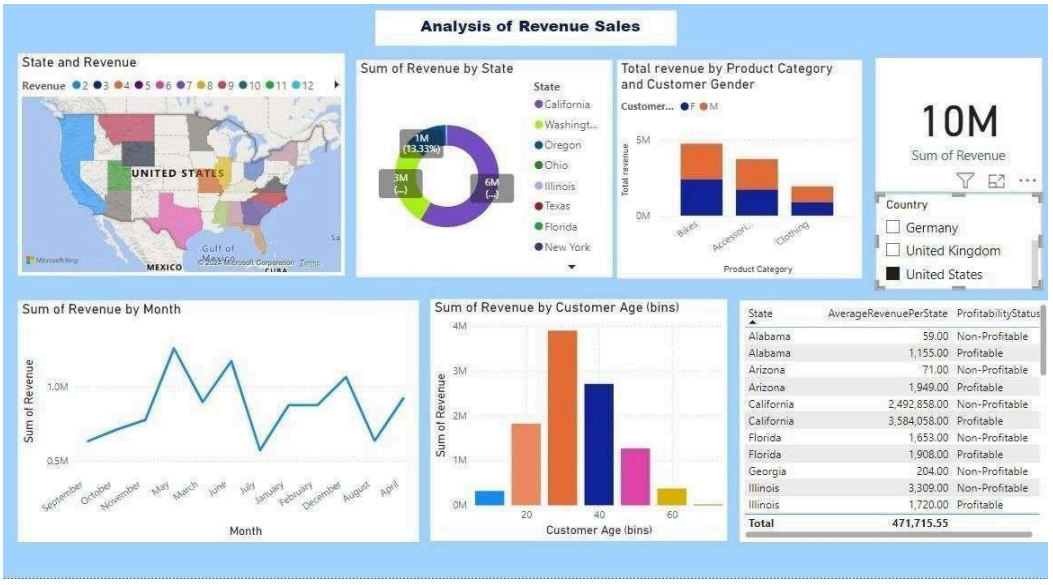
)

Step 3: Display the Results

1.Add a Table and select state, Average Revenue State and ProfitablitiyStatus.

State	AverageRevenuePerState	ProfitabilityStatus
	642.00	Non-Profitable
Alabama	59.00	Non-Profitable
Alabama	1,155.00	Profitable
Arizona	71.00	Non-Profitable
Arizona	1,949.00	Profitable
Bayern	1,63,271.00	Non-Profitable
Bayern	3,74,137.00	Profitable
Brandenburg	20,497.00	Non-Profitable
Brandenburg	67,941.00	Profitable
California	24,92,858.00	Non-Profitable
California	35,84,058.00	Profitable
Charente-Maritime	16,993.00	Non-Profitable
Charente-Maritime	20,874.00	Profitable
England	14,97,497.00	Non-Profitable
England	27,78,723.00	Profitable
Essonne	1,06,052.00	Non-Profitable
Essonne	2,31,515.00	Profitable
Florida	1,653.00	Non-Profitable
Florida	1,908.00	Profitable
Garonne (Haute)	21,192.00	Non-Profitable
Garonne (Haute)	48,495.00	Profitable
Total	**4,85,765.61**	

7: Build a dashboard.



VIVA QUESTIONS:

1. **What is Power BI?**

   Power BI is a business analytics tool by Microsoft that allows users to visualize data, share insights, and create interactive reports and dashboards.

2. **What is a choropleth map in data visualization?**

   A choropleth map is a type of map where areas are shaded in proportion to the value of a variable, such as revenue or population, to highlight spatial patterns.

3. **How do you create a calculated field in Power BI?**

   To create a calculated field in Power BI, go to the Modelling tab, select New Measure or New Column, and enter a DAX formula to perform the desired calculations.

4. **What is a bin in data analysis?**

   A bin is a grouping of continuous data into ranges. For example, an age field might be binned into ranges like 0-10, 11-20, etc., to simplify analysis.

5. **What is a donut chart used for in data visualization?**

   A donut chart is used to display the proportional relationships between categories in a dataset, similar to a pie chart, but with a hole in the center for better readability.

PROGRAM 10

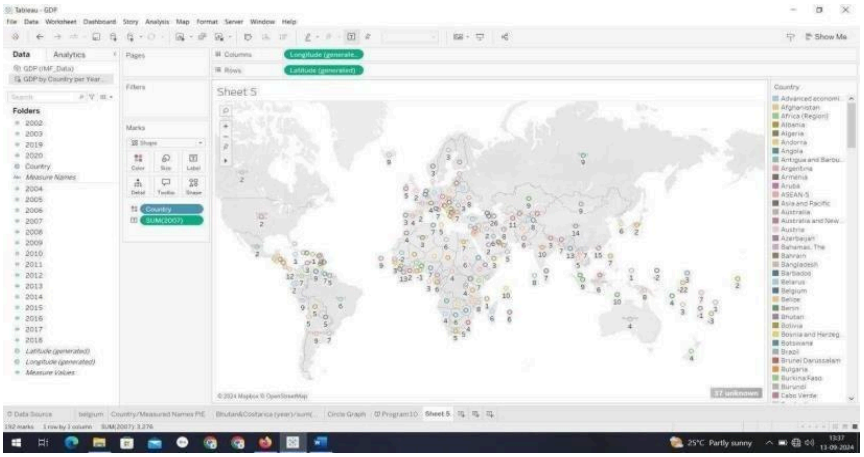
Analysis of GDP dataset

1.Visualize the countries data given in the dataset with respect to latitude and longitude along with country name using symbol maps

Step1: Bring Latitude into rows and Longitude to columns. Click on drop down , select dimension (For both latitude and longitude).

Step2: Bring Country in Color Marks Pane. Select map instead of automatic.

Bring any Year Measured Value to Label after that You be able to see screen as in below



2. Create a bar graph to compare GDP of Belgium between 2006 – 2026. Step1:

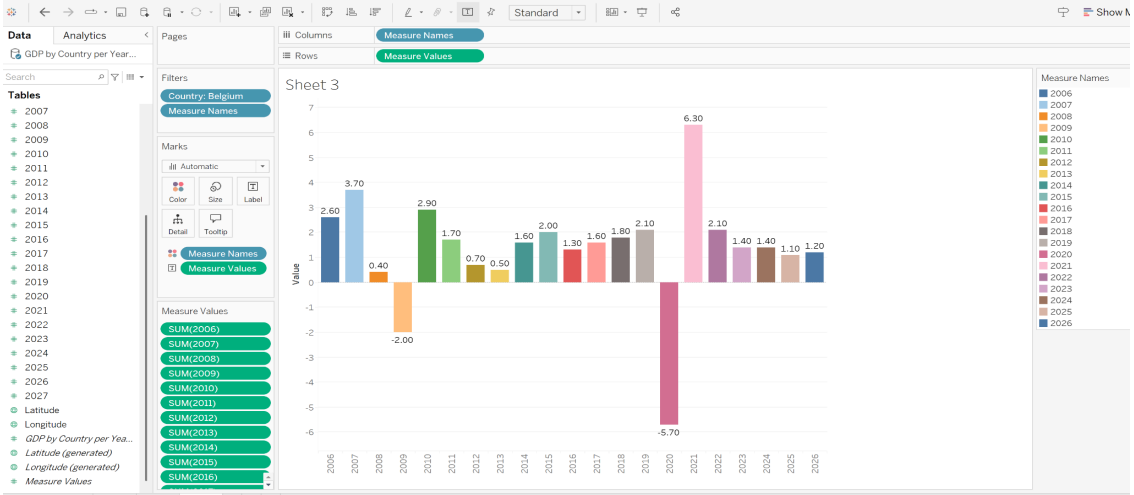
Get Measure names to Filter Pane then select as in years mentioned 2006 – 2026.Get Country to Filter and Select Belgium

Step2:

Drag Measure names into Column

Step3:

Drag measure Values to Rows You see outputs. Drag Measure names into colors and measure values to labels.



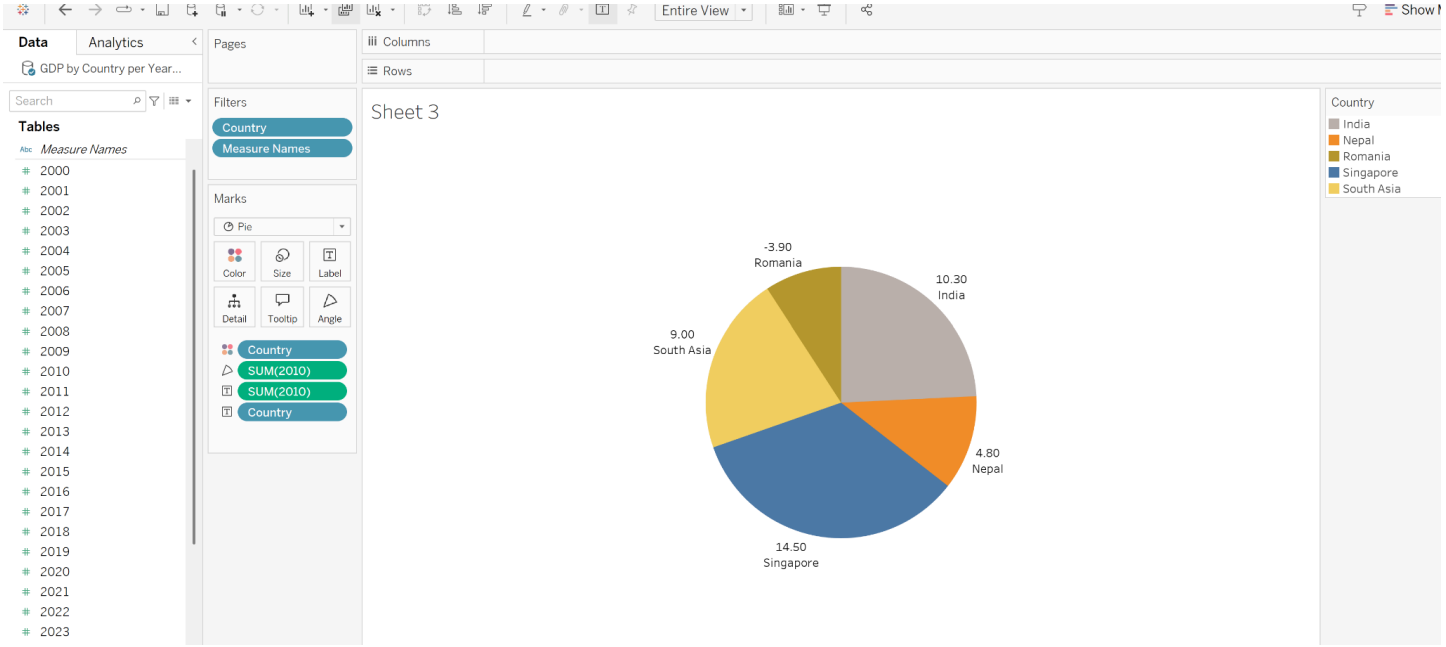
3. Using pie chart, visualize the GDP of India, Nepal, Romania, South Asia, Singapore by the year 2010. Step1:

Get Country to Filter pane and select India, Nepal, Romania, South Asia, Singapore Get measure names to Filter and select 2010.

Step2: Important Step

Select option of chart as Pie(instead of automatic in Marks Pane) and Drag Country in Color frame and label. 2010 into label and angle. (For 10 years of data from 2000 to 2010, drag measure values into angle.)

The output result is as in below

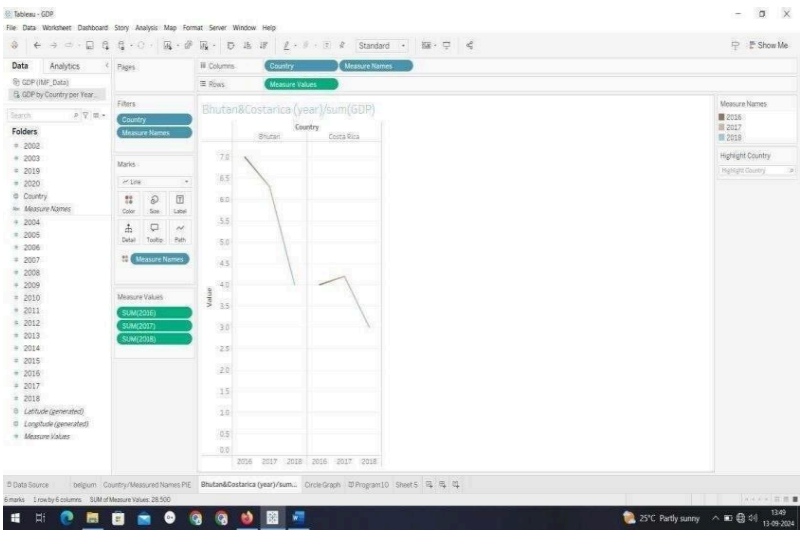


4. Visualize the countries Bhutan & Costa Rica competing in terms of GDP.

Step1: Filter Country and Measure name Iike Bhutan, Costarics and 2016,2017,2018 as year(Measure name)

Step2: Add Country and Measure Names in column, Measure Values in Row

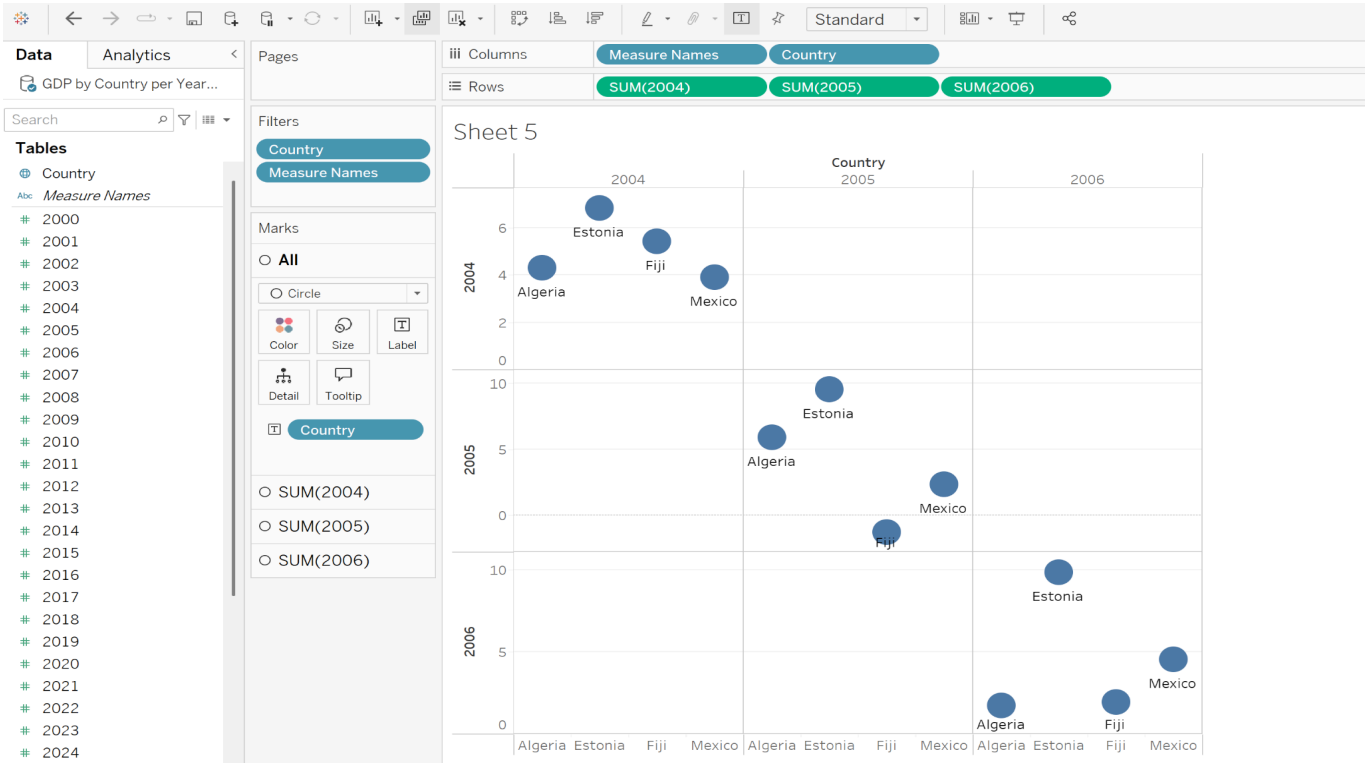
Step3: For better view add Measure Names to Color frame in Marks pane. Select line from marks pane.



5. **Create a scatter plot or circle views of GDP of Mexico, Algeria, Fiji, Estonia from 2004 to 2006. Step1:**Add Country in filter as per requirement

Add measure names in filter and select as per requirement

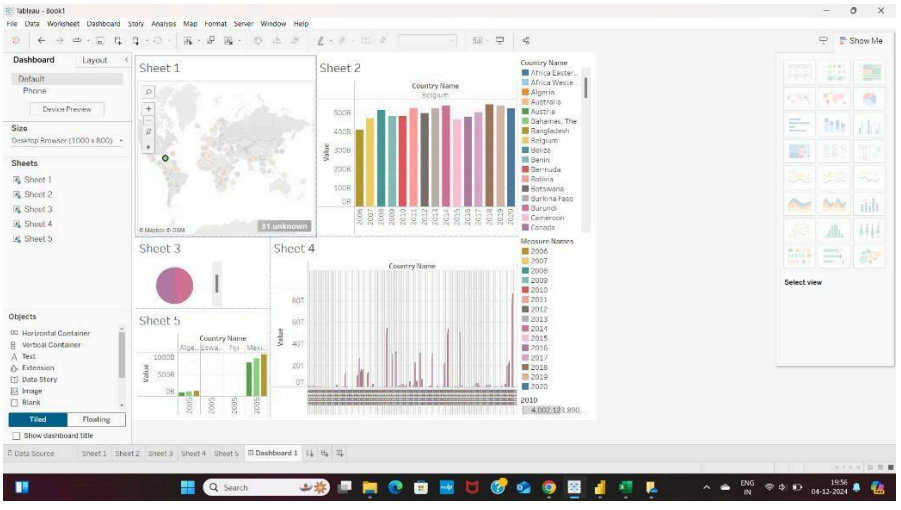
Step2: Add Measured Names and country in Column and an add any measured values of year 2004,2005,2006. Finally opt for Circle as option.



6. Build an interactive dashboard.

Drag and drop all the sheets and build an interactive dashboard.

Note: The "zero access effect" is a visual design technique often used in data visualizations to emphasize or clearly show zero values or the absence of certain data. This effect is particularly useful in charts where you want to highlight how values are distributed relative to zero, or where zero plays a significant role in the interpretation of the data.



VIVA QUESTIONS:

1. **How do you create a symbol map to visualize the GDP data based on latitude and longitude?** Drag Latitude to Rows, Country to Color, and a Year Measured Value to Label to create a symbol map.

2. **How do you create a bar graph to compare Belgium's GDP between 2006 and 2026?**
   Filter by Measured Names (2006–2026) and Country (Belgium), then place Measured Name and Country in Columns, and Measured Value in Rows.

3. **How do you use a pie chart to visualize the GDP of specific countries for the year 2010?**
   Filter by Country and 2010 Measured Name, then set the chart type to Pie and drag Country to Color and Measured Value to Angle.

4. **What steps would you follow to visualize the GDP of Bhutan and Costa Rica from 2016 to 2018?**
   Filter by Country (Bhutan and Costa Rica) and Measure Name (2016–2018), then place Country and Measure Names in Columns, and Measure Values in Rows.

5. **How do you create a scatter plot or circle views to visualize the GDP of Mexico, Algeria, Fiji, and Estonia for the years 2004 to 2006?**
   Filter by Country and Measured Name (2004–2006), then use Measured Name in Columns, Measured Value in Rows, and set Marks to "Circle."

PROGRAM 11

Analysis of HR Dataset:

- Create KPI to show employee count, attrition count, attrition rate, attrition count, active employees, and average age.
- Create a Lollipop Chart to show the attrition rate based on gender category.
- Create a pie chart to show the attrition percentage based on Department Category- Drag department into colours and change automatic to pie. Entire view, Drag attrition count to angle. Label attrition count, change to percent, add total also, edit label.
- Create a bar chart to display the number of employees by Age group,
- Create a highlight table to show the Job Satisfaction Rating for each job role based on employee count.
- Create a horizontal bar chart to show the attrition count for each Education field Education field wise attrition – drag education field to rows, sum attrition count to col,
- Create multiple donut chart to show the Attrition Rate by Gender for different Age group. Solution :

1. Create KPI to show employee count, attrition count, attrition rate, attrition count, active employees, and average age.

Step1: Create a New measure (Data set name is HR data. Change it accordingly as per the formula)

Employee_Count = COUNT('HR data'[Employee Number])

Step2: Choose KPI card or Card in the visualization and drag and drop the Employee Count by employee count measure. Format your visuals of your style. (Callout value: change text color to blue, Callout label:off, Title:on, center alignment, effects: Background color to orange)

Step3: Create a New Measure

Attrition Count = COUNTROWS(FILTER('HR data', 'HR data'[Attrition]="Yes"))

Step4: Choose KPI card in the visualization and drag and drop the Attrition Count. Format your visuals of your style.

Step5: Create a New Measure

Attrition Rate = DIVIDE([Attrition Count], [Employee_Count], 0) * 100

Step6: Choose KPI card in the visualization and drag and drop the Attrition Rate. Format your visuals of your style.

Step7: To find active employees create a new measure Active Employees = [Employee_Count] - [Attrition Count]

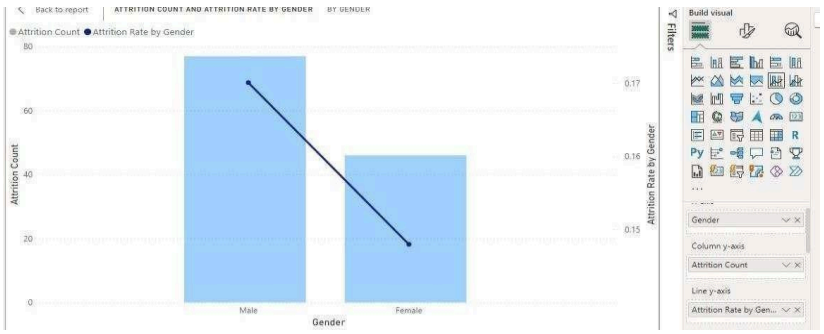
Step8: Choose KPI card in the visualization and drag and drop the Active Employees. Format your visuals of your style.

Step9: To calculate average age create a new measure Average Age = AVERAGE('HR data'[Age])

Step10: Choose KPI card in the visualization and drag and drop the Average Age. Format your visuals of your style

2.Create a Lollipop Chart to show the attrition rate based on gender category.

Power BI does not have a native Lollipop Chart, so you will simulate it using



(any chart) a **Line and Stacked column Chart**

Gender in x axis, Attrition count in column y axis, and Attrition rate in line y axis.

3. Create a pie chart to show the attrition percentage based on Department Category-

Drag department into colours and change automatic to pie. Entire view, Drag attrition count to angle. Label attrition count, change to percent, add total also, edit label.

- From the Visualizations pane on the right, select the Pie Chart visual icon. This will add a blank pie chart to your report canvas.

Set Up the Pie Chart:

- Drag the Department Field to the Legend area.
- Drag the Attrition Count Measure to the Values area.

Configure Data Labels and Formatting:

- Click on the Pie Chart to select it.
- Open the Format Pane (paint roller icon).

Change Detial Label Settings:

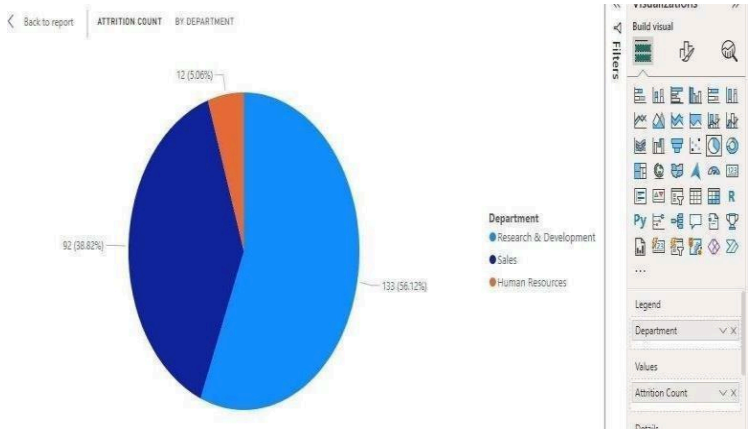
- Go to the Detail Labels section in the Format pane.
- Toggle Detail Labels to On.
- In the Detail Label settings, change Label Style to Percent. This will show the percentage of each department's attrition relative to the total.
- To show the Total alongside the percentages:
- Ensure that Data Labels are visible and set to Show.
- You can add a Total Label in the Title or Tooltips sections if needed for additional context.

Format the Pie Chart:

- Adjust Colors:
- Go to the Data Colors section in the Format pane.
- You can customize colors for each department by clicking on the color next to the department name and choosing the color you prefer.
- Edit Labels:
- If you want to customize the text in the labels, you can use the Data Label formatting options to adjust font size, color, and display units.

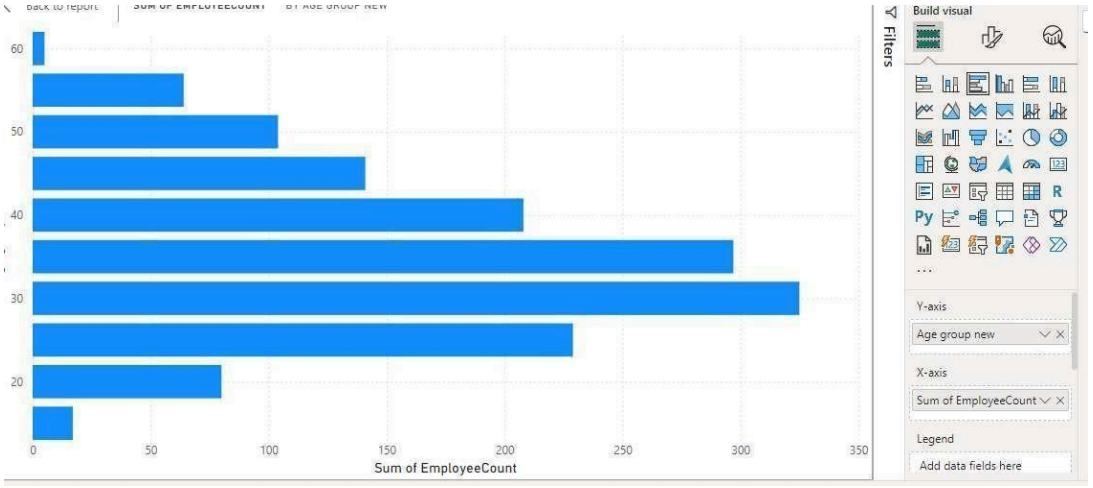
Finalize Your Visualization:

- Ensure your pie chart looks as expected with percentages representing the attrition rate for each department.



4. **Create a bar chart to display the number of employees by Age group, Step1:** Right click Age and choose new group and set bin size as 5.

Step2: Choose clustered bar chart drag and drop new age bin and employee count.



5. Create a highlight table to show the Job Satisfaction Rating for each job role based on employee count.

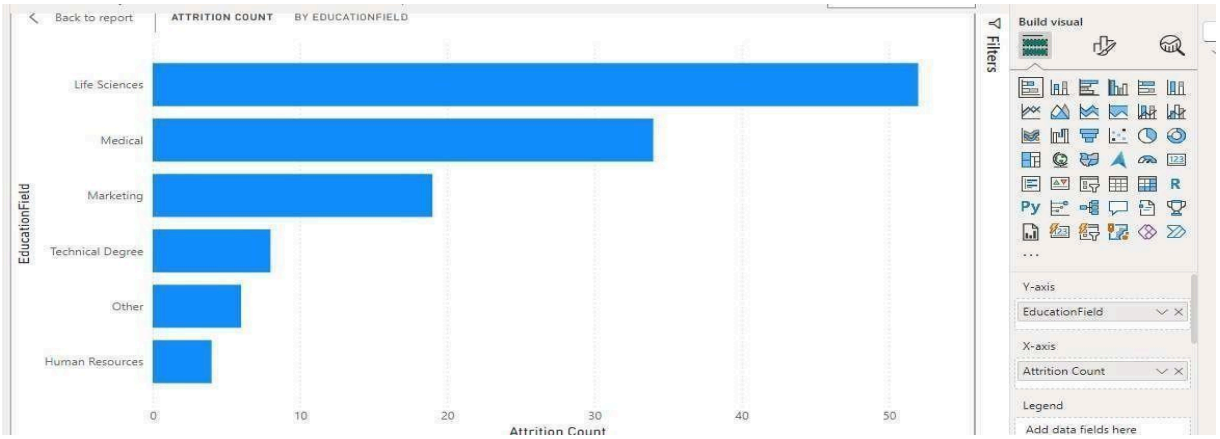
- Create a Matrix visual from the Visualizations pane.
- Drag the Job Role field to Rows.
- Drag the Job Satisfaction Rating field to Columns.
- Drag the Employee Count measure to Values.

6. Create a horizontal bar chart to show the attrition count for each Education field Education field wise

Attrition – drag education field to rows, sum attrition count to col,

Step1: Horizontal bar chart It's called the Clustered Bar Chart or Stacked Bar Chart in the visualization pane

Choose stacked bar chart and set y axis is education filed and x axis is attrition count.



7. Create multiple donut chart to show the Attrition Rate by Gender for different Age group.

Choose donut chart and drag and drop legend as gender and value as attrition rate.

Step 1: Select the Donut Chart from the Visualizations pane.

Step 2: Create separate Donut Charts for different age groups.

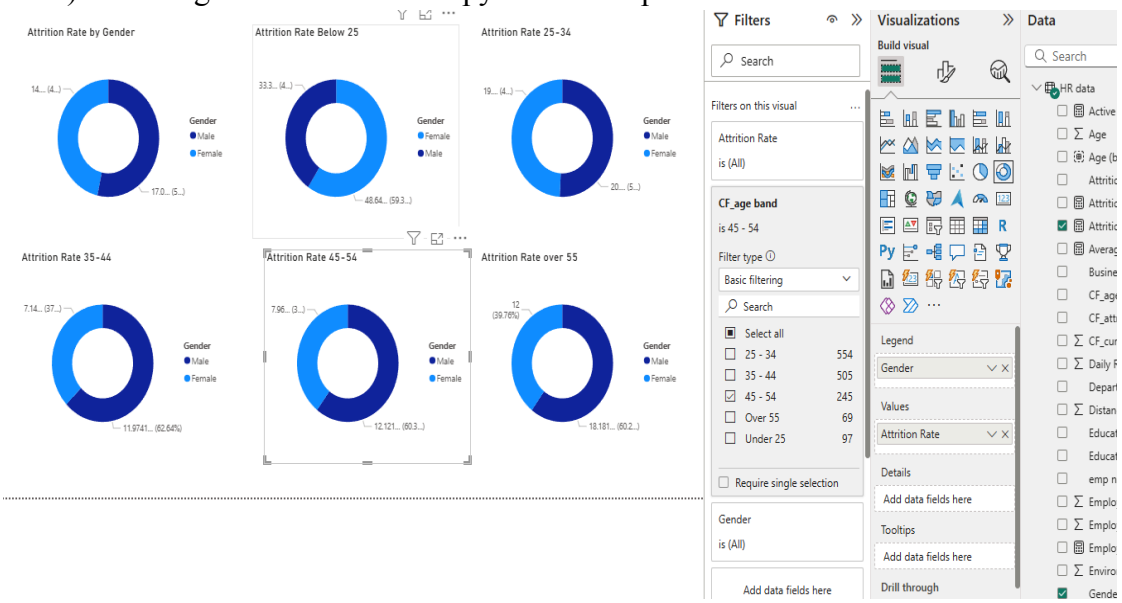
- For each chart, filter the dataset based on age group (using the Age Group field created earlier).

Step 3: Drag the Gender field to Legend. Drag the Attrition Rate measure to Values

- Repeat for each age group, ensuring each donut chart represents a different age group with gender breakdown.

Note:

- Use Filters to dynamically adjust visuals where necessary . Drag and drop CF_age band in “add data fields here” of “filters for this visual” (Not for page or all pages)(e.g., filter by Age Group or Education Field). Select age 35-50 and then copy visual and paste beside the donut chart.



VIVA QUESTIONS:

1. **How do you calculate the employee count in Power BI?**
   Use the measure Employee Count = COUNT('HR'[EmployeeNumber]) to calculate the total number of employees.

2. **How can you create a lollipop chart to show the attrition rate based on gender?**
   Since Power BI doesn't have a native lollipop chart, simulate it by using a Line and Stacked Column Chart.

3. **How do you create a pie chart to show attrition percentage by department?**
   Drag Department to Legend, Attrition Count to Values, change the chart type to Pie, and set data labels to show percentages.

4. **How do you display the number of employees by age group in Power BI?**
   Right-click Age, create a new group with a bin size of 5, then use a bar chart with Age Bin and Employee Count.

5. **How do you visualize job satisfaction ratings for each job role in Power BI?**
   Use a Matrix visual, drag Job Role to Rows, Job Satisfaction Rating to Columns, and Employee Count to Values.

PROGRAM 12

Analysis of Amazon Prime Dataset

1.Create a Donut chart to show the percentage of movie and tv shows

2.Create a area chart to shows by release year and type

3.Create a horizontal bar chart to show Top 10 genre

4.Create a map to display total shows by country

5.Create a text sheet to show the description of any movie/movies.

6.Build an interactive Dashboard.

Step1: Upload the Amazon CSV dataset.

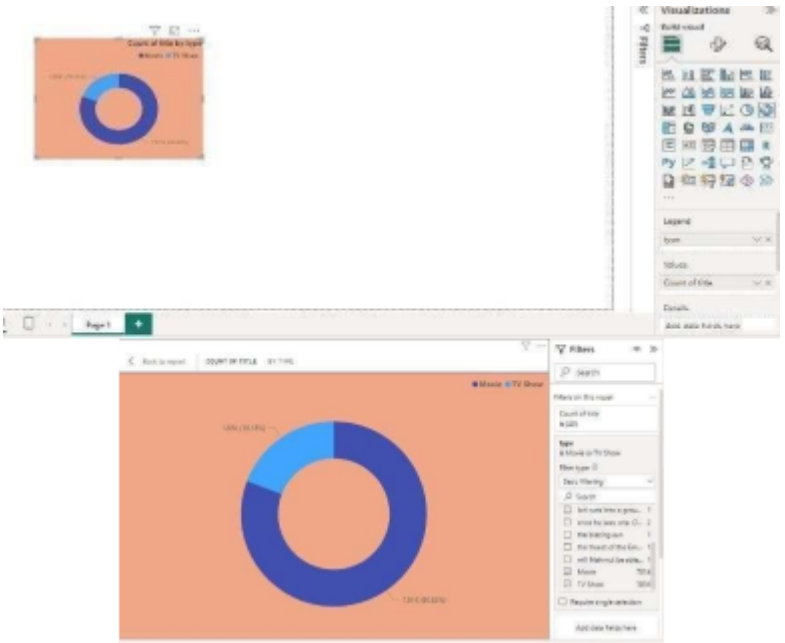
Step2: Transform data and make the data ready for reporting.

As part of Transformation remove you can remove blank, null values and remove columns which is not required for analysis.

Step3: Select close and apply.

1. Create a Donut chart to show the percentage of movie and tv shows

- From the Visualizations pane, select the Donut chart.
- Drag the 'Type' field to the Legend section.
- Drag any suitable column (e.g., ID or Title) to Values, then set the aggregation to Count.
- Use filters to filter only movie and TV show.This will show the percentage of Movies vs TV Shows.

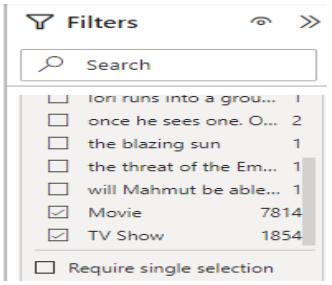


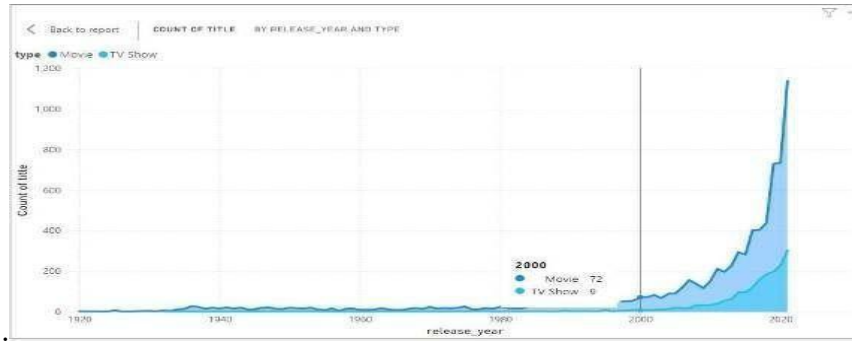
2.Create a area chart to shows by release year and type.

- Ensure your dataset contains a Release Year column and a Type column (Movies/TV Shows).

Steps to Create Area Chart:

- Choose Area chart from the Visualizations pane.
- Drag the 'Release Year' field to the X Axis section.
- Drag the 'Type' field to Legend.
- Drag the Title (or other identifying fields) to Values(Y Axis), and set the aggregation to Count.
- You'll now see an area chart with Movies and TV Shows distributed over the years. Note: Use filters to only movies and TV show.



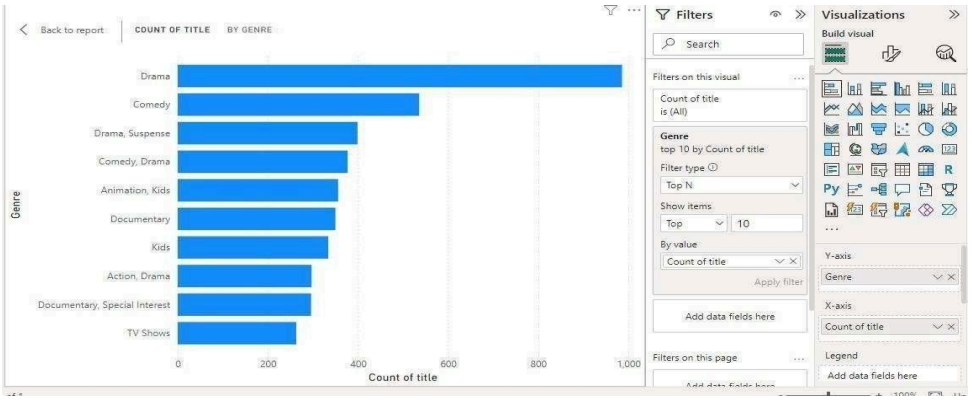


3.Create a horizontal bar chart to show Top 10 genre.

Note: Make sure you have a Genre column in your dataset.(Rename the column listed in to Genre)

Steps to Create Horizontal Bar Chart:

- From the Visualizations pane, select Bar chart and adjust it to display horizontally.
- Drag Listen_in to "Filters on this visual" . click on the drop down of "basic filtering" and selection "Top N". Drag and drop "show_ID " or "Title" in By Value and select "Count" in the drop down of the same.
- Drag the Listed_in column to the Y Axis section.
- Drag the Title (or other identifier) to X axis, and set the aggregation to Count.
- In the Filters pane, filter the Top N to display the Top 10 Genres (Listen_in) by the count of content.
- From the Visualizations pane, select Bar chart and adjust it to display horizontally.

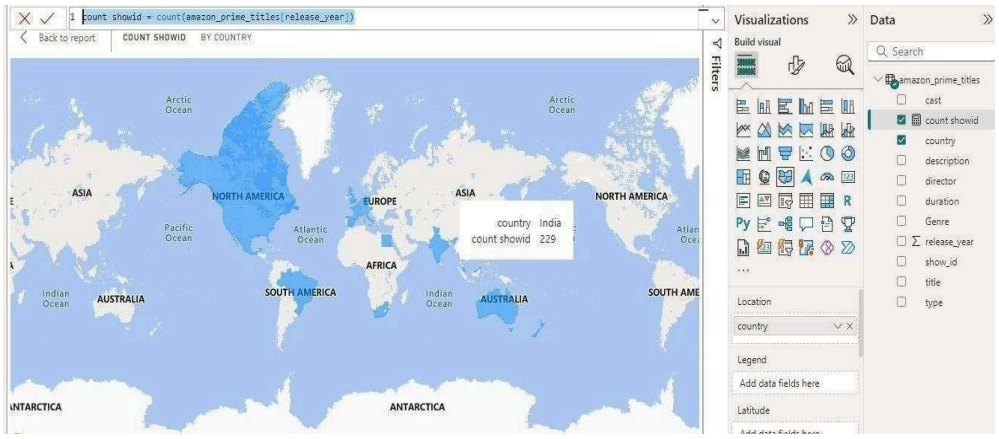


4. **Create a map to display total shows by country.**

Make sure you have a country column in your dataset. Steps to Create a Map:

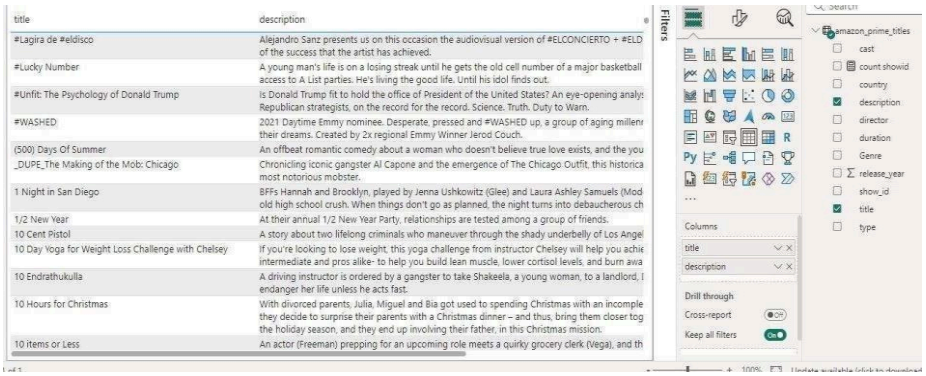
- Choose Filled Map from the Visualizations pane.
- Write a new measure to count show id

  count showid = count(amazon_prime_titles[release_year])
- Drag the Country field to the Location section.
- Checkmark or tickmark on the “count showid” the measure in the data pane. Hover over the map to see details.
- This will show a world map representing the total number of shows produced in each country.

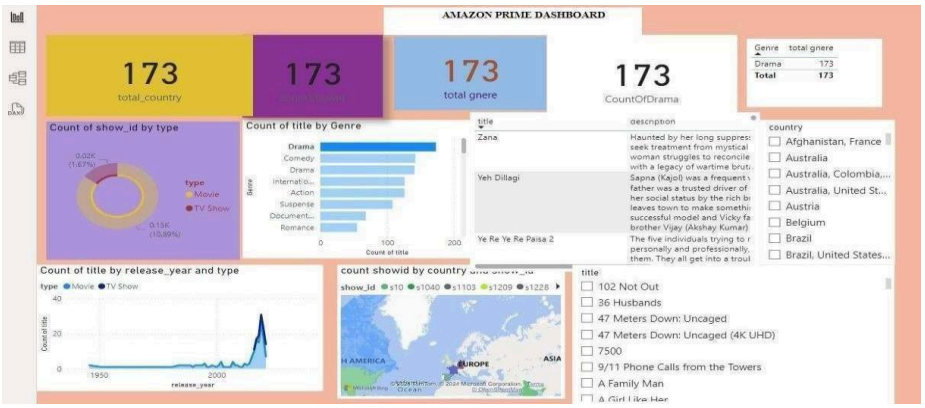


5. Create a text sheet to show the description of any movie/movies.

- Ensure your dataset has a Description column for each movie/TV show.
- Choose Table from the visuals and check the title and description columns. You can add slicer to search by title to get the description.



6. Build an interactive Dashboard:



VIVA QUESTIONS:

1. **How do you create a Donut chart to show the percentage of movies and TV shows?**
   Drag the Type field to Legend, any suitable column (e.g., Title) to Values, set aggregation to Count, and filter for Movies and TV Shows.

2. **How do you create an area chart showing the release year and type?**
   Drag Release Year to Axis, Type to Legend, and Title to Values (Count), ensuring the chart displays Movies and TV Shows over the years.

3. **How do you create a horizontal bar chart to show the top 10 genres?**
   Drag Genre to Axis, Title to Values (Count), and filter for the top 10 genres by count, then adjust the bar chart to horizontal.

4. **How do you create a map to display the total number of shows by country?**
   Use a Filled Map, drag Country to Location, and create a measure like count showid = COUNT(amazon_prime_titles[release_year]) to count shows per country.

5. **How do you create a text sheet to show the description of a movie or TV show?**
   Choose Table, drag Title and Description columns, and use a slicer to filter by movie or TV show title for detailed descriptions.