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Your First Step to Become a **Hands-on Data Scientist**

Master Data Science & Data Visualisation with **Google Cloud Platform (GCP)**

Part One | Lab Guide

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10.Table

11.Pivot Table

APPENDIX

Executive Summary

Development of Data Studio Charts began when a thought about how essential it is for people who are interested in Data Science and Data analysis to know and learn about various charts to analyse and visualise data in a profound manner. But the fact is , it is not only the data analysts and data scientists who should be having knowledge about this but then everyone who is learning about data or is in some phase going to deal with data should know about this. With the rapid growth in data and need for a good insight to be brought from any data , this lab guide is developed with the advantages of having an altogether collection of all the charts in one place and also in a simple and easy to follow manner to read and understand with business problem examples to easily understand how to implement each chart.

This lab guide is created with examples from Health, Energy and Public Sectors which would make the readers to get a clear view of how to bring insights from various data collections. It would give a new dimension on how to deal with any data and would help the reader to come to a conclusion as what Chart can be used to represent any data within a minute that dataset is been given to them. Google Data Studio has been chosen to show the examples as it would show the readers as how creatively they can represent any data and as well as would lead them to bring out their own creativity in representing the data.

Disclaimer

We share this information for learning purposes only, and we developed this material based on our prior experience, skills, knowledge, and expertise. Our perspective on the tools, technologies, systems, applications, processes, methodologies, and others used in these materials may differ from others. We advise the users to use these materials at their own risk.
The sample programs used in these materials developed by us are based on some system and data assumptions, and these examples may or may not work for others. If there are any issues in following these materials, please feel free to contact our support services, and we will try to help you based on our support resource availability.
The respective vendors own all the hardware, software, tools, technologies, processes, methodologies, and others used in these materials. Users agree to these learning resources at their own risk, and under any circumstances, DeepSphere.AI is not liable for any of these vendor's products, services, and resources.

Target Audience

This document can be used by anyone, there is no age limit. People who are interested to know about various charts can use this is as a learning material.

Outcome

The outcome of this document is the detailed explanation of various charts along with examples from three sectors namely Health,Energy and public sectors.

Deepsphere.AI and Google Cloud

DeepSphere.AI (DS.AI) is a global leader in providing an advanced and higher educational platform for schools. DS.AI provides an intelligent learning management system (iLMS) to learn applied artificial intelligence, data science, and data engineering at a personalised level. DS.AI iLMS platform hosted on Amazon web services (AWS) and the learning resources developed on Google Cloud Platform(GCP) and SAP Litmos.

To create social readiness and awareness about applied AI, DS.AI continued to develop learning resources to educate and empower schools, colleges, universities, organisations, and public entities. This article is part of a series of learning resources, and there will be several articles will be published to master applied AI on Google Colab.

We use several GCP services to develop these learning resources, including storage services, compute services, network services, and other products and services.
Our goal is to go beyond concepts, ideas, visions, and strategies to provide practical problem-solving applied AI skills, knowledge, and expertise to gain the job learning experience. To achieve our goals and objectives, we use GCP products and services, including BigQuery, AutoML, AutoML Tables, Dataproc, Dataflow, Data Studio, etc.

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DeepSphere.AI
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Big Query

Campaign Manager 360

Cloud Spanner

Cloud SQL for MySQL

Display & Video 360

Extract Data

File Upload

Google Ad Manager

Google Ads

Google Analytics

Google Cloud Storage

Google Sheets

Google Surveys

MySQL

PostgreSQL

Search Ads 360

Search Console

YouTube Analytics

DeepSphere.AI
Enterprise AI and IIoT for Analytics

Google Data Studio Connectors

	Big Query	Campaign Manager 360	Cloud Spanner
Describe the connector business purposes	Using Data Studio , we can connect to a single Google BigQuery table or view. The data source editor allows you to traverse the Project, Data Set, and Table hierarchy.	With the Google Campaign Manager 360 connector, you can access and transform your CM360 data to generate and share dashboards with your stakeholders.	The Cloud Spanner connector allows you to access data from Cloud Spanner within Data Studio. A Data Studio data source can connect to Cloud Spanner using SQL.
Data Source Name	Big Query Tables	CM360 Data	Cloud Spanner Database
Type of data supported	Structured Data Table Data	Structured data	Structured Data Table Data
Extraction Frequency	Batch mode Real time	Batch mode Real time	Batch mode Real time

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Google Data Studio Connectors

	Cloud SQL for MySQL	**Display & Video 360**	**Extract Data**
Describe the connector business purposes	The Cloud SQL connector allows you to access data from Cloud SQL databases within Data Studio. A Data Studio data source can connect to a single Cloud SQL database table.	The Google Display & Video 360 connector enables advertisers to view Display & Video 360 report data in Data Studio.	Data extract lets you explore a subset of your data. This can make your reports and explorations load faster and be more responsive when applying filters and date ranges than when working with a live connection to your data.
Data Source Name	Cloud SQL Data base	Display & Video 360 report data	A subset of an already existing data set.
Type of data supported	Structured Data Table Data	Structured Data video	Structured Data
Extraction Frequency	Batch mode Real time	Batch mode Real time	Batch mode

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Google Data Studio Connectors

	File Upload	**Google Ad Manager**	**Google Ads**
Describe the connector business purposes	You can bring data into Data Studio from almost any source by uploading CSV (comma-separated values) files. File upload lets you report on data not supported by a specific connector.	You can add Ad Manager as a data source in Data Studio to create data visualization reports. The most popular Ad Manager report dimensions and metrics are available. These reports can be securely shared with others in your organization or publicly.	Google Ads allows you to reach potential customers with online ads. The Data Studio Google Ads connector enables Google Ads advertisers to access performance report data within Data Studio.
Data Source Name	CSV files Note: CSV file	Ad Manager reports	Performance report data of Google Ads
Type of data supported	Structured Data Table Data	Structured Data Table Data video	Structured Data
Extraction Frequency	Batch mode	Batch mode	Batch mode Real time

Google Data Studio Connectors

	Google Analytics	Google Cloud Storage	Google Sheets
Describe the connector business purposes	Google Analytics gives insights into how visitors find and use website, app, or internet-connected device. Data Studio can be used to visualize the same data that is available in Analytics custom reporting. You can apply Universal Analytics ("Web") Analytics segments to your Data Studio reports, as well as see whether and how your data is being sampled.	The Google Cloud Storage connector lets you create and share reports and dashboards based on your GCS data.	Google Sheets lets you create and format online spreadsheets, and work on them simultaneously with other people. The Data Studio Google Sheets connector allows you to access data stored in a Google Sheets worksheet.
Data Source Name	Website log data of the website connected with Google Analytics.	GCS Data	Google Sheets worksheets
Type of data supported	Structured Data	Structured Data Unstructured Data Table data	Structured Data Table Data
Extraction Frequency	Batch mode Real time	Batch mode Real time	Batch mode Real time

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Google Data Studio Connectors

	Google Surveys	**MySQL**	**PostgreSQL**
Describe the connector business purposes	Google Surveys is a market research platform designed to help researchers get answers to their questions quickly. The Data Studio Google Surveys connector allows you to access response data from existing surveys.	The Data Studio MySQL connector is based on Google Cloud SQL for MySQL, and is subject to the same limits on versions and supported features. The MySQL connector allows you to access data from MySQL databases within Data Studio.	The PostgreSQL connector allows you to access data from PostgreSQL based databases within Data Studio. This connector uses the PostgreSQL JDBC driver to connect a Data Studio data source to a single PostgreSQL database table.
Data Source Name	Survey data	My SQL databases	PostgreSQL based databases
Type of data supported	Structured Data	Structured Data Table Data	Structured Data Table Data
Extraction Frequency	Batch mode	Batch mode Real time	Batch mode Real time

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Google Data Studio Connectors

	Search Ads 360	Search Console	YouTube Analytics
Describe the connector business purposes	The Google Search Ads 360 connector enables advertisers to view Search Ads 360 performance data in Data Studio.	The Data Studio Search Console connector helps you measure and analyze your site's performance on Google Search. You can easily extend those reports to include data from other sources, such as Google Analytics and Google Ads, to give you a more comprehensive view of your online presence	The YouTube Analytics connector allows you to use Data Studio to report on analytics data about the YouTube channels you own.
Data Source Name	Search Ads 360 performance data	Website Performance data	Analytics data on YouTube Channel
Type of data supported	Structured Data	--------	--------
Extraction Frequency	Batch mode Real time	Real time	Batch mode Real time

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1

LINE CHARTS

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Line Charts   1

1.a) What is a Line Chart
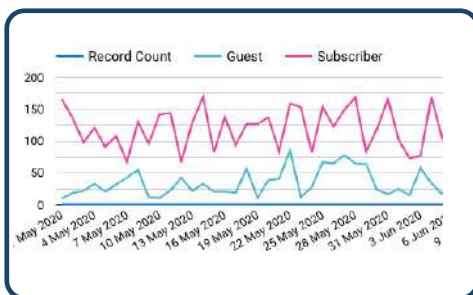
- It represents Information as a series of Data Points called "MARKERS" connected by straight line segments.
- It usually represents a change in Quantity with respect to another Quantity
- Line Graph is also called a "LINEAR GRAPH".
- There are different types of Line graphs:
    - a)Simple
    - b)Multiple
    - c)Compound

1.b) When to use a Line Chart

- Line chart talks about the Trend which is over a period of Time.
- It is used to compare the changes over the same period of time for different groups.
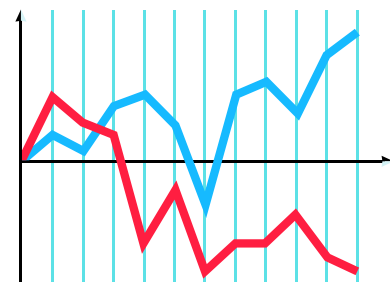
1.c) Business Problems

- -

i) Example 1: 'Election Commission of India' Website Login Data (PUBLIC SECTOR)

Here, We consider A Very simple use case.
The data shows the Website Login report of the number of Guests vs Number of Users in a period of Time
The below Line Chart shows the Trend for Guests and Subscribers Login on the Given period of Time :

	Date	Guest	Subscriber
Subscriber 12,137			
1.	8 Aug 2020	50	71
2.	7 Aug 2020	51	104
3.	6 Aug 2020	68	139
4.	5 Aug 2020	59	149
5.	4 Aug 2020	53	127
Guest 4,579			
6.	3 Aug 2020	68	167
7.	2 Aug 2020	73	169
		1 - 100 / 100	
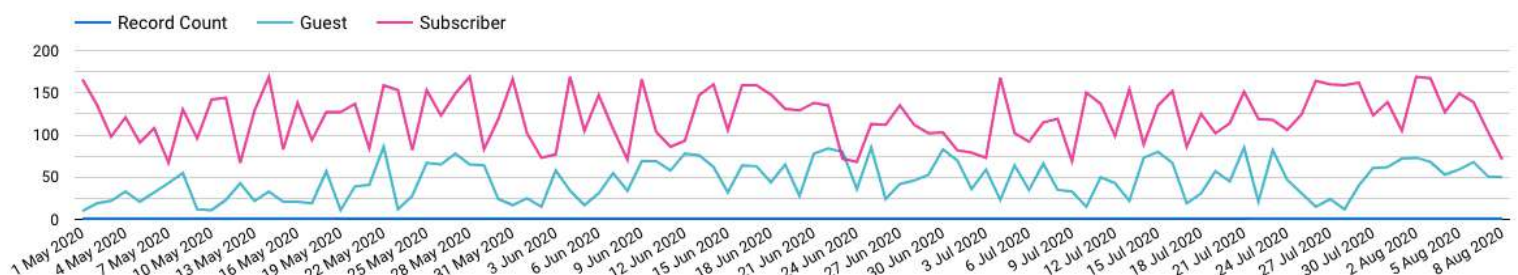
DATA STUDIO IMPLEMENTATION FOR LINE CHART

i) Example 1: 'Election Commission of India' Website Login Data (PUBLIC SECTOR)

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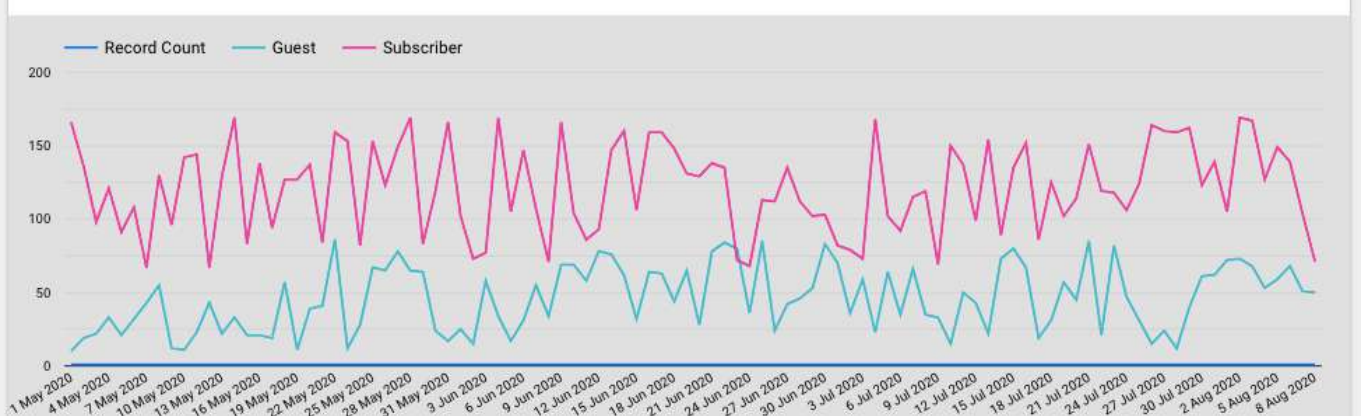
1.c) Business Problems

- -

ii) Example 2: Gadget Sales (PUBLIC SECTOR)

Stacked Line Chart:

Let's assume that we got the sales data of different Gadgets in a Shop. Below, the Dimension is Month and the Metrics are Tablets,Desktop and Laptops Sold.

	Month	Laptop	Desktop	Tablets	Record Cou... ▼
1.	Jan 2009	145	83	200	1
2.	Feb 2009	70	231	52	1
3.	Mar 2009	171	296	149	1
4.	Apr 2009	55	172	88	1
5.	May 2009	99	296	92	1
6.	Jun 2009	169	313	135	1
7.	Jul 2009	81	63	143	1
8.	Aug 2009	68	189	179	1

1 - 100 / 100   ‹   ›

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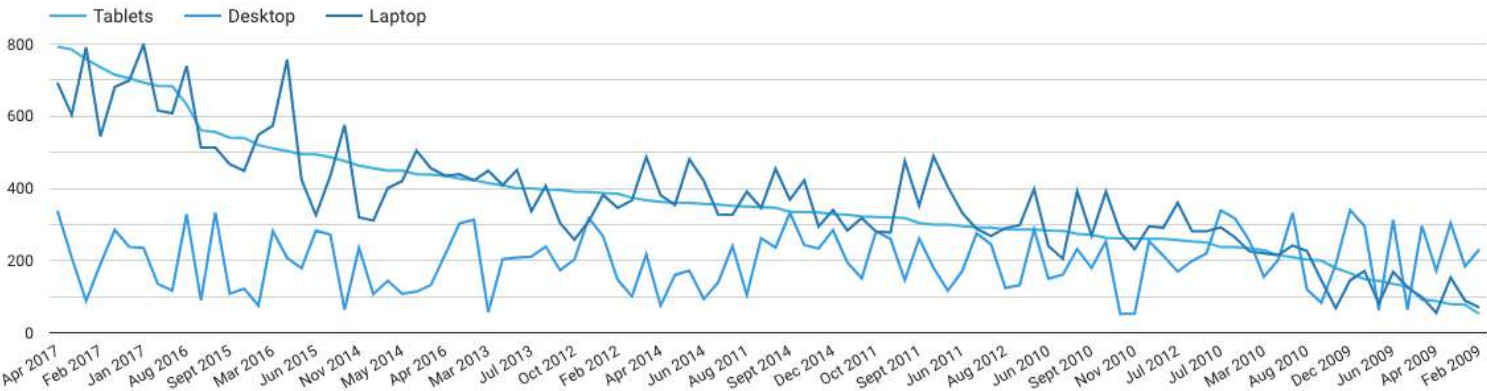
DATA STUDIO IMPLEMENTATION FOR LINE CHART

ii) Example 2: Gadget Sales (PUBLIC SECTOR)
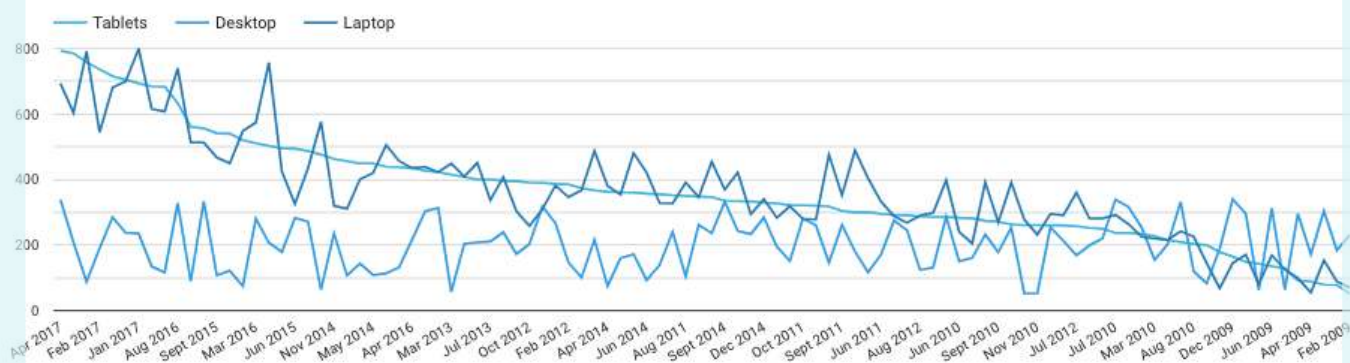
1.c) Business Problems

— —

iii) Example 3: Community Mobility Change (PUBLIC SECTOR)

Stacked Line Chart:
Next, We consider the Community Mobility Changes of a particular Area. Below , Dimension is Month and the Metrics are Parks,Grocery Store,Theatre and Workplace

	Month	Parks	Grocery...	Theatre	Workplace
1.	Jan 2012	392	283	3811	2527
2.	Feb 2012	300	226	2960	1517
3.	Mar 2012	375	208	3357	2184
4.	Apr 2012	354	302	3247	2768

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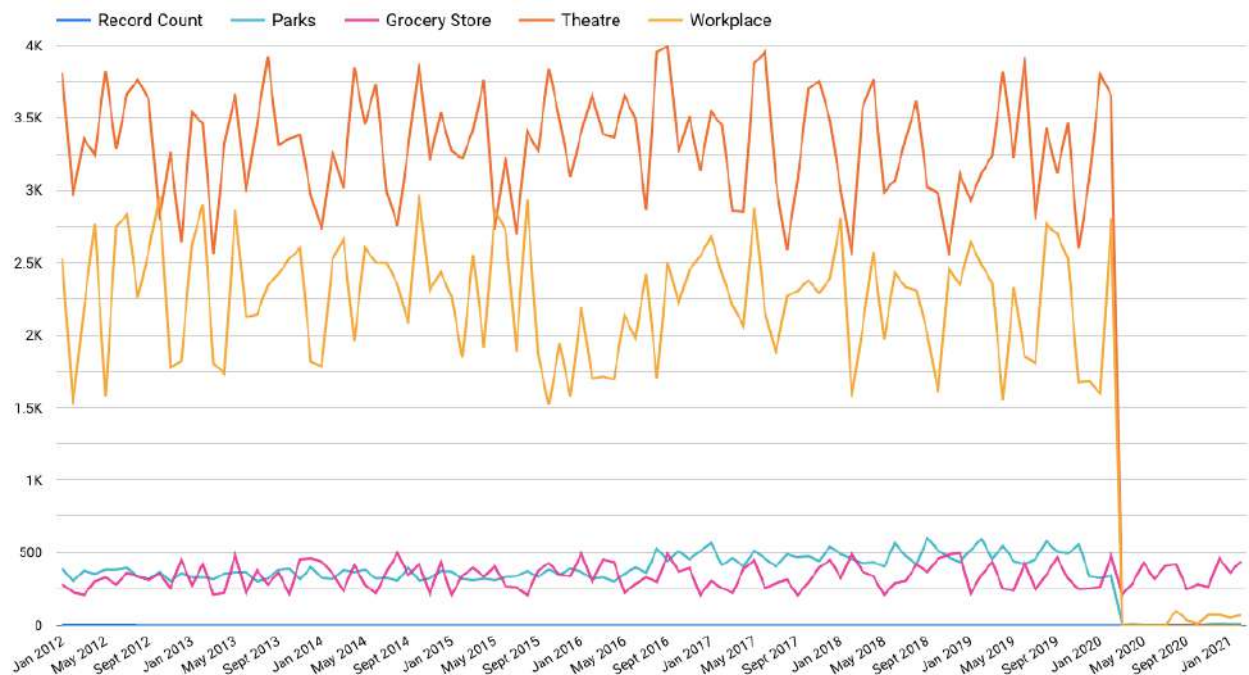
DATA STUDIO IMPLEMENTATION FOR LINE CHART

iii) Example 3: Community Mobility Change (PUBLIC SECTOR)

2
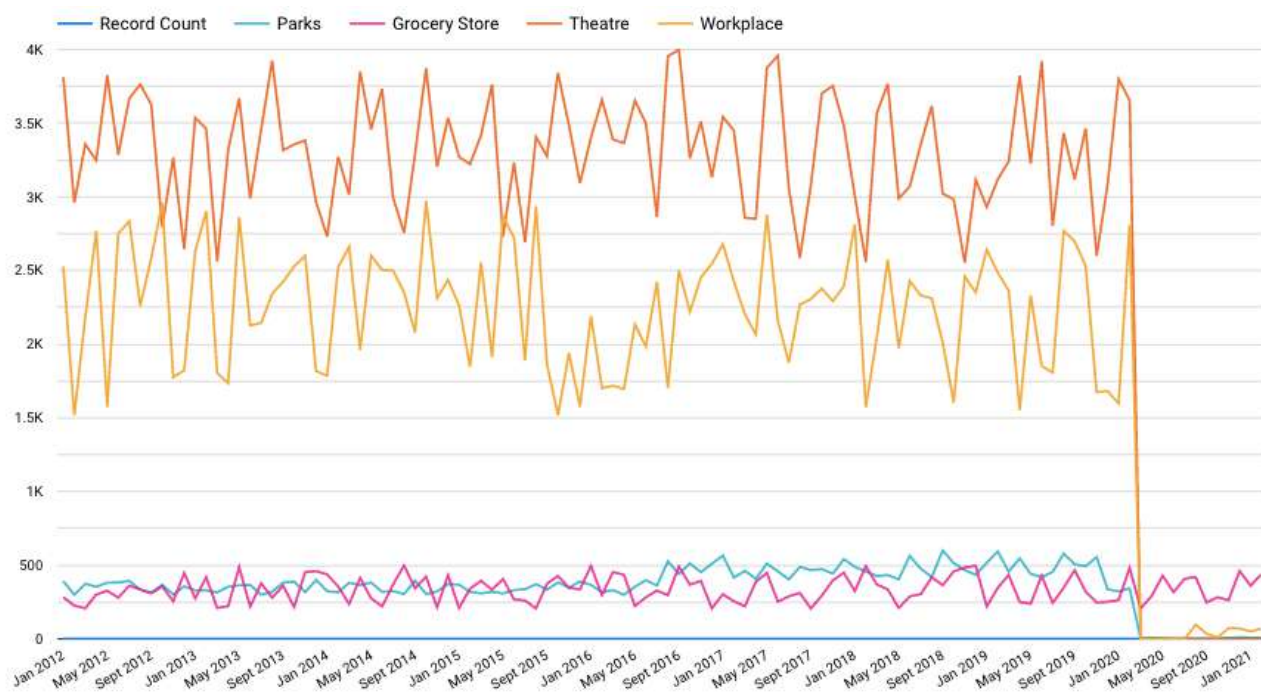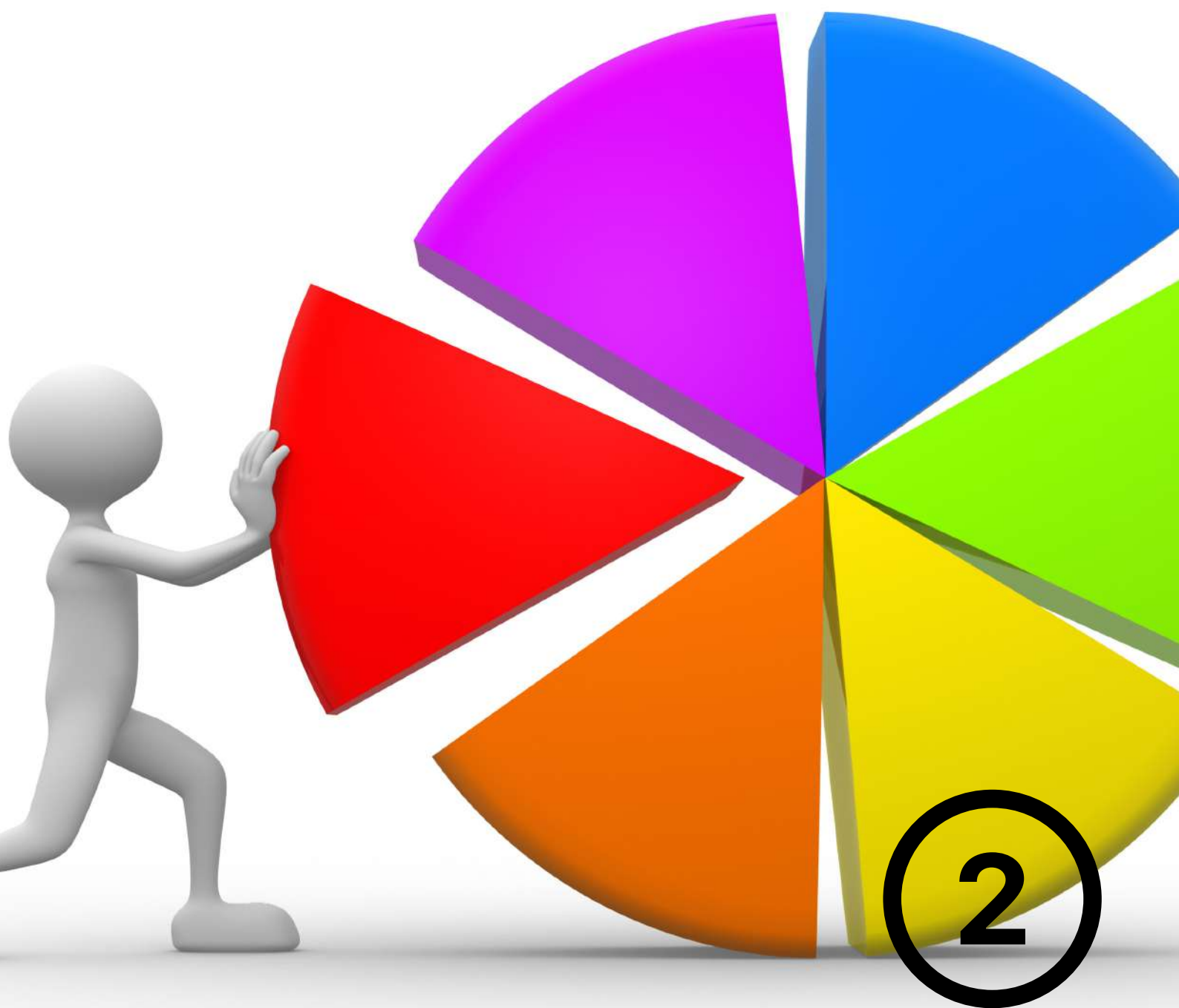
PIE
CHARTS

Pie Chart 2

2.a) What is a Pie Chart?
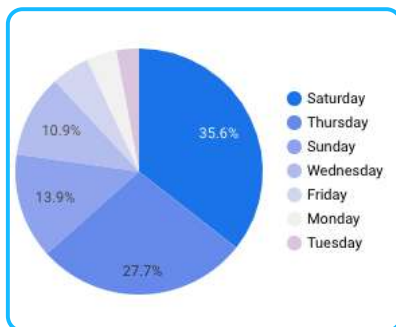
Pie charts are representations of datasets in the shape of a circle with slices. It usually represents data in the form of parts as how much each part contributes to the whole. Here parts are represented as slices. In general , it is termed as 'part-to-whole' representation of datasets.
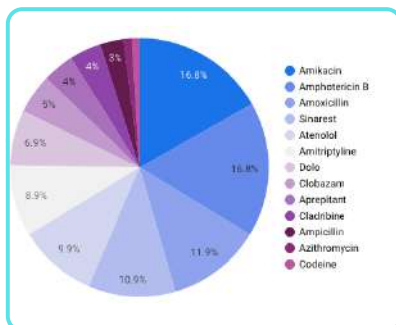
2.a.i) What type of data can be used to create Pie Charts?

Pie charts can be created for datasets having categorical variables and metric values.

2.b) When to use a Pie Chart?

1. Pie charts can be used to show which categories of a variable have the highest and lowest contribution. In other words pie charts are used to show which categories of a categorical variable have been distributed largest and lowest.
2. Pie charts can be used to show how much each category contributes in a categorical variable to the whole result.

2.c) Business Problems

- -

i) EXAMPLE 1: Medicine Sales in a Pharmacy (HEALTH SECTOR)

In a pharmacy , the variable date_of_purchase has been taken into consideration. Using a pie chart, the day of a week in which maximum and minimum sales has occurred can be estimated which would help the store to make necessary arrangements to refill the stock and also attend the customers more efficiently by avoiding staff to take leave on those days. Here, Date_of_purchase has been taken as the dimension and record count has been taken as the metric.

	Date of purchase (Day of…	Record Count ▼
1.	Saturday	36
2.	Thursday	28
3.	Sunday	14
4.	Wednesday	11
5.	Friday	5
6.	Monday	4
7.	Tuesday	3
		1 - 7 / 7 ‹ ›

DATA STUDIO IMPLEMENTATION FOR PIE CHART

i) EXAMPLE 1: Medicine Sales in a Pharmacy (HEALTH SECTOR)

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2.c) Business Problems

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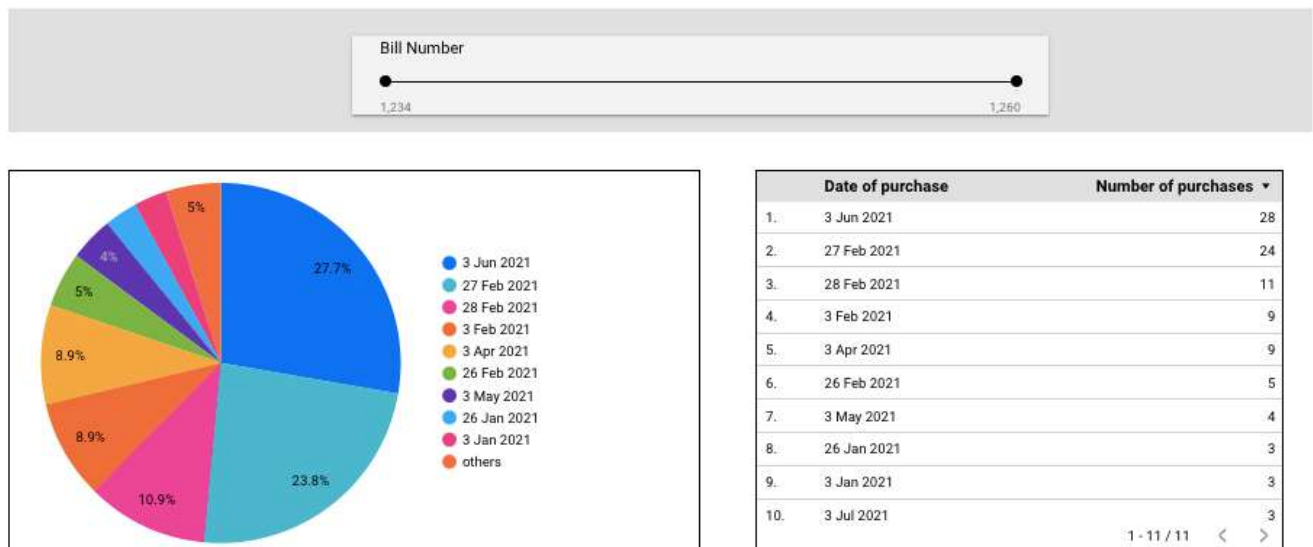
ii) EXAMPLE 2: Medicine Sales in a Pharmacy (HEALTH SECTOR)

In a pharmacy, a pie chart has been used to see as which medicine has been sold the most and has contributed the most to the total profit and which medicines have been sold the least and also we can see which medicines are also contributing subsequently to the profit.

	Date of purchase (Day of...	Record Count ▾
1.	Saturday	36
2.	Thursday	28
3.	Sunday	14
4.	Wednesday	11
5.	Friday	5
6.	Monday	4
7.	Tuesday	3
		1 - 7 / 7 〈 〉

DATA STUDIO IMPLEMENTATION FOR PIE CHART

ii) EXAMPLE 2: Medicine Sales in a Pharmacy (HEALTH SECTOR)

Legend:
- Bangalore Rural (Lok Sabha constituency)
- Bangalore South (Lok Sabha constituency)
- Chamarajanagar (Lok Sabha constituency)
- Chikballapur (Lok Sabha constituency)
- Bagalkot (Lok Sabha constituency)
- Belgaum North (Lok Sabha constituency)
- Bidar (Lok Sabha constituency)
- Chitradurga (Lok Sabha constituency)
- Bangalore North (Lok Sabha constituency)
- others

Pie values: 5.8%, 5.8%, 5.8%, 5.8%, 5.5%, 5.5%, 5.5%, 5.5%, 5.4%, 49.5%

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2.c) Business Problems

----

iii) EXAMPLE 3: State's Constituency (PUBLIC SECTOR)

Data about Karnataka State's constituency has been taken in which the data shows how much each constituency has allocated seats for each Gender(Male, Female, Others).
Left side Pie chart shows how much each constituency has allocated seats in "Lok Sabha" for 'Others' and the Right side pie chart show how many seats has been allocated for Women.
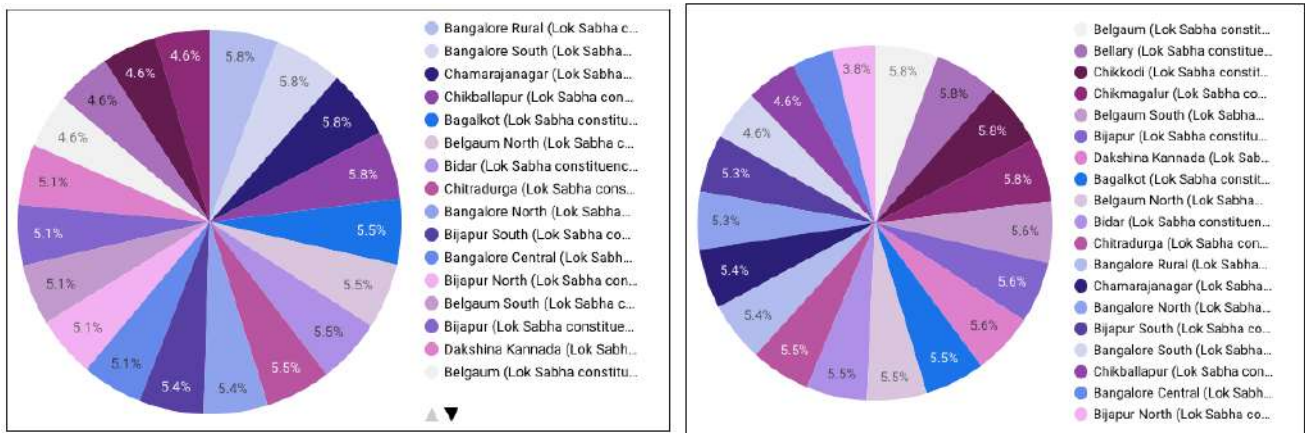
DATA STUDIO IMPLEMENTATION FOR PIE CHART

iii) EXAMPLE 3: State's Constituency (PUBLIC SECTOR)

③

BAR
CHARTS
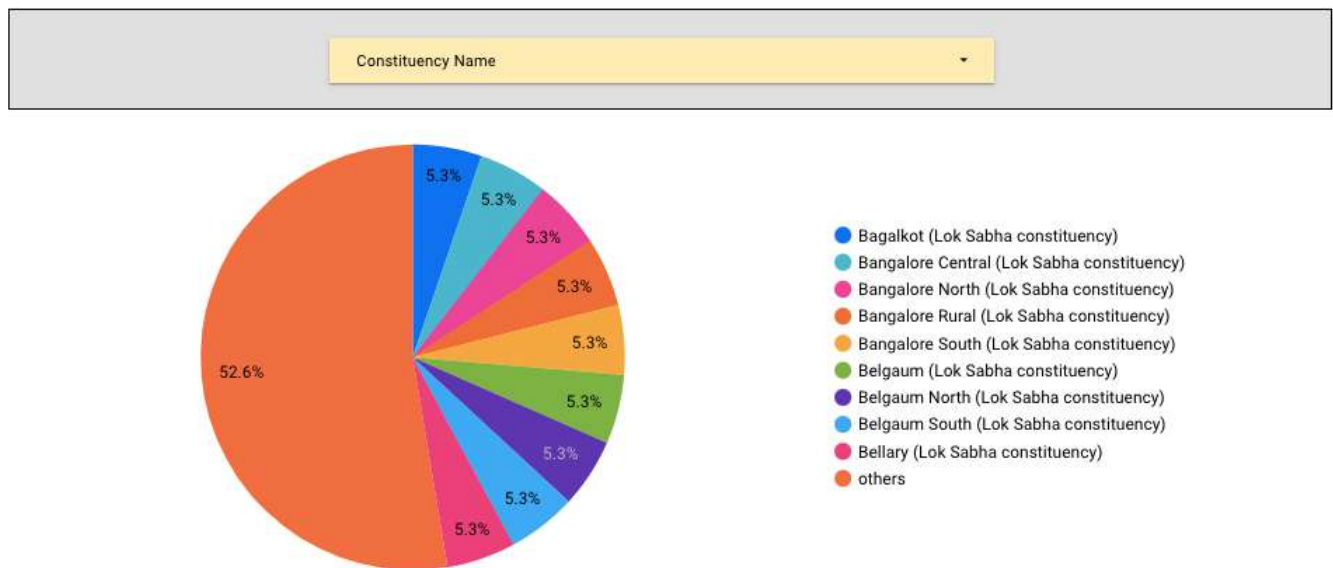
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Bar Chart 3

3.a) What is a Bar Chart

A Bar Chart is a Graphical Representation which is used to represent any categorical data in a relative manner to the values they represent. It usually contains Rectangular structures or bars to represent data. The bars can be plotted Horizontally or Vertically. When Bars are plotted vertically, it is known as Column Chart.
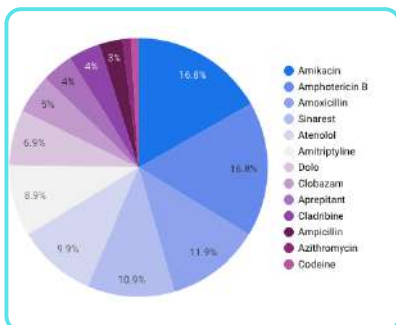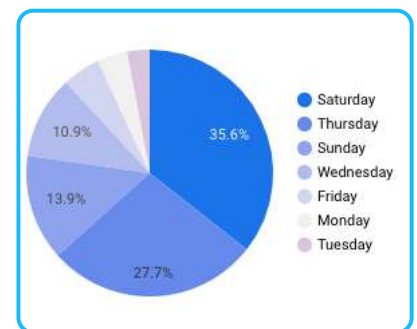
3.a.i) What type of data can be used to create Bar Charts

Bar charts can be created for datasets having categorical variables and metric values.

3.b) When to use a Bar Chart

1. It can be used to show the Comparison between Groups and Sub Groups of Data

2. It can be used to show the distribution of data points for a particular variable.
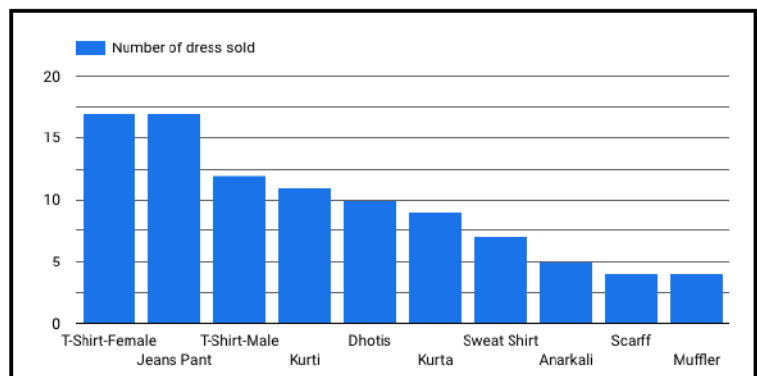
3.c) Business Problems

- -

i) Example 1: Dress Sales in a Clothing store (BUSINESS PROBLEM)

In a Clothing store, Data about purchase of clothes for two weeks has been taken. In this case, with the help of a bar graph, the store can come to know about the liking of the customers to that store, like what type of dress is most likely to be chosen by the customers. Here the dimension is Dress and the measure is the record count of each dress respectively.

	Dress	Number of dress sold ▾
1.	T-Shirt-Female	17
2.	Jeans Pant	17
3.	T-Shirt-Male	12
4.	Kurti	11
5.	Dhotis	10
6.	Kurta	9
7.	Sweat Shirt	7
8.	Anarkali	5
9.	Scarff	4
10.	Muffler	4
11.	Ghagra Choli	3

1 - 13 / 13   <   >

DATA STUDIO IMPLEMENTATION FOR BAR CHART

i) Example 1: Dress Sales in a Clothing store (BUSINESS PROBLEM)
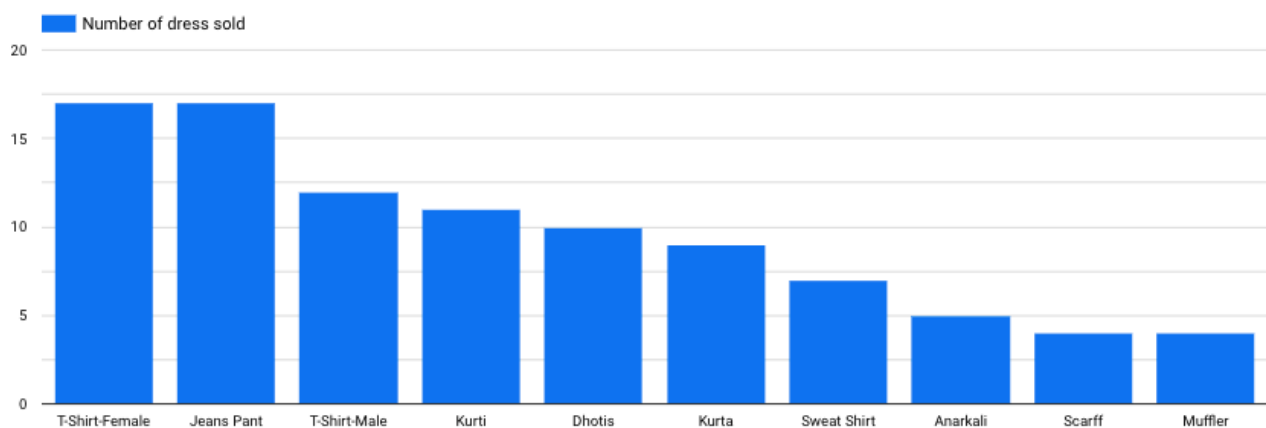
3.c) Examples of Business Problems for Bar Chart:

- -

ii) Example 2: Medicine Sales in Pharmacy (HEALTH SECTOR)

Bar graphs can be used to estimate the requirements and do the production of dresses accordingly. Like here, after knowing the most moving dresses and sizes, unnecessary production of unchosen dresses can be limited, which would save some resources and also reduce unnecessary production costs. In, the dimension is dress/dress type and the measure is the record count of those dresses sold respectively.

	Medicine Name	Medicine Name ▼
1.	Amikacin	17
2.	Amphotericin B	17
3.	Amoxicillin	12
4.	Sinarest	11
5.	Atenolol	10
6.	Amitriptyline	9
7.	Dolo	7
8.	Clobazam	5
9.	Aprepitant	4

1 - 13 / 13   ‹   ›
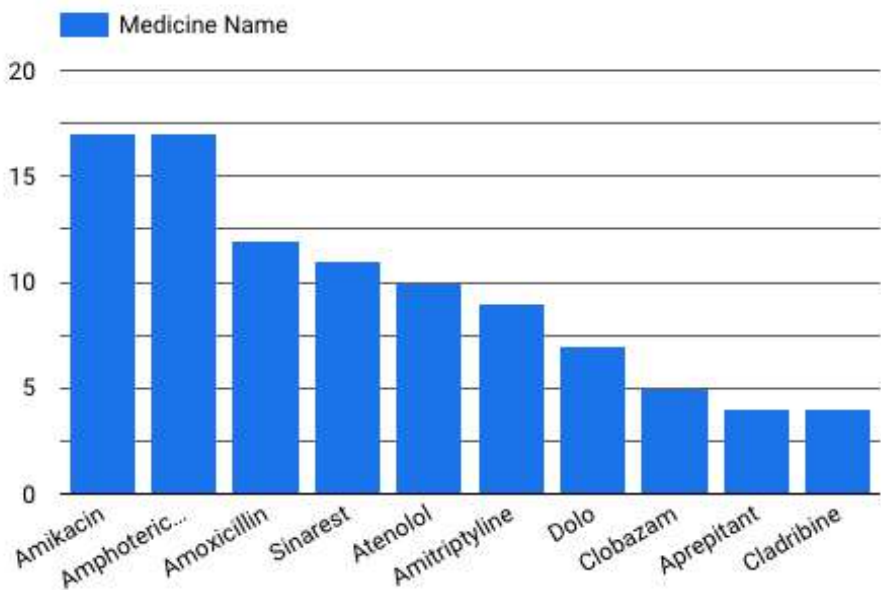
DATA STUDIO IMPLEMENTATION FOR BAR CHART

ii) Example 2: Medicine Sales in Pharmacy (HEALTH SECTOR)

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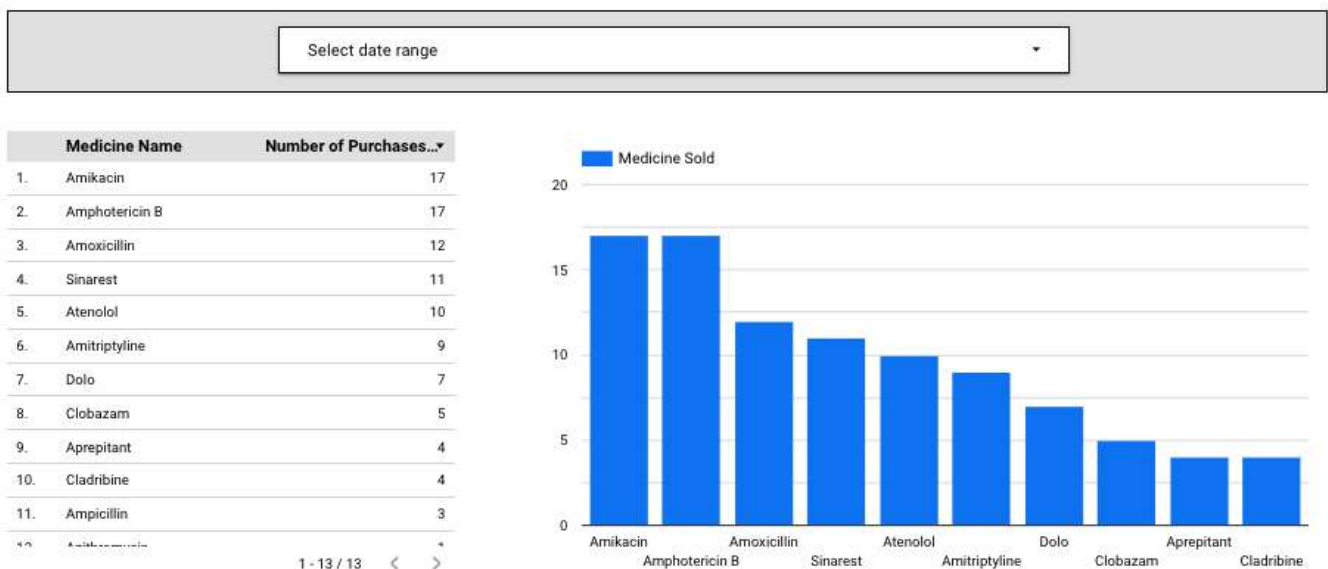
3.c) Examples of Business Problems for Bar Chart:

iii) Example 3: Survey on Drug Usage and Depression (HEALTH SECTOR)

Data contains the survey about people where information like tendency to have depression, drug usage and suicidal thoughts have been taken as data. The record counts of the answers have been taken as the KPI. Bar graph requires data which has categorical variables. This data mostly has categorical variables and thus the bar graph can be efficiently used in this case.

Graph on the left shows the comparison of count between people having/not having suicidal thoughts.After seeing the comparison between the counts of people having suicidal thoughts, it can be used to see as in which age people counter this thought more likely using the breakdown dimension. Here the dimension is age and the breakdown dimension is suicidal thoughts, the measure is the count of people having suicidal thoughts or not.

	Suicidal Thoughts	Suicidal Thoughts ▾
1.	No	73
2.	Yes	50

1 - 2 / 2 　〈　〉

	Age	Number of people...▾
1.	19	29
2.	20	27
3.	18	19
4.	17	7
5.	29	7
6.	22	6
7.	23	5
8.	11	4

1 - 19 / 19 　〈　〉
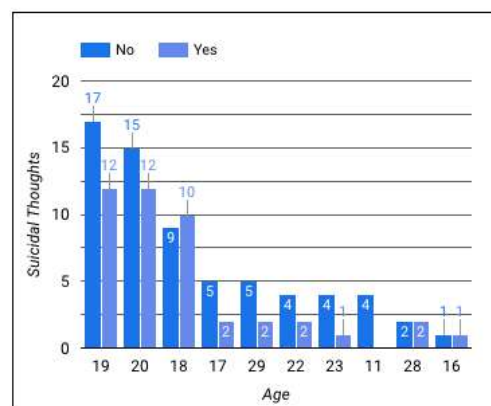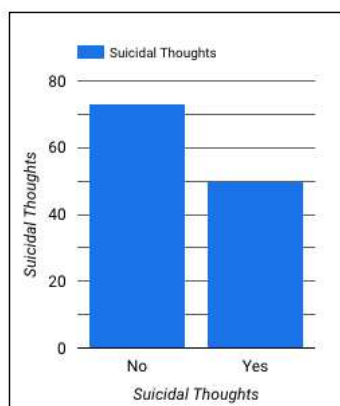
DATA STUDIO IMPLEMENTATION FOR BAR CHART

iii) Example 3: Survey on Drug Usage and Depression (HEALTH SECTOR)

④

GEO
CHARTS
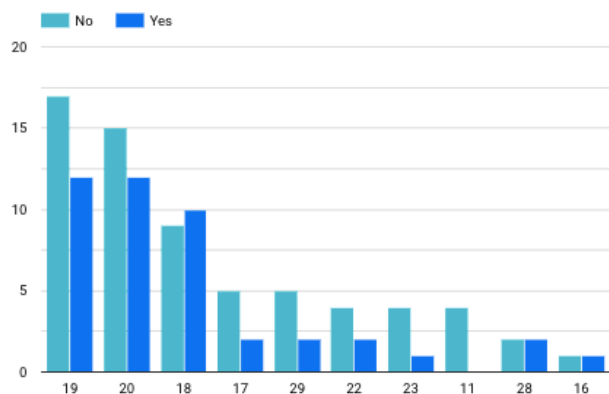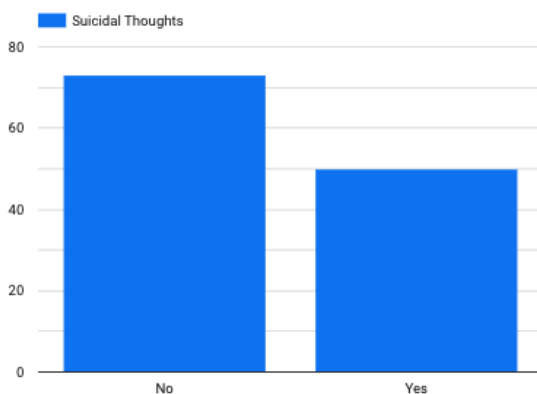
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Geo Chart 4

4.a) What is a Geo Chart

- A geochart is a map of a country or a place with areas identified as different colours.
- The type of geographic dimension selected for a chart determines how your data will be organized on the map.
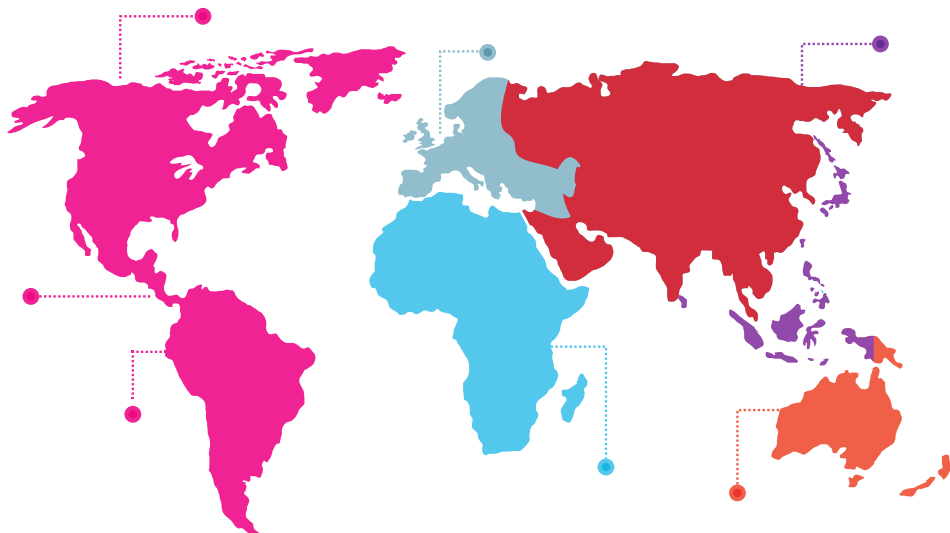
4.a.i) What type of data can be used to create Geo Charts

Geo charts can be created for datasets having Location Data such as Country, Region, City etc

4.b) When to use Geo Chart

We use a Geo chart to identify or show a map of a Country, State, or Region.

4.c) Business Problems

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i) Example 1: Cases and Deaths Recorded due to Covid (HEALTH SECTOR)

Here, We consider A Very simple use case: The data shows the Cases and Deaths recorded due to COVID-19.

	Country ▼	Cases	Deaths
1.	Zambia	86993	1187
2.	Venezuela	152508	1511
3.	Uzbekistan	81678	623
4.	Uruguay	86007	827
5.	United States	30639651	556895
6.	United Kingdom	4307304	126284
7.	United Arab Emirat...	446594	1456
8.	Ukraine	1579906	30773
9.	Turkey	3061520	30316
10.	Tunisia	246507	8610
11.	Switzerland	588118	10254
		1 - 100 / 100 < >	

DATA STUDIO IMPLEMENTATION FOR GEO CHART

i) Example 1: Cases and Deaths Recorded due to Covid (HEALTH SECTOR)
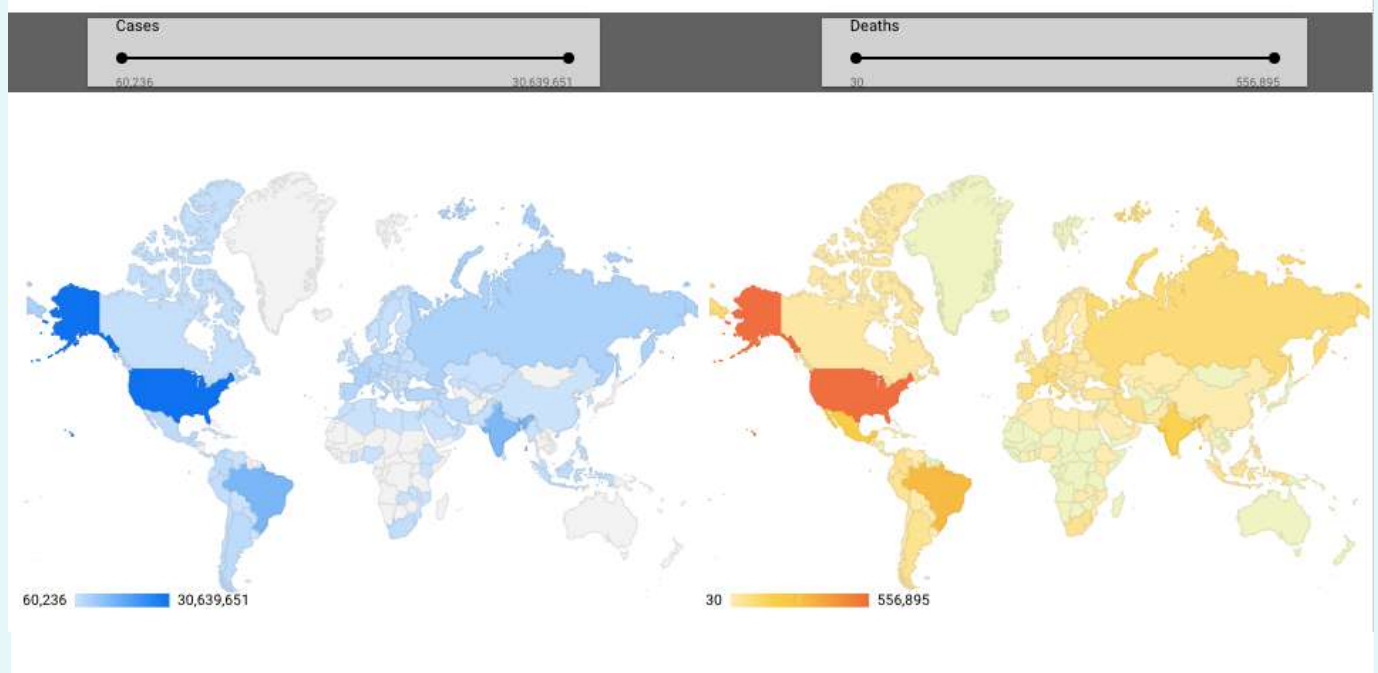
4.c) Business Problems

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ii) Example 2: Petrol Prices (ENERGY SECTOR)

Next we Consider the Data showing the Price of Petrol in Different Parts of the World. Below, Dimension is country
Metric is the price.

	Country ▼	Previous	Unit
1.	Zimbabwe	1.21	USD/Liter
2.	Vietnam	0.71	USD/Liter
3.	Venezuela	0.02	USD/Liter
4.	Uruguay	1.38	USD/Liter
5.	United States	0.62	USD/Liter
6.	United Kingdom	1.63	USD/Liter
7.	United Arab Emirates	0.49	USD/Liter
8.	Ukraine	0.86	USD/Liter
9.	Turkey	0.99	USD/Liter
10.	Trinidad And Tobago	0.34	USD/Liter
11.	Thailand	1	USD/Liter
12.	Tanzania	0.79	USD/Liter

1 - 96 / 96   〈   〉

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DATA STUDIO IMPLEMENTATION FOR GEO CHART

ii) Example 2: Petrol Prices (ENERGY SECTOR)
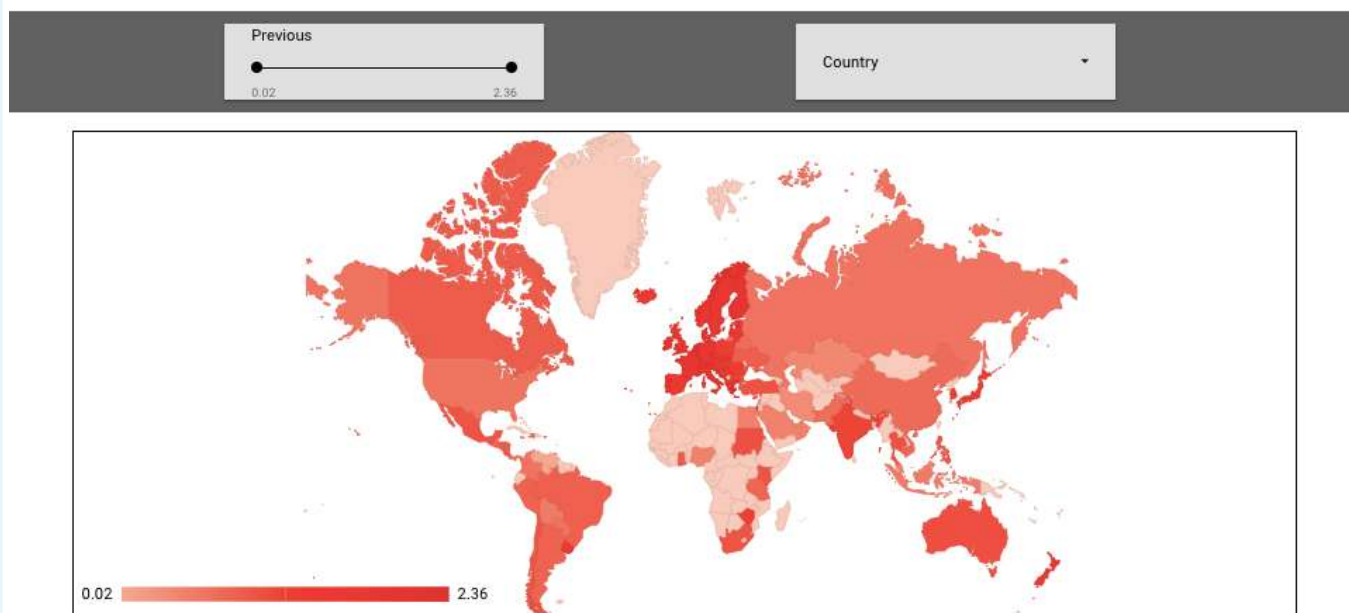
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4.c) Business Problems

- -

iii) Example 3: Energy Consumption (ENERGY SECTOR)

We consider the amount of energy (In Watts) consumed in
different parts of the world. Below ,Dimension is Country,
Metrics is Energy.

	Country/Territory ▼	W
1.	Zimbabwe	1017.2
2.	Zambia	835.9
3.	Yemen	396.6
4.	Vietnam	907.2
5.	Venezuela	3553
6.	Uzbekistan	2041.1
7.	Uruguay	1652.1
8.	United States	9538.8
9.	United Kingdom	4332.5
10.	United Arab Emirates	11012.6
11.	Ukraine	3787.7
12.	Turkmenistan	5626.3

1 - 100 / 137   <   >

DATA STUDIO IMPLEMENTATION FOR GEO CHART

iii) Example 3: Energy Consumption (ENERGY SECTOR)

5

AREA
CHARTS
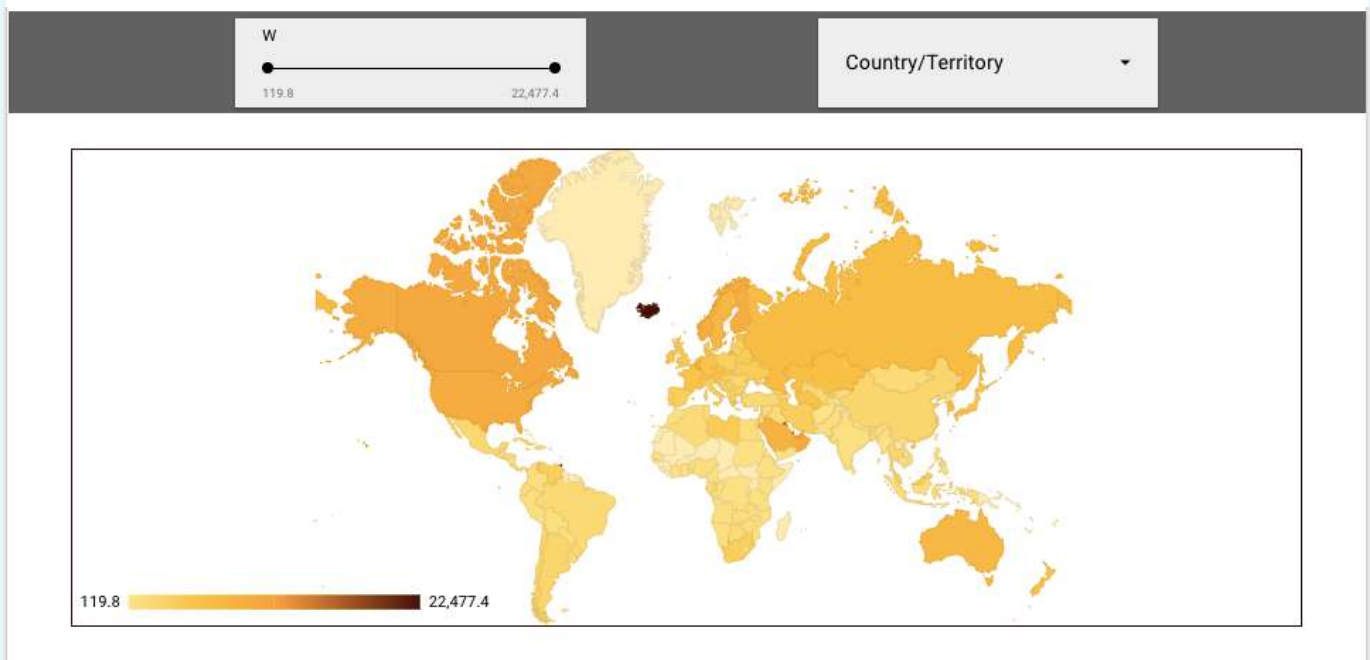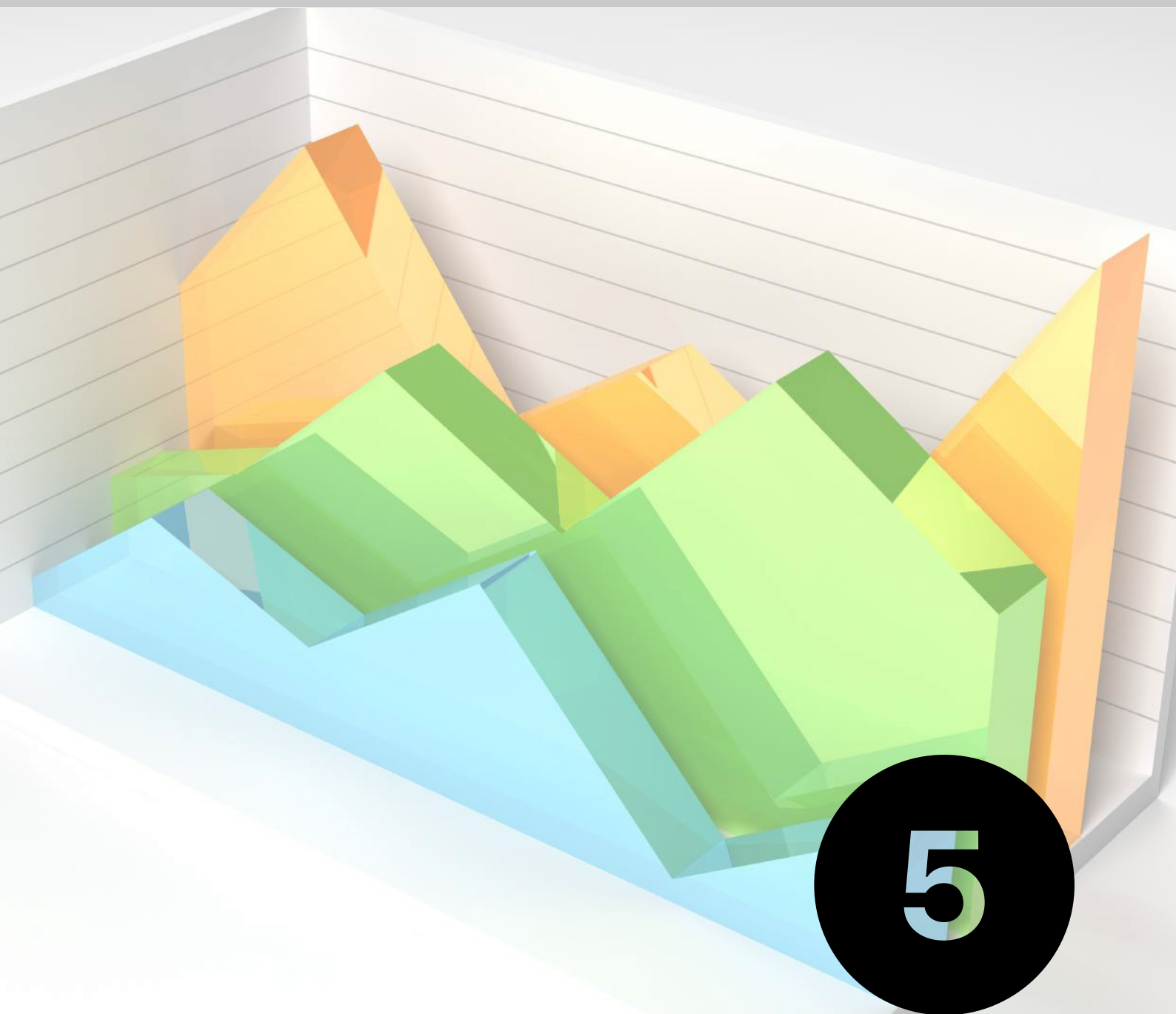
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Area Chart 5

5.a) What is an Area Chart

Area Chart is a representation of data with the shading between line and baseline showing the variation in data through the change in position/shape of the line. It is a combination of bar graph and line graph. When there are two variables having series of data to be compared, area charts can be used. Area charts can be used to see the change in data along with the progression of another value(like days, years).

5.a.i) What type of data can be used to create Area Charts

Data which has a progressive variable (like date, year, increasing numbers,etc.) along with which one or more variables have changing values(numeric values) can be used to create Area Charts.
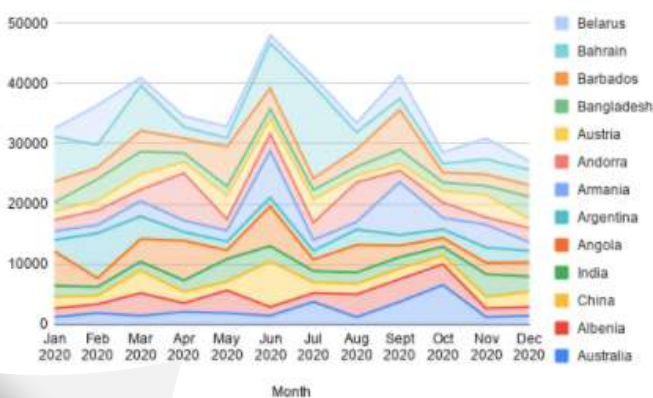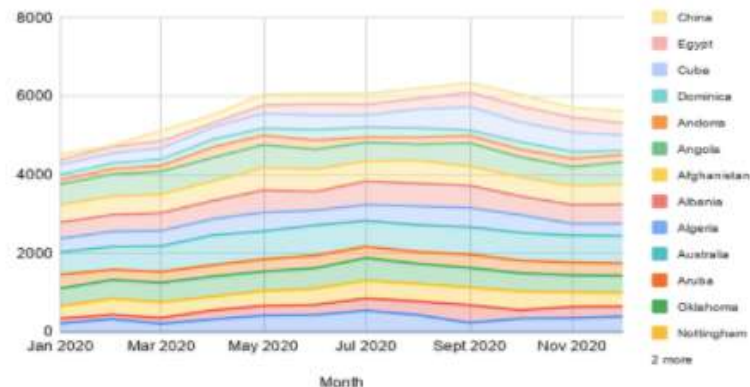
5.b) When to use an Area Chart

Area charts are usually used when there is comparison between groups i.e series of data or to represent how a whole is divided into component parts.

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5.c) Types of Area Charts :

• Overlapping Area Charts:

When comparison between changes in two or more non-categorical(series) variables relative to the change in a proportional value has to be done, Overlapping area 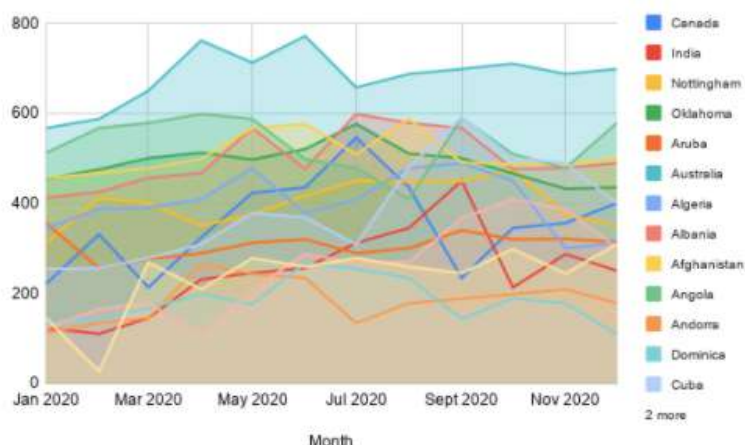charts can be used. These charts have lines for each variable in which each line is a connector of data points of that variable and has shading from the baseline to that line respectively. Each line has different shading and also becomes slightly transparent in the places where the shading of lines meet, in order to show every line clearly.

• Stacked Area Charts:

When area charts are taken, usually stacked area charts are most commonly implemented. In an overlapping area chart, each line starts from its own vertical value, whereas in a stacked area chart, after one line is being plotted, this line is taken as the base line for the next line's vertical value. Thus, the most recently plotted line serves as the moving baseline. Thus the topmost stacked line will be the total when summing across all groups.
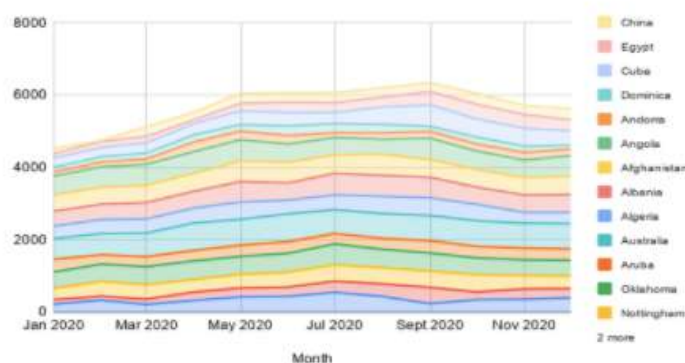
5.d) Business Problems

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i) Example 1: Medical Checkups done in Countries (HEALTH SECTOR)

Data about how much each country has been doing medical checkups for people in each month has been taken. In this case, an overlapping Area Chart has been taken to see the data points(medical check up count of each month) of each country. Here the dimension is Month and metrics are the values(in series) of each month.

	Month ▼	Albania	Aruba	India	Egypt	Nottingh...	Angola	Afgh...
1.	Sept 2020	567	340	450	367	449	589	490
2.	Oct 2020	476	320	213	409	475	509	487
3.	Nov 2020	478	321	287	387	375	478	487
4.	May 2020	567	312	245	209	375	587	567
5.	Mar 2020	456	276	145	178	400	578	478
6.	Jun 2020	476	320	256	287	416	498	576
7.	Jul 2020	598	289	312	268	450	478	509
8.	Jan 2020	413	256	123	123	312	512	456

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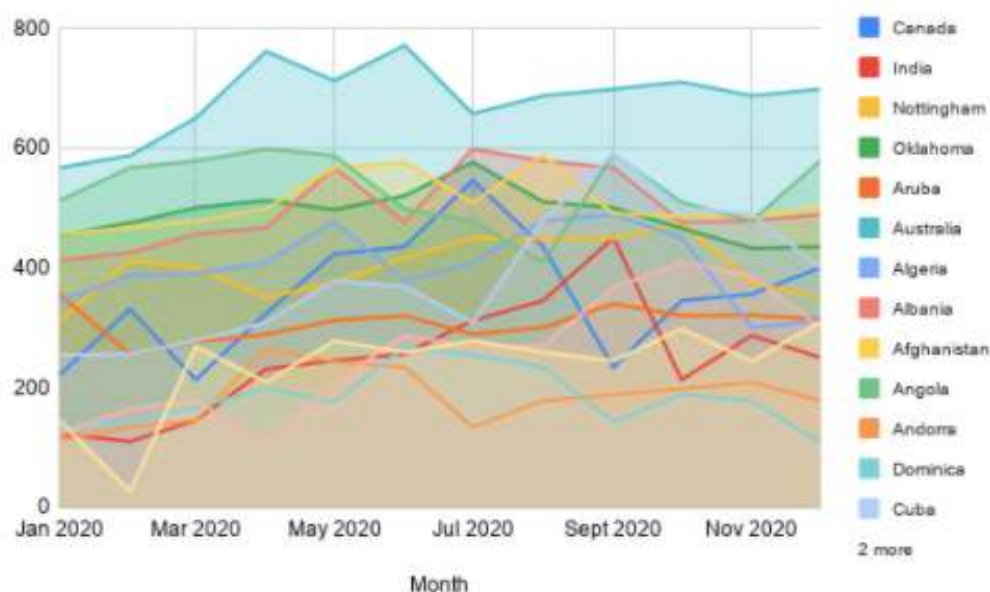
DATA STUDIO IMPLEMENTATION FOR AREA CHART

i) Example 1: Medical Checkups done in Countries (HEALTH SECTOR)
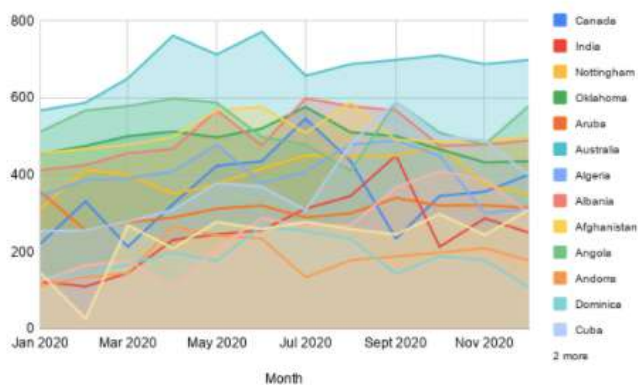
Month	Apr 2020	May 2020	Jun 2020 ▾	Aug 2020
1. Australia	761	712	771	687
2. Afghanistan	498	567	576	587
3. Oklahoma	512	497	520	510
4. Angola	598	587	498	409
5. Albania	467	567	476	578
6. Canada	324	423	435	435
7. Nottingham	350	375	416	448
8. Algeria	409	478	378	478
9. Cuba	309	378	369	480
10. Aruba	289	312	320	300
11. Egypt	109	209	287	269

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5.d) Business Problems

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ii)Example 2: Medical Checkups done in Countries (HEALTH SECTOR)

In this case, a stacked area chart can be used to see how much each country has contributed to the sum of whole number of medical checkups taken in a year.This chart shows that "Australia" has contributed the most to the total number of medical checkups taken. Here, the dimension is Month and the metrics are the series of variables containing numeric data depicting the number of medical checkups each country has done in each month.

Month	Canada	Aust...	Andor...	Aruba	Algeria	Albania	Afghani...
1. Aug 2020	435	687	178	300	478	578	587
2. Jun 2020	435	771	234	320	378	476	576
3. May 2020	423	712	243	312	478	567	567
4. Jul 2020	546	657	134	289	409	598	509
5. Dec 2020	400	698	178	314	312	489	499
6. Apr 2020	324	761	265	289	409	467	498
7. Sept 2020	234	698	188	340	489	567	490
8. Oct 2020	345	710	198	320	450	476	487
9. Nov 2020	356	687	209	321	300	478	487
1. Mar 2020	213	650	145	276	390	456	478

1 - 12 / 12   ‹   ›
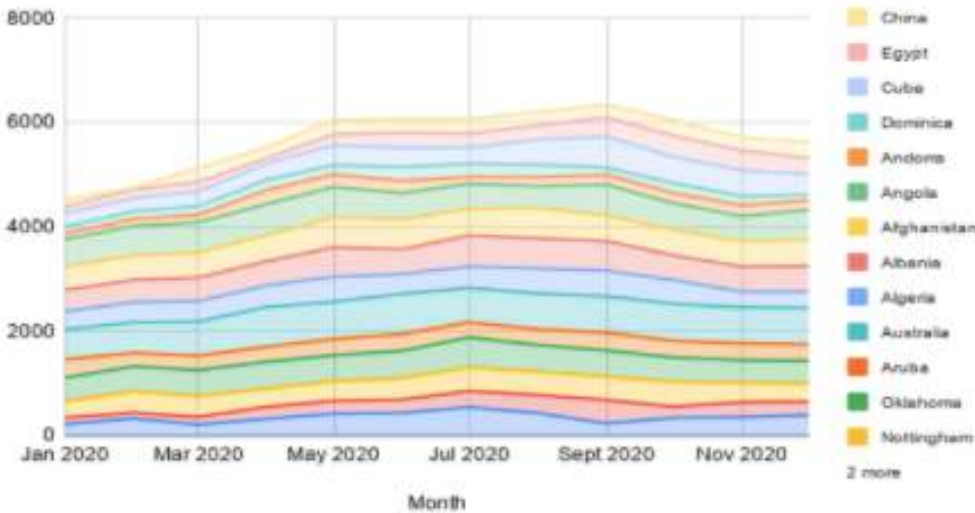
DATA STUDIO IMPLEMENTATION FOR AREA CHART

ii)Example 2: Medical Checkups done in Countries (HEALTH SECTOR)

	Month	China...▾	Egypt	Cuba	Dominica	Andorra	Angola
1.	Dec 2020	309	300	400	109	178	578
2.	Oct 2020	298	409	500	189	198	509
3.	May 2020	278	209	378	176	243	587
4.	Jul 2020	278	268	308	254	134	478
5.	Mar 2020	269	178	278	167	145	578
6.	Jun 2020	259	287	369	267	234	498
7.	Aug 2020	259	269	480	234	178	409
8.	Sept 2020	245	367	590	143	188	589
9.	Nov 2020	244	387	489	178	209	478
1...	Apr 2020	209	109	309	198	265	598

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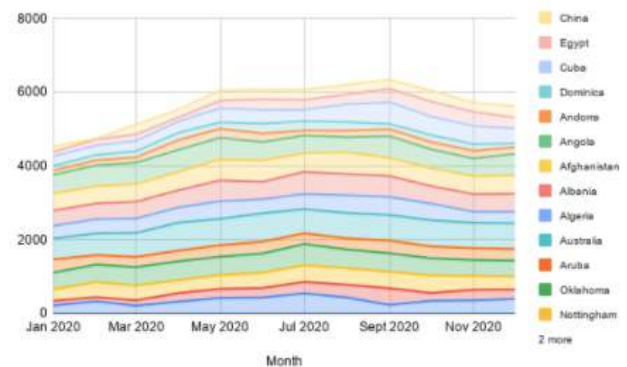
5.d) Business Problems

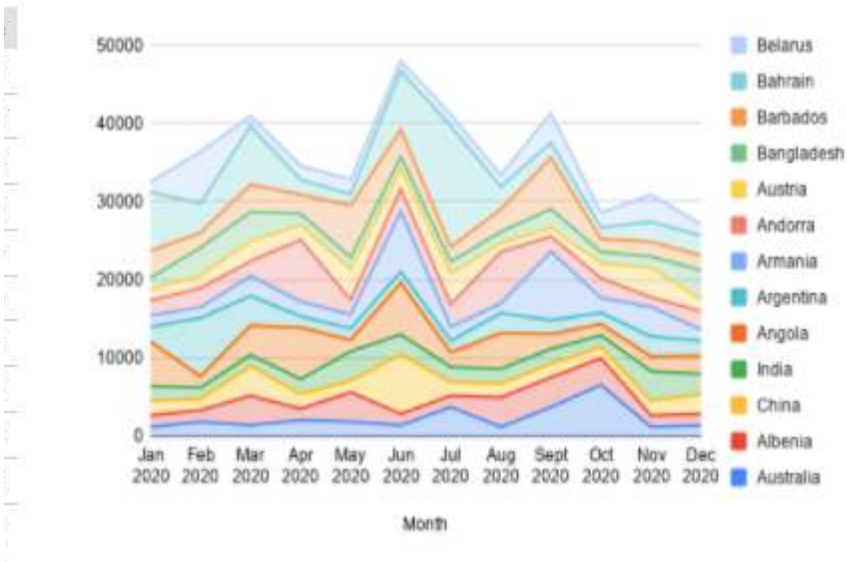
iii) Example 3: Military Expenditure by various Countries' Governments (PUBLIC SECTOR)

Data about how much each country's Government has been spending for the military expenses has been taken as data. Here, a stacked area chart is used to visualise which Government has been spending more in the last year.

Month	Bangladesh	Angola	India	China	Belarus	Andorra	Albenia	Arge...
1. Feb 2020	3,564	1,450	1,450	1,450	6,587	2,435	1,450	7,465
2. Mar 2020	3,768	3,768	1,450	3,768	1,298	1,890	3,768	3,768
3. Aug 2020	1,450	4,563	1,890	1,767	1,524	6,587	3,768	2,563
4. Nov 2020	1,450	1,898	3,768	1,898	3,454	1,232	1,450	2,543
5. Jan 2020	1,450	5,674	1,890	1,890	1,298	1,898	1,450	1,890
6. Dec 2020	3,768	2,343	2,543	2,543	1,450	2,345	1,450	1,890
7. Sept 2020	2,333	1,898	1,890	1,767	3,768	1,898	3,768	1,767
8. May 2020	1,567	1,450	3,768	1,450	1,898	1,890	3,768	1,456

1 - 12 / 12   〈   〉

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DATA STUDIO IMPLEMENTATION FOR AREA CHART

iii) Example 3: Military Expenditure by various Countries' Governments (PUBLIC SECTOR)

	Month	Albenia ▾	Australia	Belarus	India	China	Armania
1.	Mar 2020	3,768	1,450	1,298	1,450	3,768	2,543
2.	May 2020	3,768	1,898	1,898	3,768	1,450	1,789
3.	Aug 2020	3,768	1,230	1,524	1,890	1,767	1,223
4.	Sept 2020	3,768	3,768	3,768	1,890	1,767	8,790
5.	Oct 2020	3,425	6,587	1,898	1,450	1,450	1,890
6.	Jan 2020	1,450	1,230	1,298	1,890	1,890	1,450
7.	Feb 2020	1,450	1,898	6,587	1,450	1,450	1,345
8.	Apr 2020	1,450	2,098	1,787	1,890	1,890	1,890
9.	Jun 2020	1,450	1,450	1,298	2,543	7,589	7,686
10.	Jul 2020	1,450	3,768	1,450	1,890	1,767	1,789

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6
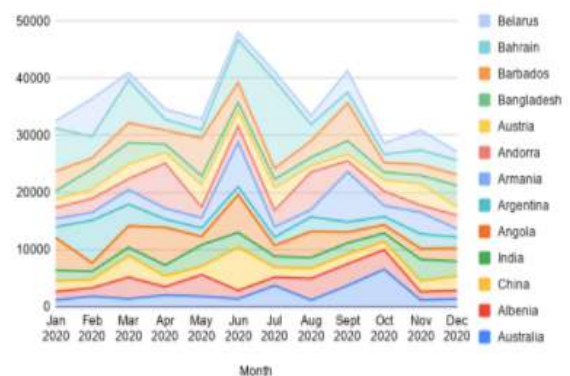
GOOGLE MAP CHARTS

Google Map Chart 6

6.a) What is a Google Map Chart

- Google Maps chart is used to add detailed geographic context to the report.
- There are two types of Google Maps charts available in Data Studio: Filled Map and Bubble Map.
- The Filled Map allows you to plot your data over geographic areas, such as country, state, and ZIP code, appearing as shaded regions on the map.
- The Bubble Map lets you plot data points at specific map coordinates, including latitude/longitude and address.
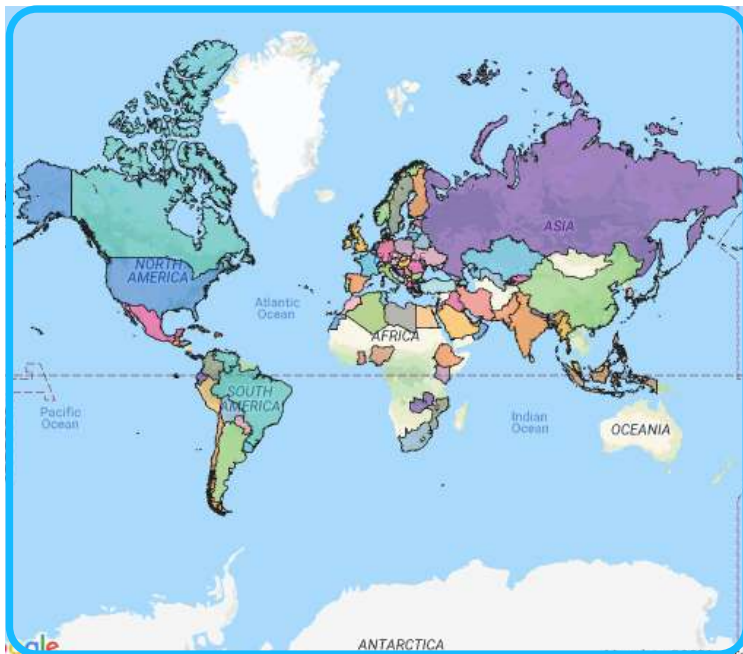
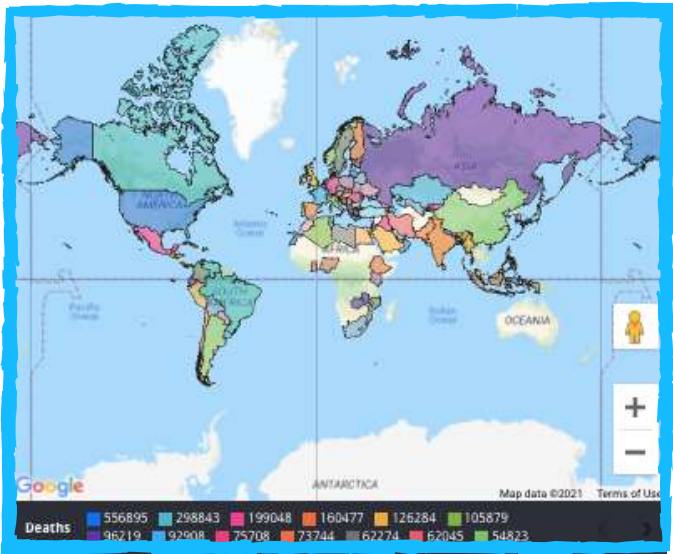
6.b) When to use Google Map chart

- Maps are a versatile tool which helps Visualizing data in a more realistic way.
- Visualising on a map will show spatial relationships in a way that no other chart can.
- The context provided by seeing geographic regions, landmarks, and other features can be vital to understanding patterns in your data.

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6.c) Business Problems

- -

i) Example 1: Cases and Deaths – Covid (HEALTH SECTOR)

Here, We consider A Very simple use case: The data shows the Cases and Deaths recorded due to COVID-19.

DATA STUDIO IMPLEMENTATION FOR GOOGLE MAP CHART

i) Example 1: Cases and Deaths – Covid (HEALTH SECTOR)

6.c) Business Problems

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ii)Example 2: Price of Petrol (ENERGY SECTOR)

Next we Consider the Data showing the Price of Petrol in Different Parts of the World:
Below, Dimension is country and the Metric is the price
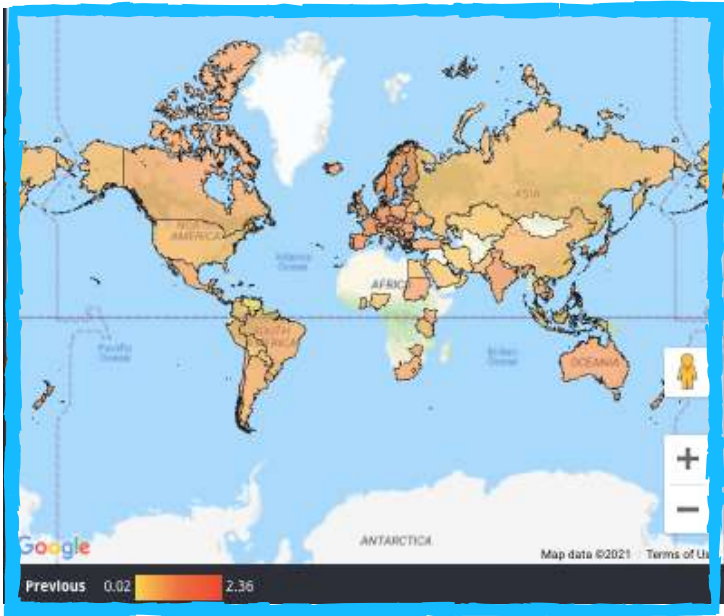
	Country	Record Count ▾
1.	Albania	1
2.	Argentina	1
3.	Australia	1
4.	Austria	1
5.	Azerbaijan	1
6.	Bahrain	1
7.	Belarus	1
8.	Belgium	1
9.	Bolivia	1
10.	Bosnia and Herzegovina	1
11.	Brazil	1
12.	Bulgaria	1
13.	Cambodia	1
14.	Canada	1
15.	Chile	1
16.	China	1

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DATA STUDIO IMPLEMENTATION FOR GOOGLE MAP CHART

ii)Example 2: Price of Petrol (ENERGY SECTOR)

6.c) Business Problems

- -

iii) Example 3: Energy Consumption (ENERGY SECTOR)

We consider the amount of energy (In Watts) consumed in different parts of the world. Below , Dimension is Country and Metric is Energy

DATA STUDIO IMPLEMENTATION FOR GOOGLE MAP CHART

iii) Example 3: Energy Consumption (ENERGY SECTOR)

7

TIME SERIES
CHARTS

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Time Series Chart 7

7.a) What is a Time Series Chart

- It represents data points at successive Intervals of Time
- Each point on the chart corresponds to both a time and a quantity that is being measured.

7.b) When to use Time Series chart

- Time Series is used to Visualise the Trend in the Data over a period of Time.
- Common Examples where Time Series is Plotted are: Ocean Tides, Sales data etc.

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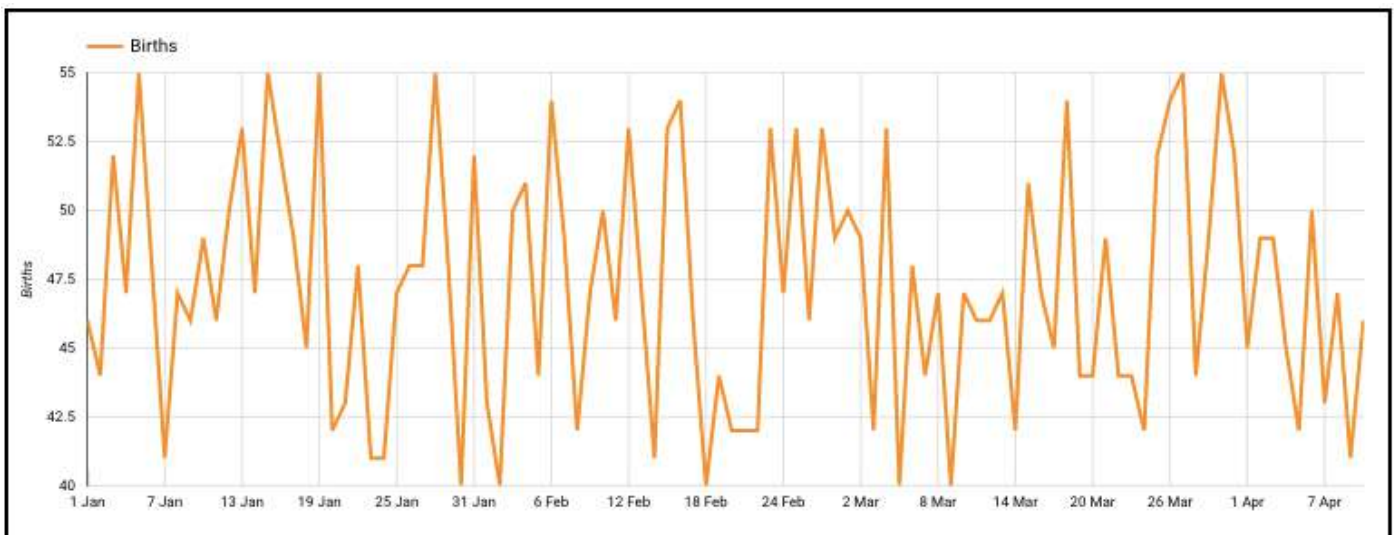
7.c) Business Problems

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i) Example 1: Number of Female Births
(HEALTH SECTOR)

Here, We consider the Number of Female Births per Day in the Year 1959 in California.

	Date ▾	Births
1.	9/4/1959	41
2.	9/3/1959	40
3.	9/2/1959	47
4.	9/1/1959	46
5.	8/4/1959	47
6.	8/3/1959	47

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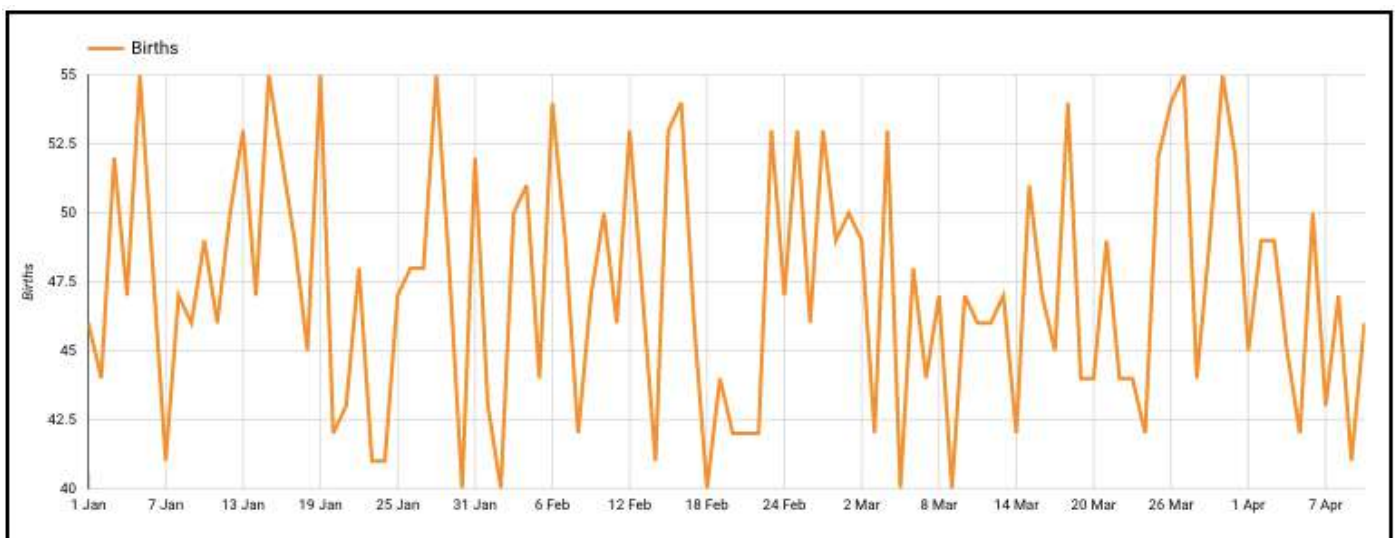
DATA STUDIO IMPLEMENTATION FOR TIME SERIES CHART

i) Example 1: Number of Female Births (HEALTH SECTOR)
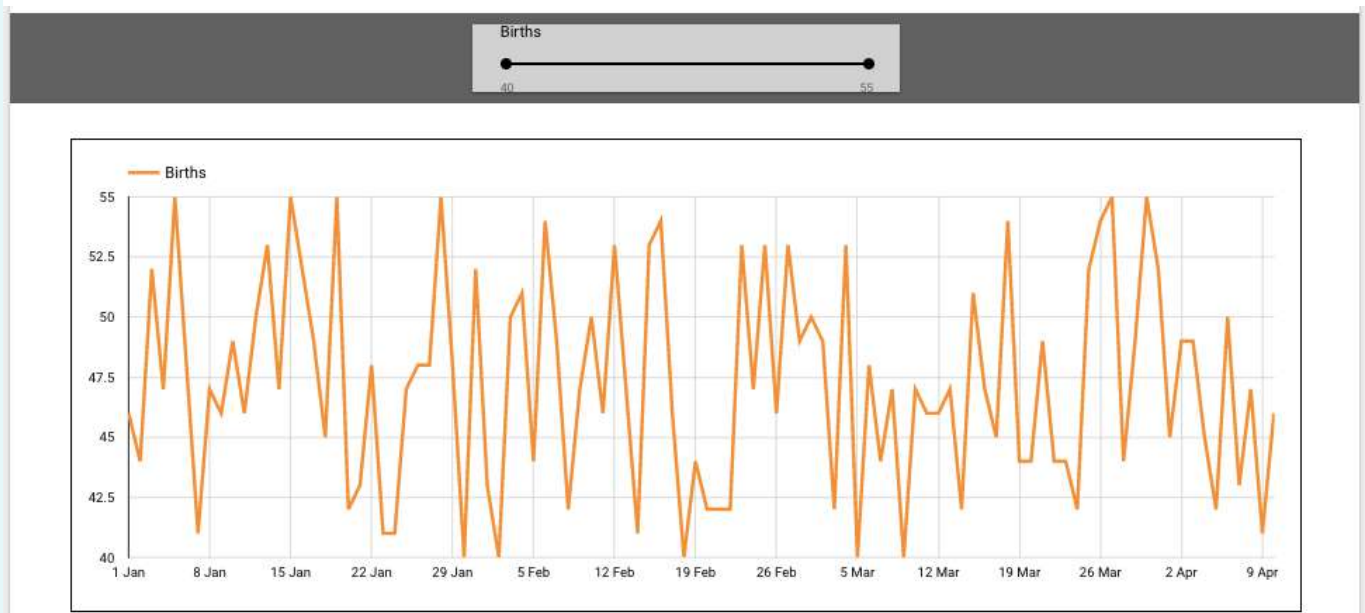
7.c) Business Problems

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ii)Example 2: Number of Covid Cases at
Chennai (HEALTH SECTOR)

Next we Consider the Number of Covid Positive Cases and Deaths recorded at Chennai in the year 2020.

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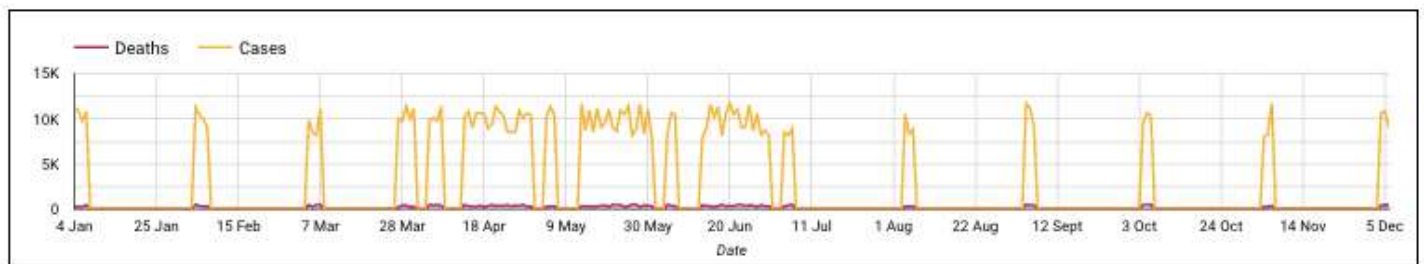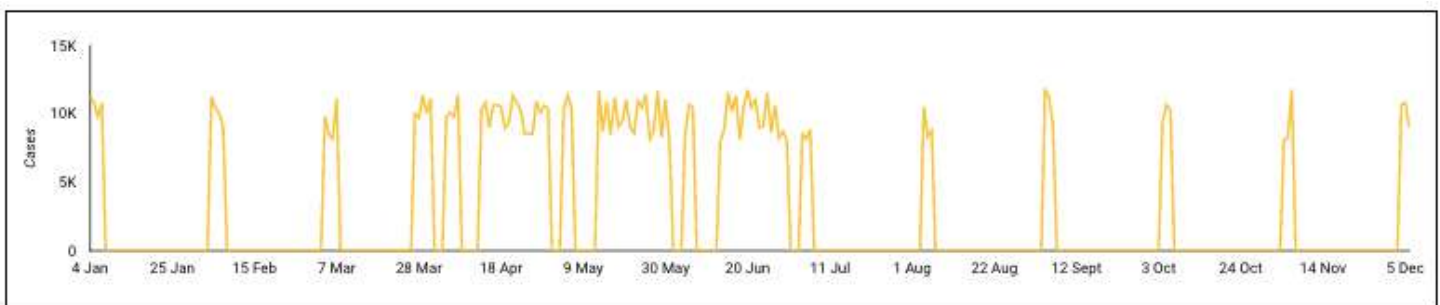
DATA STUDIO IMPLEMENTATION FOR TIME SERIES CHART

ii)Example 2: Number of Covid Cases at Chennai (HEALTH SECTOR)

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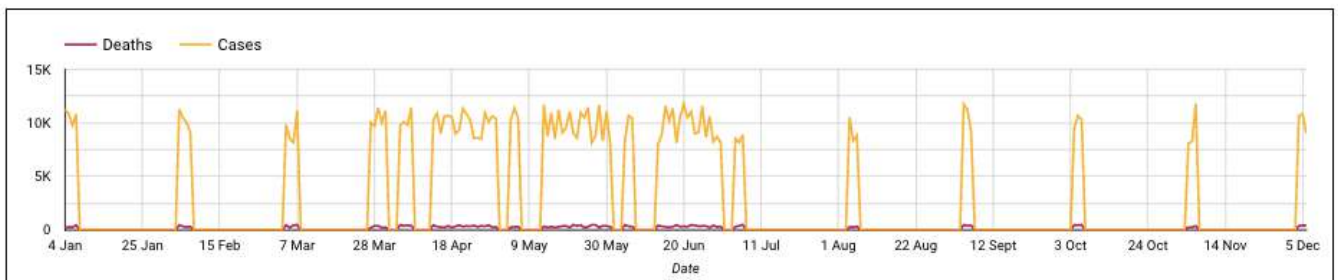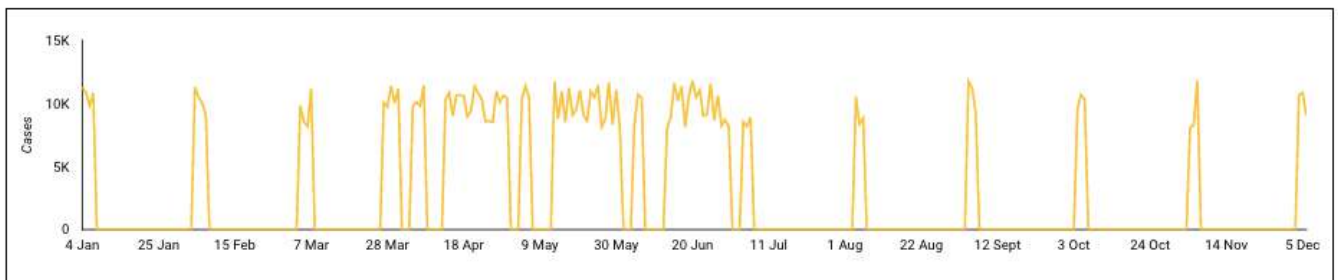
7.c) Business Problems

- -

iii)Example 3: Record of Internet Data used (PUBLIC SECTOR)

We consider the amount of Internet Data(in GB) used in a House per Day.

	Date ▾	Data usage in ...
1.	5 Dec 2021	5
2.	4 Dec 2021	5
3.	3 Dec 2021	6
4.	5 Nov 2021	6
5.	4 Nov 2021	5
6.	3 Nov 2021	3
7.	5 Oct 2021	4
8.	4 Oct 2021	6

1 - 100 / 100   ‹   ›

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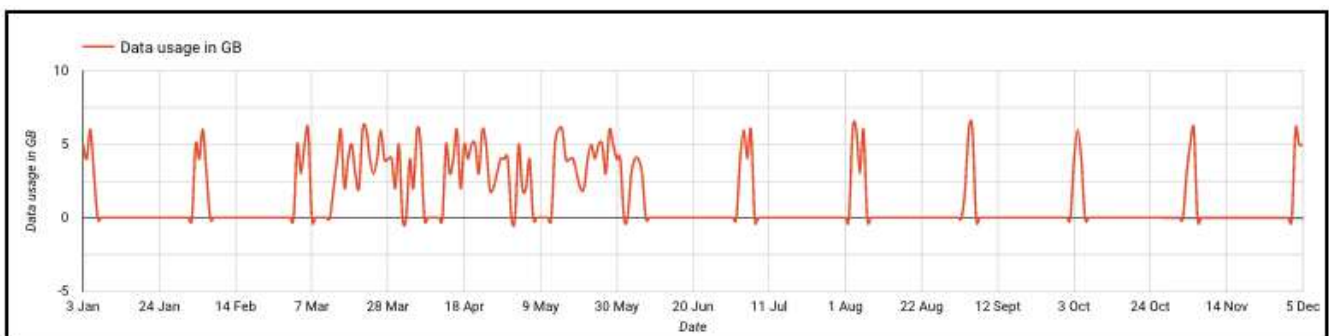
DATA STUDIO IMPLEMENTATION FOR TIME SERIES CHART

iii)Example 3: Record of Internet Data used (PUBLIC SECTOR)

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Remaining Inventory

5 Days Old, 2000

Pink Lady

42 Days Old, 1200

12 Days Old, 700

35 Days Old, 500

42 Days Old, 1200

Braeburn

14 Days Old, 900

Royal Gala

42 Days Old, 700

8

TREE MAP

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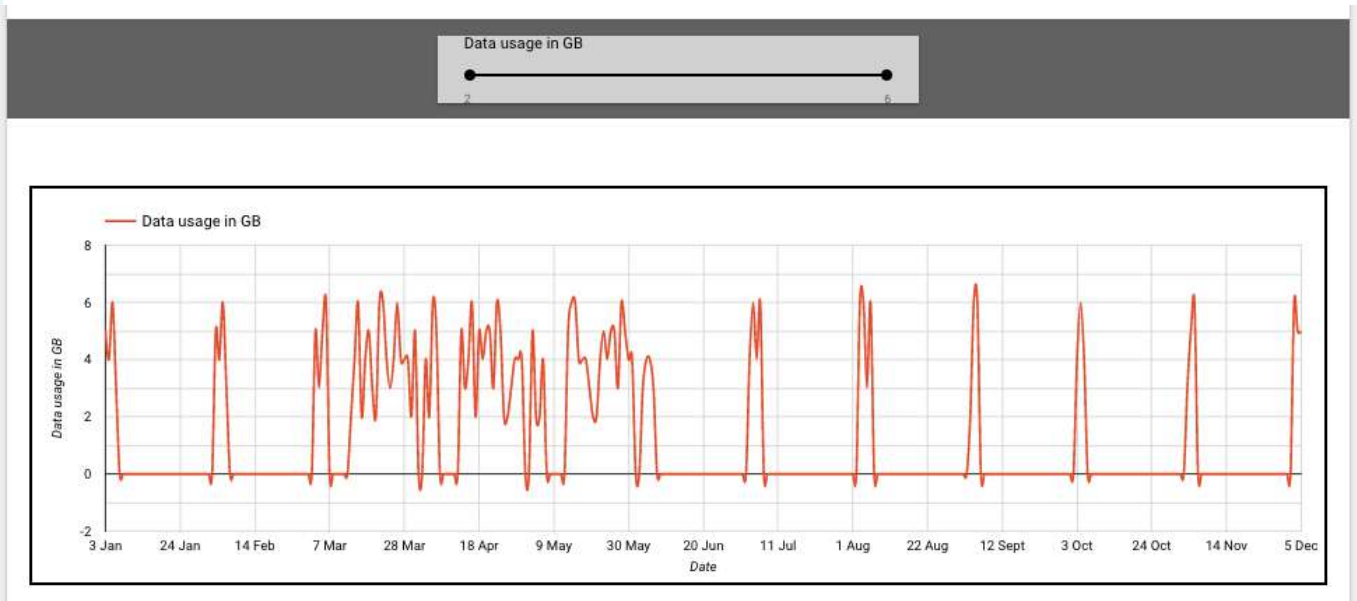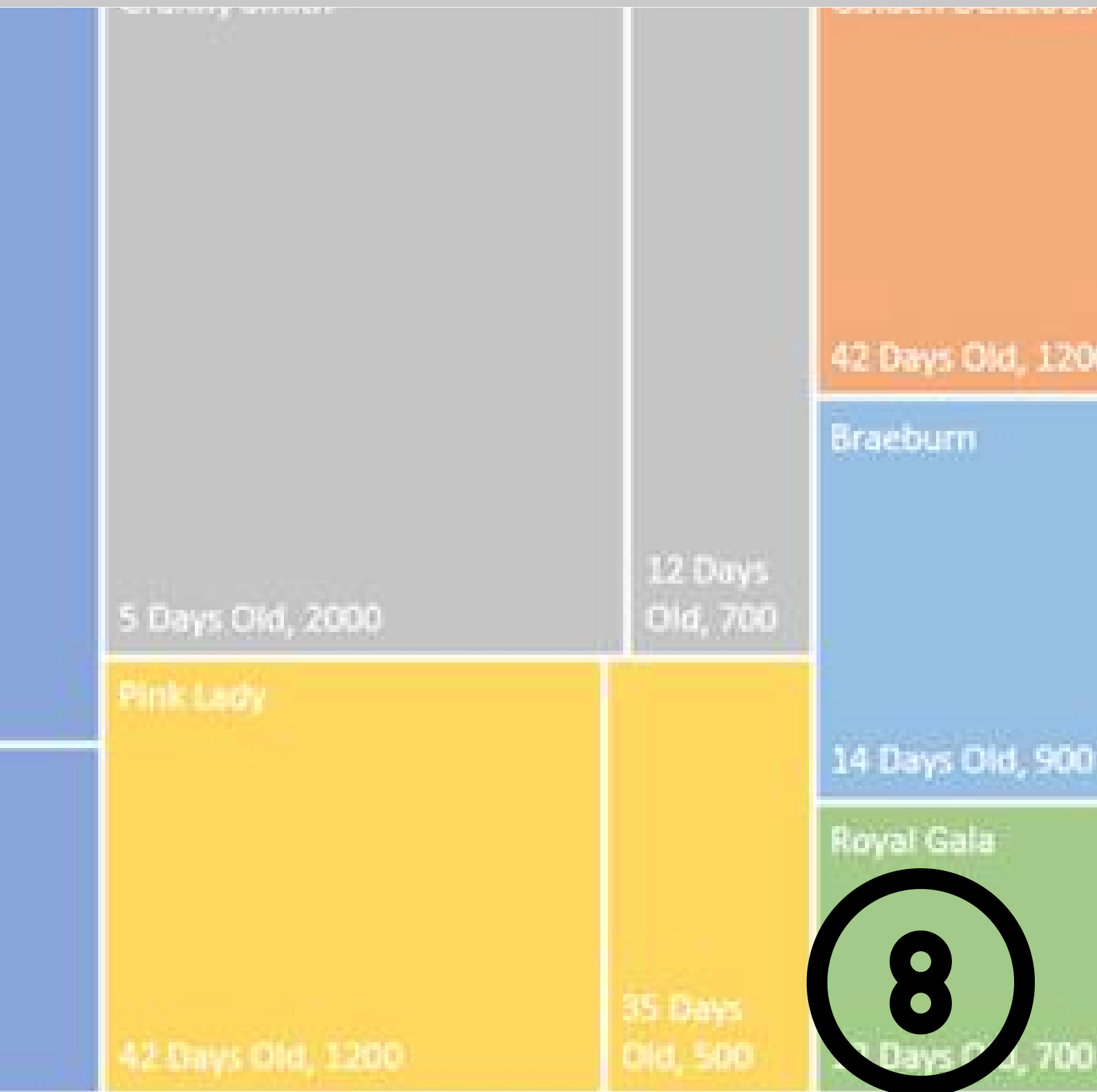
Tree Map 8

8.a) What is a Tree Map

Treemap is a way of representing data in a hierarchical way, which helps the data to be understood and read in a detailed manner with great ease in no matter of time. As the name suggests, data is being represented as a tree with nodes and branches in rectangular shapes where variation in data is shown through difference in size and colour of the rectangular boxes. Each node has zero or more branches and each branch has one parental node except for the root node which is a parental node itself.

8.b) When to use Tree Map

Tree maps can be used:
- to see the relationship between two or categorical variables.
- To see the distribution of values of a particular categorical variable in a data.

Which type of datasets can be used to create a Tree Map

Datasets having one or more categorical variables can be used to create a Tree Map.
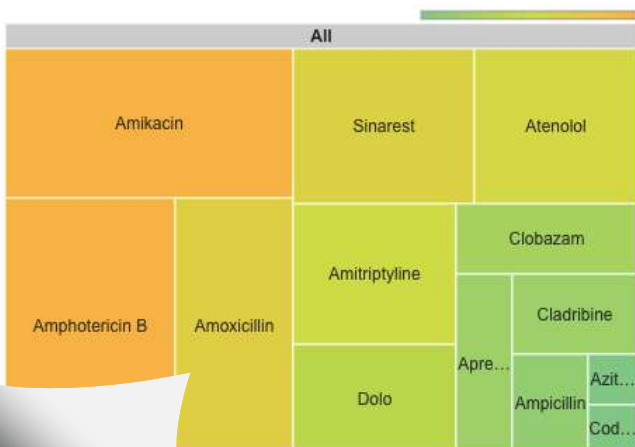
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8.c) Business Problems

i) Example 1: Electricity consumption by devices/Electronic items in a House (ENERGY SECTOR)

Data about how much each device / electronic item at a house consumes electrical energy has been taken. Here, a tree map is being used to create a visual representation of how much energy each device consumes at each place of the house.

Here (in Chart 1.1) we have taken level one dimension as device and level two dimension as place which makes the parent nodes to be the devices and the hierarchical branches to be the places. We can even do vice versa dimensional setup to view the case (Chart 1.2) .
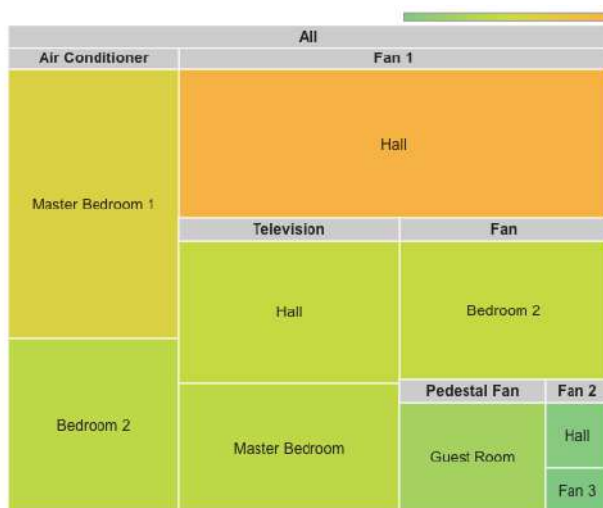
Chart 1.1

Chart 1.2

DATA STUDIO IMPLEMENTATION FOR TREE MAP

i) Example 1: Electricity consumption by devices/Electronic items in a House (ENERGY SECTOR)

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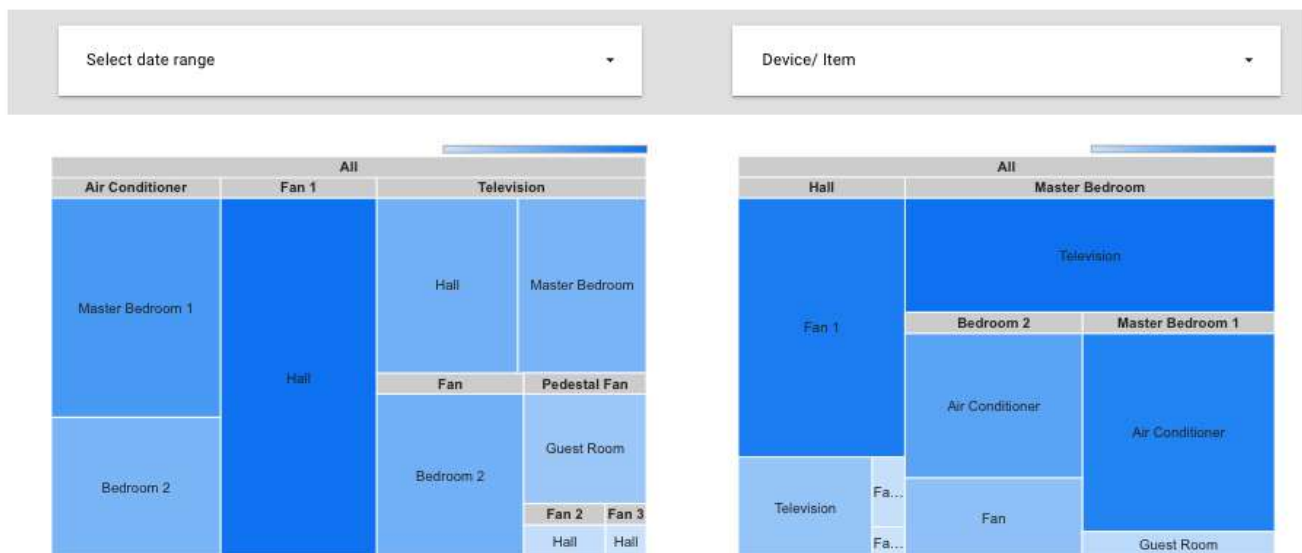
8.c) Business Problems

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ii)Example 2: Request management in "Election Commission of India" Website (PUBLIC SECTOR)

Data about new requests filed in the website of Election commission of India has been taken. Here, Tree map(Chart 2.1) is been used to see which requests has been mostly registered in which places so that officials can be appointed according to the need. For example, In the node "New Voter ID", places like Arcot, Pallavaram has more requests in which more officials has to be appointed to verify in person with the newly registered users.

Tree map (Chart 2.2) in this case has been used to show the frequency of registration of requests wise different dates.
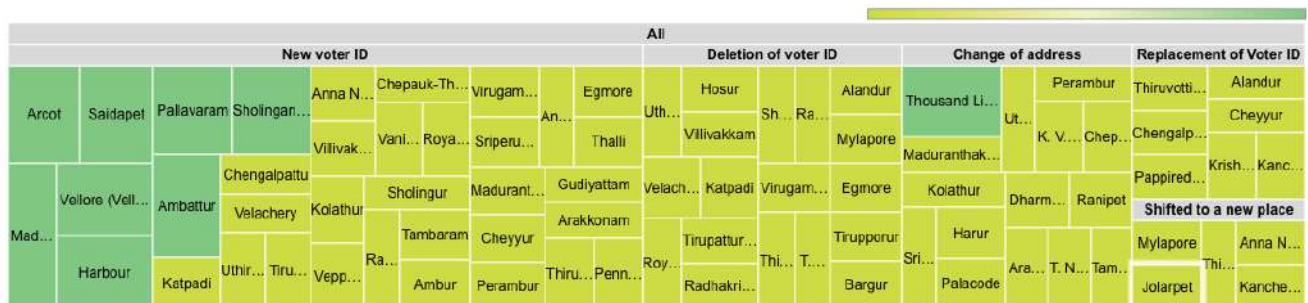
Chart 2.1
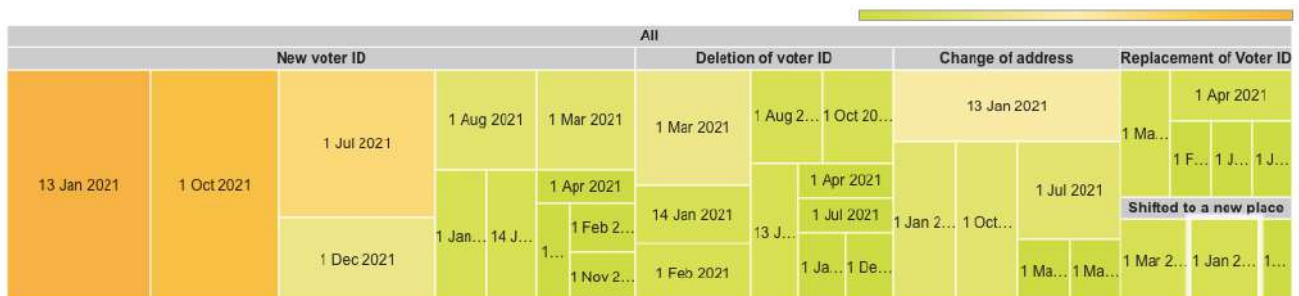
Chart 2.2

DATA STUDIO IMPLEMENTATION FOR TREE MAP

ii)Example 2: Request management in "Election Commission of India" Website (PUBLIC SECTOR)

8.c) Business Problems

- -

iii)Example 3: Medicines purchased in a pharmacy (HEALTH SECTOR)

Data about purchase of medicines in a pharmacy has been taken. In this case, a tree map has been used to see which mode of payment has been done for each medicine. Here the size and colour of the rectangles show how each mode of payment has been used. For example , for the medicine "Amphotericin B" Debit card has been used the most (Larger rectangle and dark blue coloured) and credit card the next mostly used and debit card the least used to buy that particular medicine. Here the dimension is Medicine name and mode of payment.
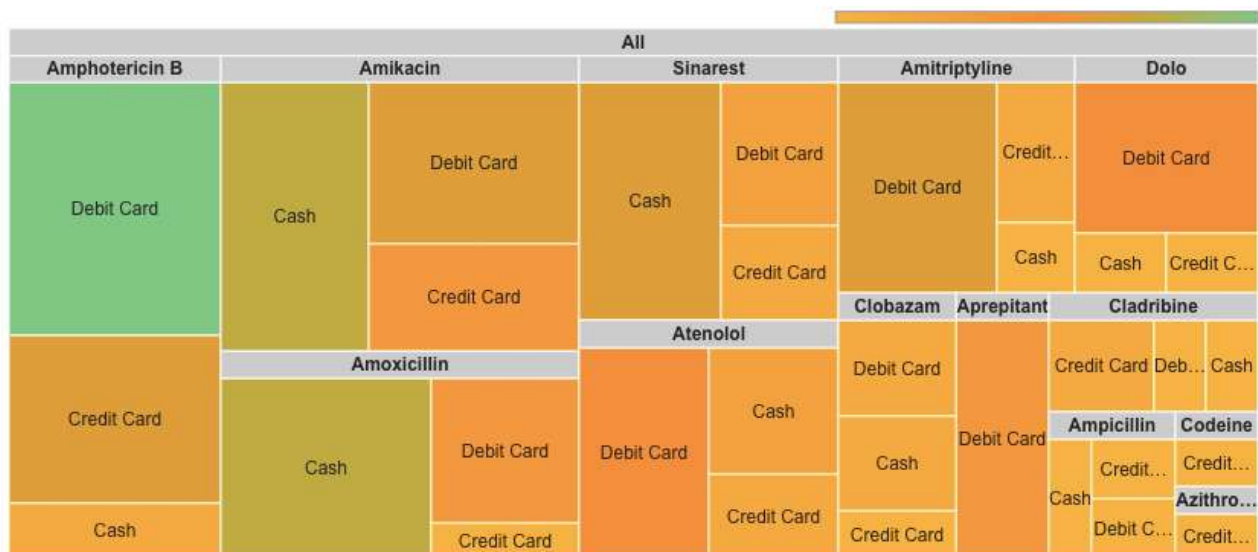
DATA STUDIO IMPLEMENTATION FOR TREE MAP

iii)Example 3: Medicines purchased in a pharmacy (HEALTH SECTOR)

9

SCATTER CHART

DeepSphere.AI
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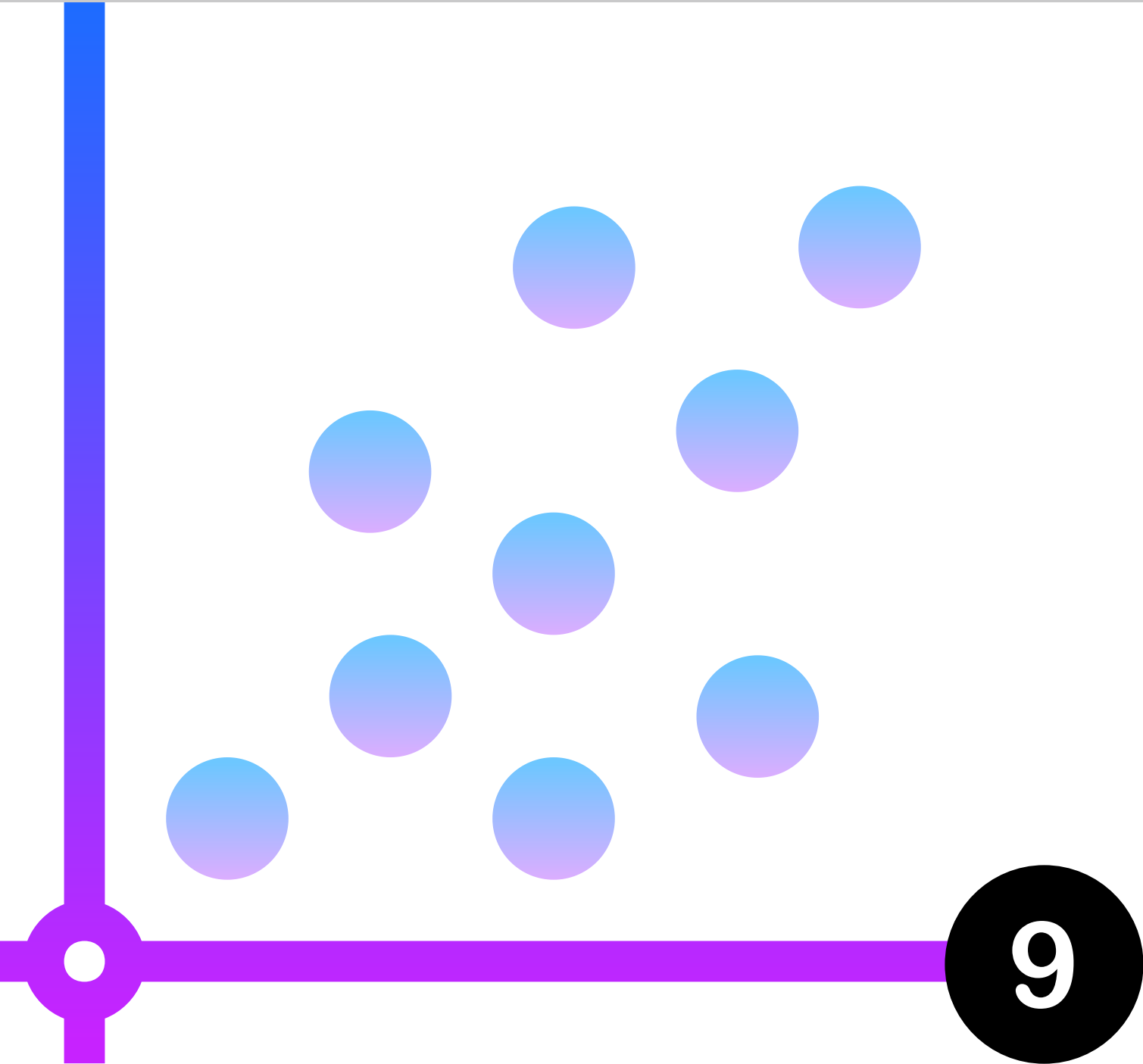
Scatter Chart 9

11.a) What is a Scatter Chart

Scatter chart is a way of representing the comparison between two variables(metrics) using dots. It can have upto three dimensions. It is useful to represent data having two or more non-categorical variables. The dots represent the data points of records and it is marked according to the values in the X and Y axis.

Which type of datasets can be used to create a Scatter Chart

Scatter can be used:
- to see the relationship between two or more non-categorical variables.
.

9.b) When to use Scatter Chart

Scatter can be used:
- to see the relationship between two or more non-categorical variables.
.

9.c) Business Problems

- -

i) Example 1: Electricity Bills for Houses (ENERGY SECTOR)

IN THIS EXAMPLE, data about how much electricity bill amounts are varied due to the usage of electronic items and the duration of usage has been taken. This scatter chart shows how the number of hours used affects the bill amount generated per house. We can see some houses having very less bill amounts having a greater number of hours used, this could be due to the variation in the number of air conditioners or fans they have.

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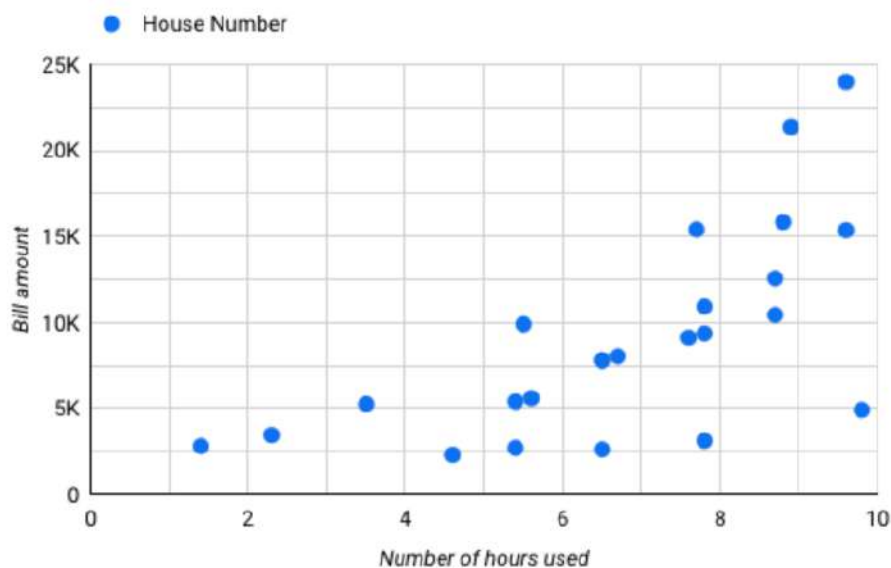
DATA STUDIO IMPLEMENTATION FOR SCATTER CHART

i) Example 1: Electricity Bills for Houses (ENERGY SECTOR)
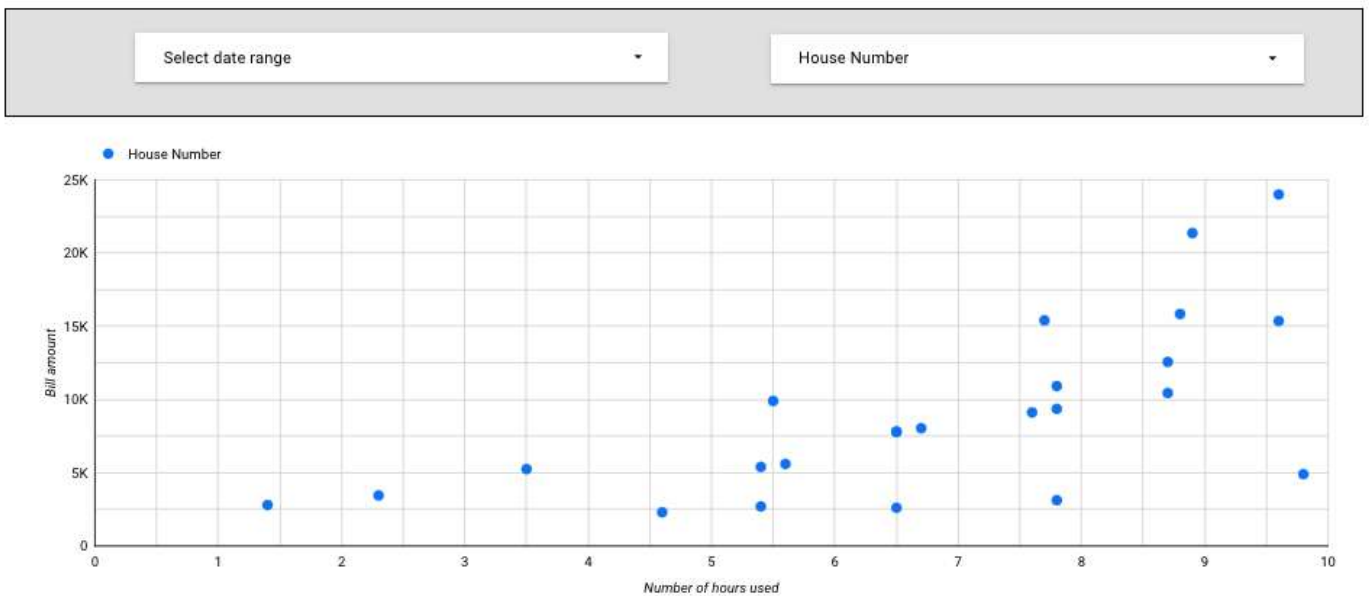
9.c) Business Problems

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ii)Example 2: Salary For Nurses in Hospitals (HEALTH SECTOR)

In this Example, data about nurses income has been taken. Here we use a scatter plot to see how Years of experience affects the income of nurses. We take the metrics as "income" and "Years of experience" and the dimension as "Employee ID"

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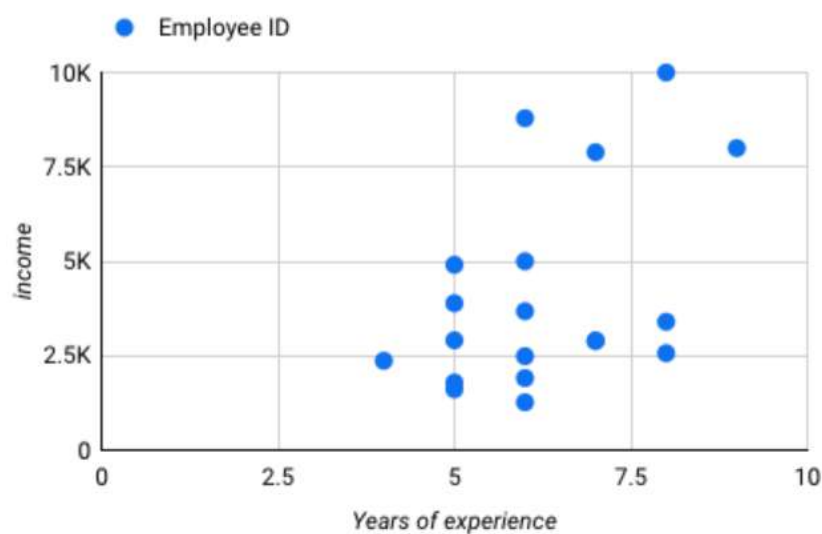
DATA STUDIO IMPLEMENTATION FOR SCATTER CHART

ii)Example 2: Salary For Nurses in Hospitals (HEALTH SECTOR)

9.c) Business Problems

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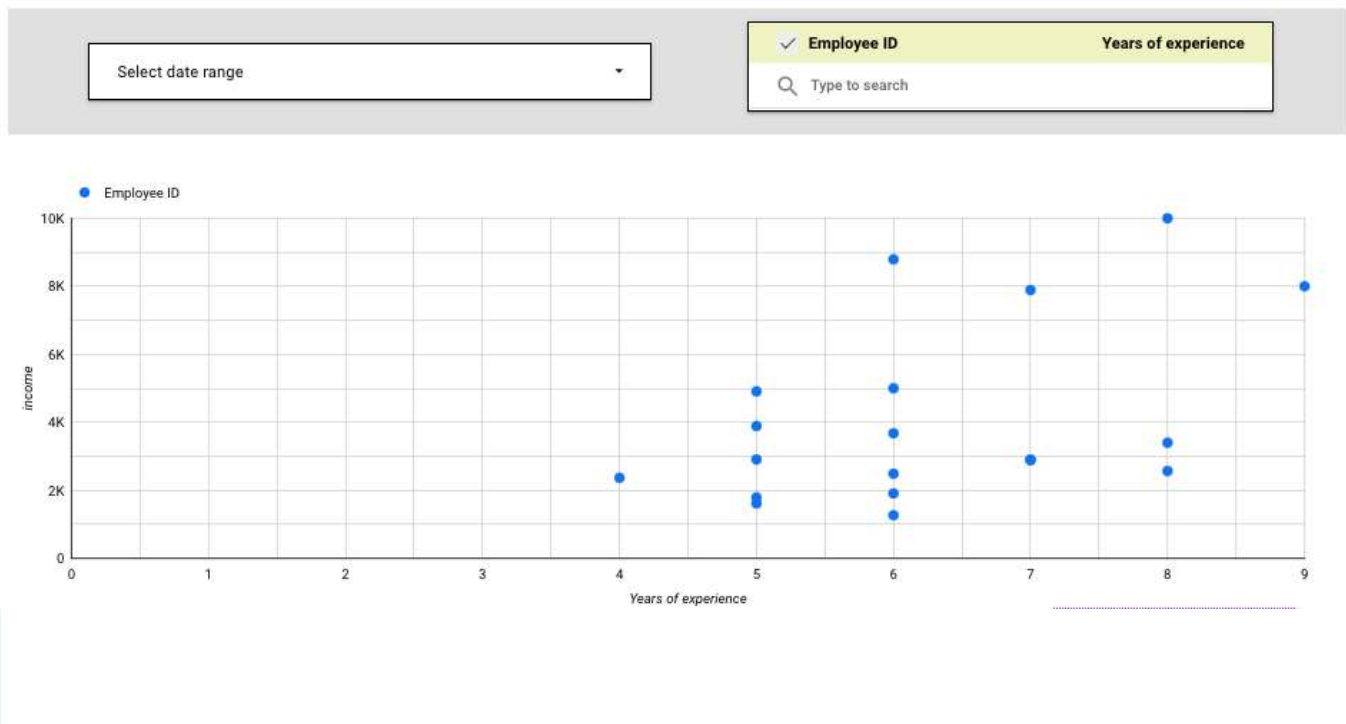
iii)Example 3: Election Campaign (PUBLIC SECTOR)

Data about election campaigns done by candidates has been taken. In this case a scatter plot has been used to compare the variables ``Number of activities done" and "Number of votes gained". Here the dimension is "Candidate ID".

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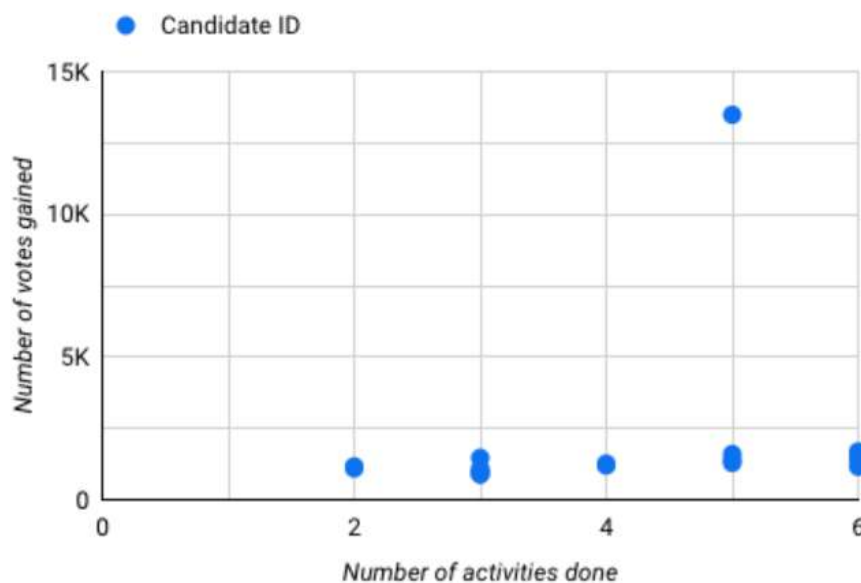
DATA STUDIO IMPLEMENTATION FOR SCATTER CHART

iii)Example 3: Election Campaign (PUBLIC SECTOR)

10

BUBBLE

CHART

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Enterprise AI and IIoT for Analytics

Bubble Chart 10

10.a) What is a Bubble Chart

Bubble chart, as the name suggests, is a way of representing data in the form of bubbles(circles). It usually takes in three metrics (for X-axis,Y-Axis and size of the bubble). It resembles XY scatter plots but then it also takes a third variable to represent the XY plotted points in terms of different sizes (bubbles) instead of a dot in case of scatter charts. It is usually used to represent the relationship between variables in a data.
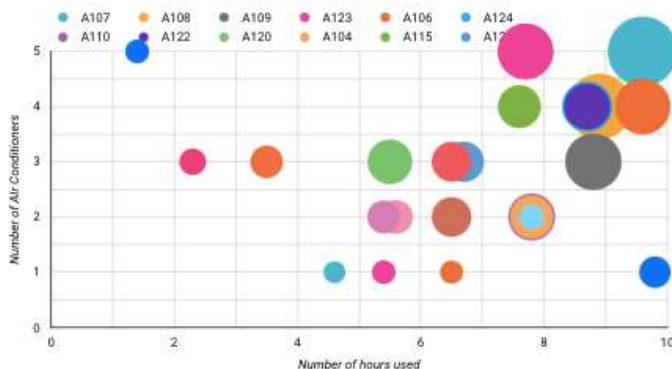
Which type of datasets can be used to create a Bubble Chart

Datasets having three non-categorical variables can be used to create a Bubble Chart.
.

10.b) When to use Bubble Chart

Bubble Chart can be used:
- to see the relationship between three non-categorical variables in a data.
.

10.c) Business Problems

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i) Example 1: Election Campaign (PUBLIC SECTOR)

Data about how much each candidate's Campaigns before election has affected the number of votes gained by them has been taken. Here we use a Bubble chart to compare the variables "Number of Campaigns conducted" and "Number of activities" done and how this has affected in terms of getting votes. Here the metric taken for X-Axis is "Number of Campaigns conducted",metric for Y-Axis is "Number of activities" and bubble size metric is taken as Number of votes gained.
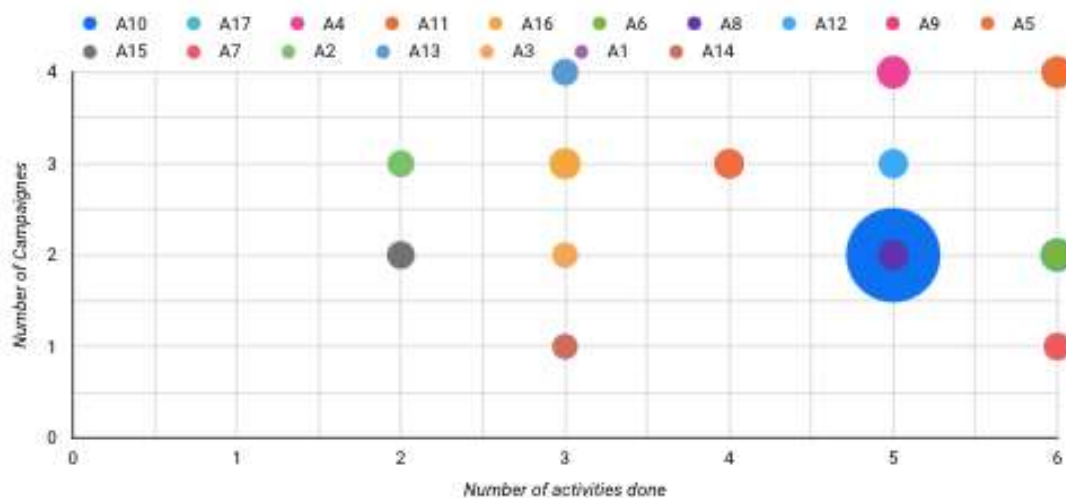
DATA STUDIO IMPLEMENTATION FOR BUBBLE CHART

i) Example 1: Election Campaign (PUBLIC SECTOR)

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10.c) Business Problems

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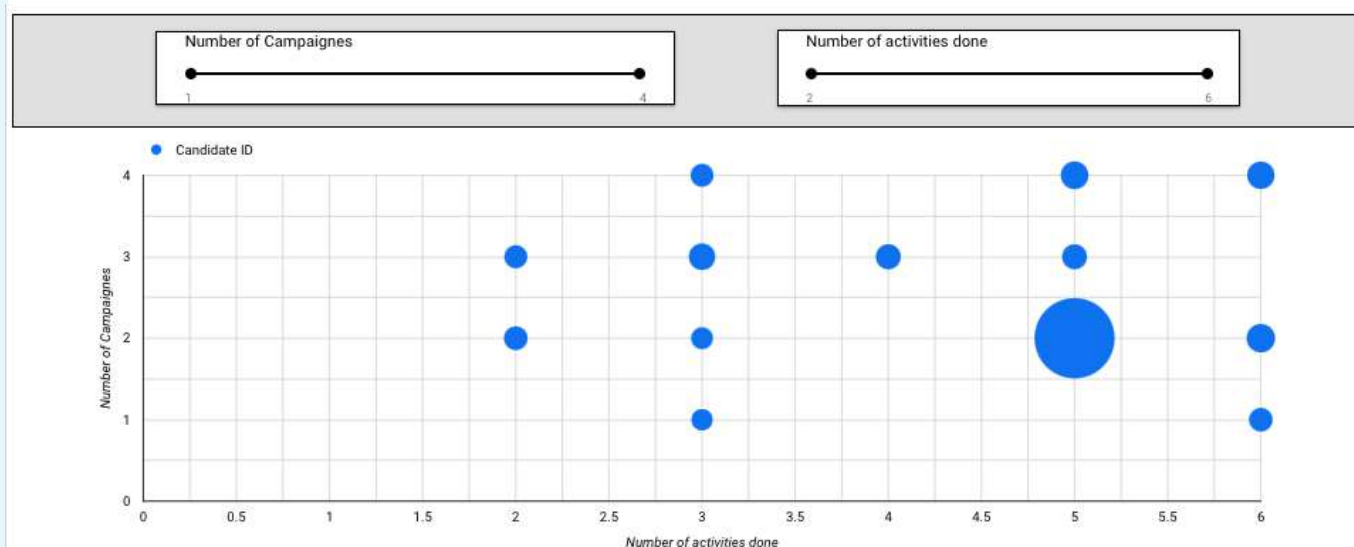
ii)Example 2: Salary For Nurses in Hospitals (HEALTH SECTOR)

Data about How much nurses have been working at a hospital and how it affects their income has been taken. Here, we use bubble chart to visualise how each nurses' income is affected by the number of patients they attend and years of experience they have.
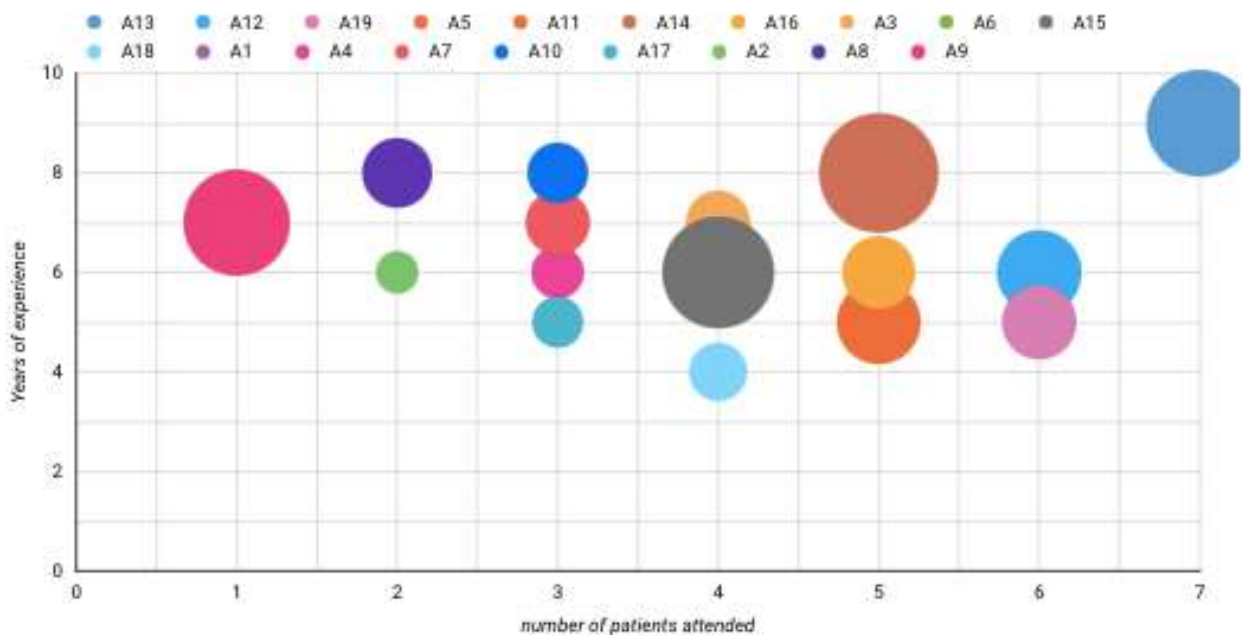
DATA STUDIO IMPLEMENTATION FOR BUBBLE CHART

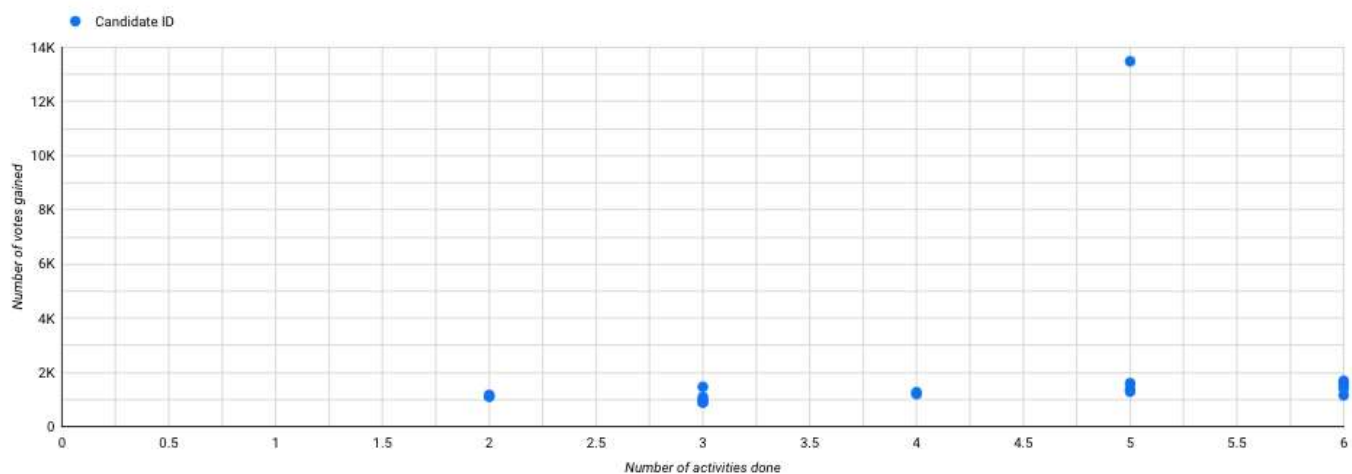## ii)Example 2: Salary For Nurses in Hospitals (HEALTH SECTOR)
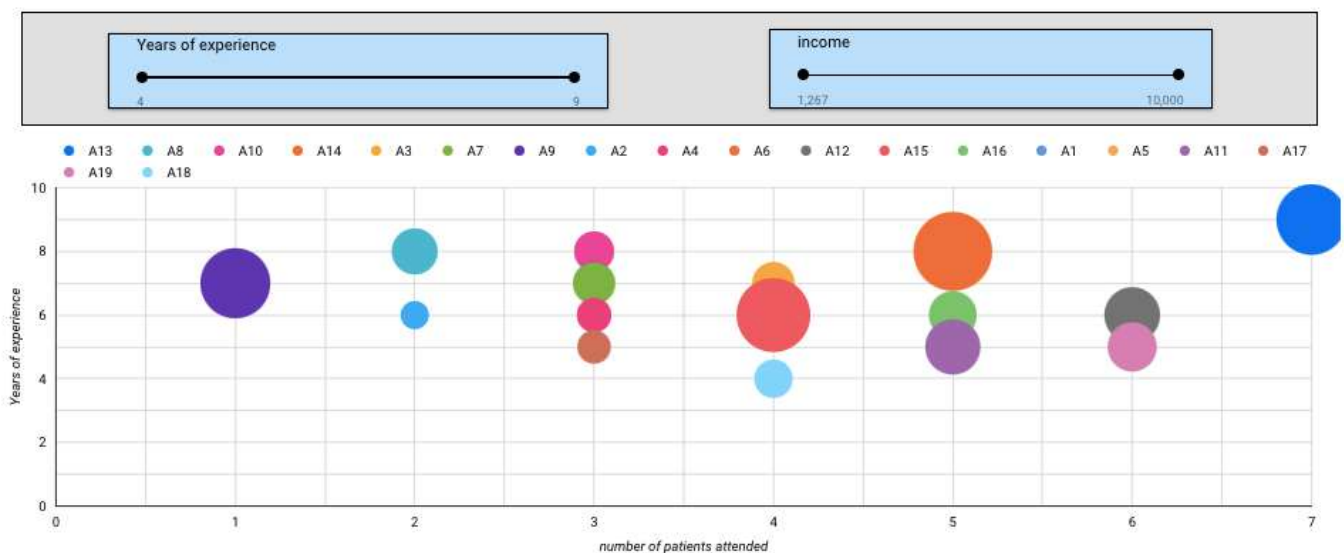
10.c) Business Problems

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iii)Example 3: Electricity Bills for Houses (ENERGY SECTOR)

Data about electronic items and how they contribute to the electricity bill has been taken. Here we use a bubble chart to visualise the comparison between the three variables "Number of Air Conditioners","Number of hours used" and "Electricity Bill". Here the Dimension is the "House Number".
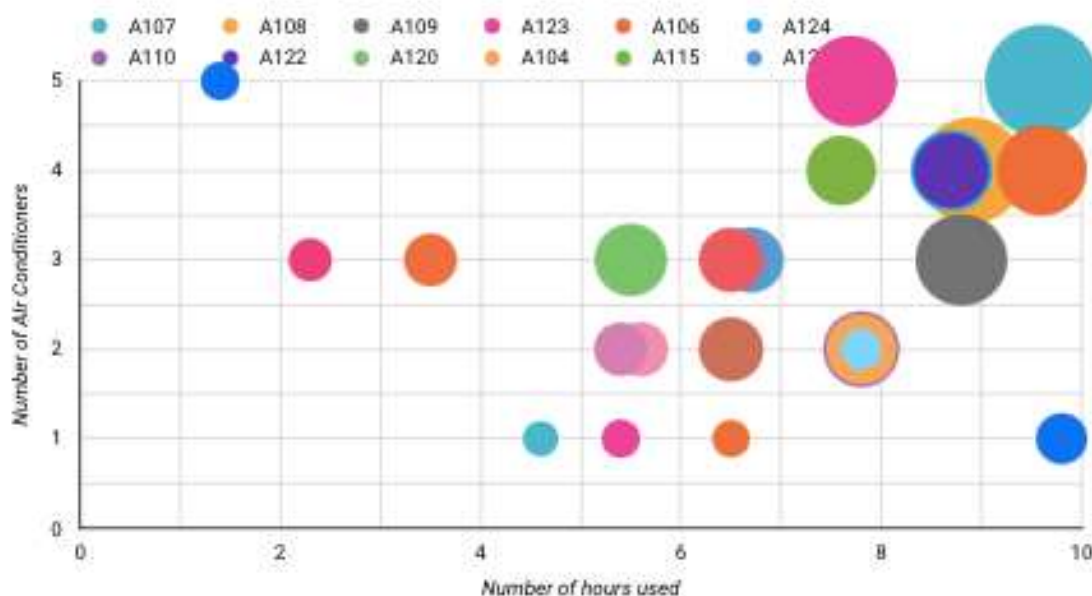
DATA STUDIO IMPLEMENTATION FOR BUBBLE CHART

iii)Example 3: Electricity Bills for Houses (ENERGY SECTOR)

TABLES

11
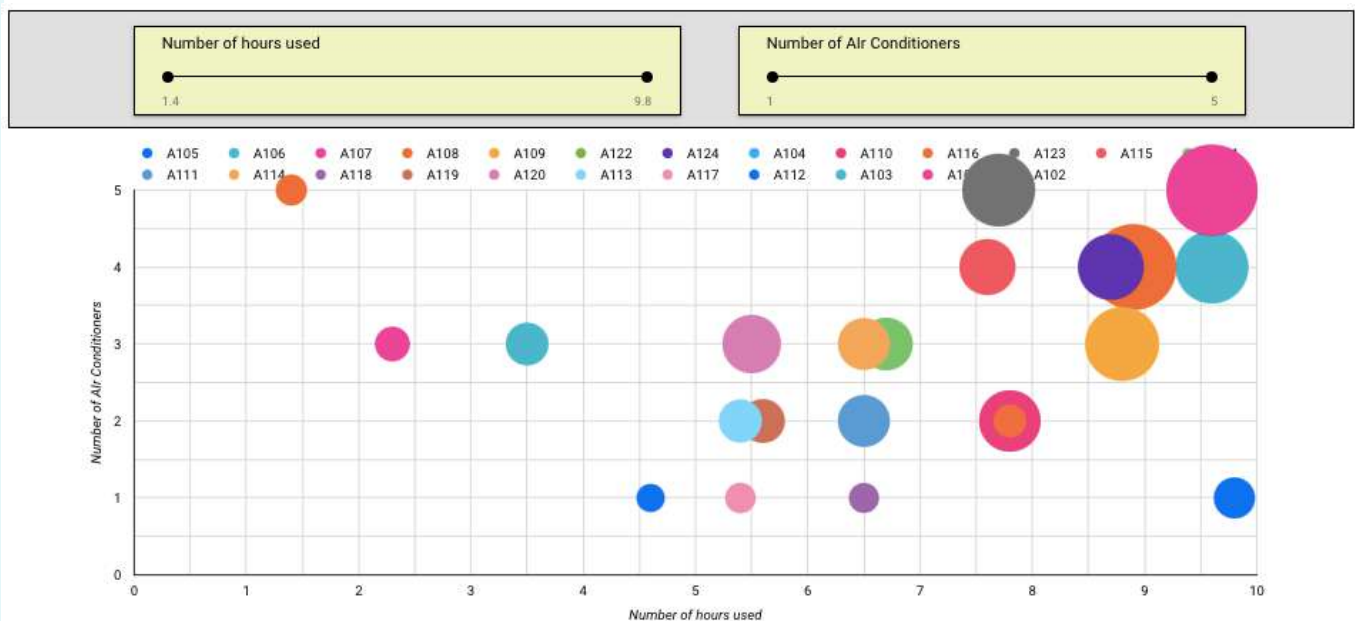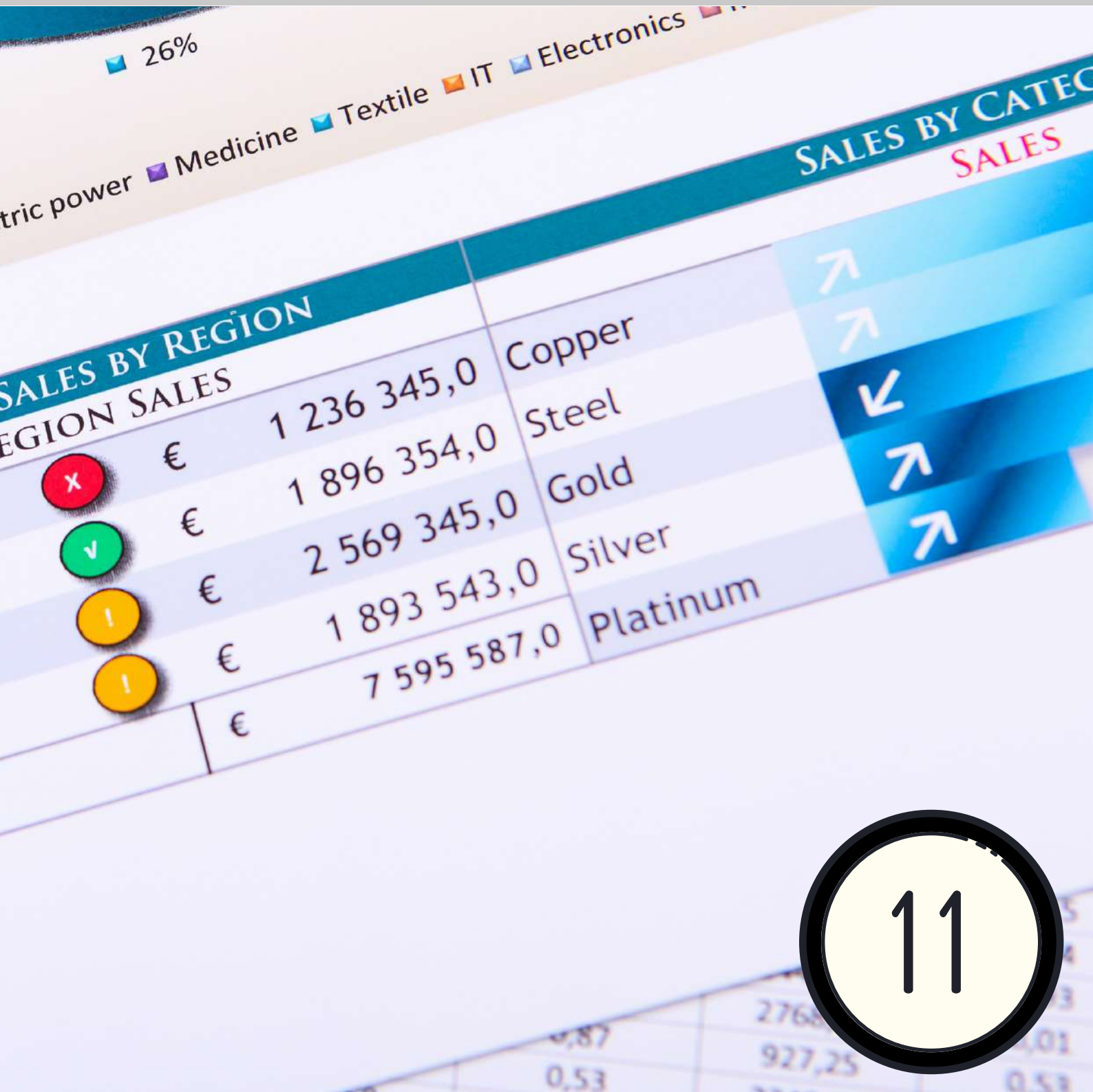
Table

11

11.a) What is a Table

A table is a representation of data in grids of columns and rows. It summarises the data according to the dimensions and metrics given. The columns are formed with the dimensions and each row gives the record count of the metric specified(sum, average, count, count distinct, etc.).

It has two more types:
- Table with bars
- Table with heat map

Table with bars

In this type , Metrics can be represented as bars with each bar in a row representing the metric specified in that column(dimension). This gives a clear view of each record in the table specified by us with specific dimensions and metrics. A google Data Studio can have upto 10 dimensions and 20 metrics.

Table with HeatMaps

In this type of table, metrics can be represented in different colours depending upon the value of the record in each row. While the value is greatest, it has the original colour specified for that row and while the value decreases, the colour fades off.

11.b) When to use the Tables

Tables can be used when data is to be represented in particular dimensions and metrics of our choice or a part of data in the form of rows and columns.

	House Number	Number of h...	Number of Air Condi...
1.	A102	1.4	5
2.	A107	9.6	5
3.	A123	7.7	5
4.	A106	9.6	4
		8.9	4
		7.6	4
		8.7	4

1 - 24 / 24   <   >

11.c) Business Problems

- -

i) Example 1: Electricity Bills for Houses (ENERGY SECTOR)

In this example, data about electricity bill generation in various houses has been taken. Here, a table with two dimensions(House Number and Number of Air Conditioners) and one metric(Bill amount) has been taken which is shown as the columns along with rows of data. A Table is used to show just a particular part of data.

	House Number	Number of Air Conditioners	Bill amount ▼
1.	A107	5	24,000
2.	A108	4	21,360
3.	A109	3	15,840
4.	A123	5	15,400
5.	A106	4	15,360
6.	A124	4	12,567
7.	A110	2	10,920
8.	A122	4	10,440
9.	A120	3	9,900

1 - 24 / 24   ‹   ›

DATA STUDIO IMPLEMENTATION FOR TABLE

i) Example 1: Electricity Bills for Houses (ENERGY SECTOR)

	Bill amount	Number of Air Conditioners
	2,300 — 24,000	1 — 5

	House Number	Number of Air Conditioners	Bill amount ▾
1.	A107	5	24,000
2.	A108	4	21,360
3.	A109	3	15,840
4.	A123	5	15,400
5.	A106	4	15,360
6.	A124	4	12,567
7.	A110	2	10,920
8.	A122	4	10,440
9.	A120	3	9,900
10.	A104	2	9,360
11.	A115	4	9,120
12.	A121	3	8,040
13.	A111	2	7,800

1 - 24 / 24 ‹ ›

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11.c) Business Problems

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ii)Example 2: Salary For Nurses in Hospitals (HEALTH SECTOR)

In this, data about nurse salary calculation has been taken. This table has the dimensions(Employee ID and Income) and metric(Income). Here the metric is shown in bars(rectangular shapes). This type of representation makes it easier for the user to visualise a metric along with each record.

	Employee ID	income	income ▼
1.	A14	10000	
2.	A15	8790	
3.	A13	7999	
4.	A9	7890	
5.	A12	5000	
6.	A11	4908	
7.	A19	3890	
8.	A16	3678	
9.	A8	3400	

1 - 19 / 19   ‹   ›

DATA STUDIO IMPLEMENTATION FOR TABLE

ii)Example 2: Salary For Nurses in Hospitals (HEALTH SECTOR)

	Employee ID	number of patients attended	income	income ▾
1.	A14	5	10000	
2.	A15	4	8790	
3.	A13	7	7999	
4.	A9	1	7890	
5.	A12	6	5000	
6.	A11	5	4908	
7.	A19	6	3890	
8.	A16	5	3678	
9.	A8	2	3400	
10.	A5	5	2909	
11.	A7	3	2902	

1 - 19 / 19 〈 〉

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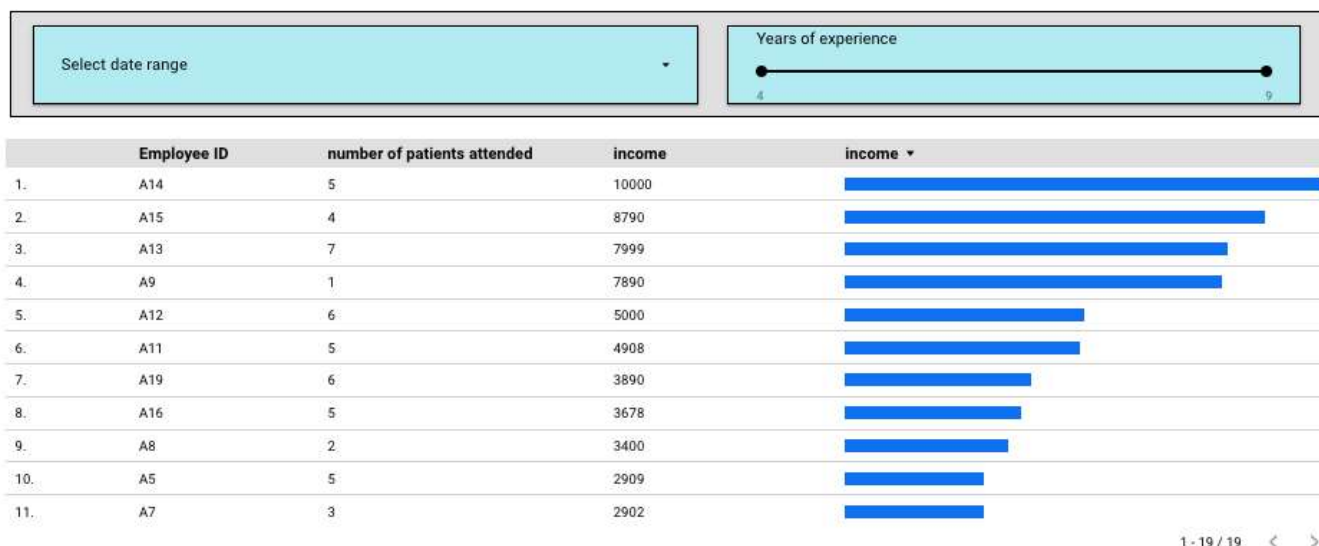
11.c) Business Problems

iii)Example 3: Medicine Purchase in Pharmacy (HEALTH SECTOR)

In this example, data about medicines purchased in a pharmacy has been taken. Here, a HeatMap table has been used to show the variation in the sales of each tablet. The heatMap is easy to visualise as it shows colour variation along with the values. The colour fades out as much as the value decreases. The dimension here is Medicine name and the metric is "Number of tablets sold". On or more metrics can be represented in this way.

	Medicine Name	Number of tablets sold ▾
1.	Amikacin	17
2.	Amphotericin B	17
3.	Amoxicillin	12
4.	Sinarest	11
5.	Atenolol	10
6.	Amitriptyline	9
7.	Dolo	7
8.	Clobazam	5

1 - 13 / 13   ‹ ›

DATA STUDIO IMPLEMENTATION FOR TABLE

iii)Example 3: Medicine Purchase in Pharmacy (HEALTH SECTOR)

Select date range	▾	Payment Type	▾

	Medicine Name	Number of tablets sold ▾
1.	Amikacin	17
2.	Amphotericin B	17
3.	Amoxicillin	12
4.	Sinarest	11
5.	Atenolol	10
6.	Amitriptyline	9
7.	Dolo	7
8.	Clobazam	5
9.	Aprepitant	4
10.	Cladribine	4
11.	Ampicillin	3
12.	Azithromycin	1

1 - 13 / 13 ‹ ›

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Gender	Q3	
male	$271.09	$
female	$158.54	$
male	–	**$158.54**
female	–	
male	$74.06	$
female	$75.52	
	–	
female		$

12

PIVOT
TABLES

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Pivot Table 12

12.a) What is a Pivot Table

Pivot tables are useful in the case where the data points are to be compared and the visualisation of data has to be more narrow. Here, rows are taken and are pivoted where they become the columns. There are many options in Google Data Studio which helps us to visualise in a more peculiar manner. There are types of pivot table:
- Pivot Table with Bars
- Pivot Table with Heat Maps

12.b) When to use Pivot Tables

Pivot Tables can be used at any case, for any dataset when a narrow view or representation of data is required.

Device/ Item	Date / Units of energy consumed(A)			
	1 Dec 2021	1 Nov 2021	1 Oct 2021	1 Sept :
Television	76	76	1,078	
Pedestal Fan	-	-	-	
Fan 3	-	-	-	
Fan 2	-	-	24	
Fan 1	87	-	642	
Fan	45	-	56	
Air Conditioner	55	-	1,126	

12.c) Business Problems

- -

i) Example 1: Electricity Bills for Houses (ENERGY SECTOR)

In this example, the column is taken as date and the metric is taken as the "Units of energy consumed". In the left chart there is only one dimension(Device) and we can add more dimensions to view the data in a more narrow way like the right side chart. In the right side chart, the dimension(place) is added.

	Date / Units of energy consumed(A)		
Device/ Item	1 Oct 2021	13 Jan 2021	1 Mar 2021
Air Conditioner	1,126	362	200
Television	1,078	540	-
Fan 1	642	138	181
Fan	56	82	125
Pedestal Fan	-	-	72
Fan 3	-	-	-
Fan 2	24	-	-

		Date / Units of energy consumed(A)	
Device/ Item	Place	1 Oct 2021	13 Jan 2021
Air Conditioner	Master Bedro...	772	145
	Bedroom 2	354	217
Television	Master Bedro...	968	427
	Hall	110	113
Fan 1	Hall	642	138
Fan	Bedroom 2	56	82
Pedestal Fan	Guest Room	-	-
Fan 3	Hall	-	-
Fan 2	Hall	24	-

DATA STUDIO IMPLEMENTATION FOR PIVOT TABLE

i) Example 1: Electricity Bills for Houses (ENERGY SECTOR)

Select date range ▼

Device/ Item	Date / Units of energy consumed(A)				
	1 Oct 2021	13 Jan 2021	1 Mar 2021	null	1 Jul 2021
Air Conditioner	1,126	362	200	172	93
Television	1,078	540	-	153	104
Fan 1	642	138	181	122	87
Fan	56	82	125	-	147
Pedestal Fan	-	-	72	-	-
Fan 3	-	-	-	-	-
Fan 2	24	-	-	-	-

Device/ Item	Place	Date / Units of energy consumed(A)			
		13 Jan 2021	1 Oct 2021	1 Mar 2021	1 Jul 2
Air Conditioner	Master Bedro...	3	2	2	
	Bedroom 2	3	1	2	
Fan 1	Hall	4	4	3	
Television	Hall	3	2	-	
	Master Bedro...	3	3	-	
Fan	Bedroom 2	1	1	2	
Pedestal Fan	Guest Room	-	-	3	
Fan 2	Hall	-	1	-	
Fan 3	Hall	-	-	-	

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12.c) Business Problems

ii)Example 2: "Election Commission of India" Website(PUBLIC SECTOR)

In this example, data about the request entries in "Election Commission of India" Website has been taken. A pivot table in this case has been used to compare how much each request has been entered by the users in various dates. A bar pivot table in this case is helpful to visualise the values more easily than to read them.

Date of Reque..	New voter ID	Deletion of voter ID	Change of address	Replacement of V..	Shifted to a new pl..
				Type of Request / Record Count	
13 Jan 2021	▮▮▮▮▮	▪	▮▮▮	-	-
1 Oct 2021	▮▮▮▮▮	▪	▮▮	-	-
1 Mar 2021	▮	▮▮	▎	▪	▪
1 Jul 2021	▮▮▮	▎	▮	-	-
1 Jan 2021	▪	▎	▮	▎	▪
1 Feb 2021	▎	▪	-	▎	▎
1 Aug 2021	▪	▪	-	-	-
1 Dec 2021	▮	▎	-	-	-

DATA STUDIO IMPLEMENTATION FOR PIVOT TABLE

ii)Example 2: "Election Commission of India" Website(PUBLIC SECTOR)

12.c) Business Problems

- -

iii)Example 3: Electricity Bills for Houses (ENERGY SECTOR)

In this case, a pivot table with a heat map is used. Data about energy consumption in a house by various devices has been taken. Here, the pivot table shows how each device has been consuming energy on the basis of dates and it has been arranged in the descending order of Units of energy consumed. Here the Row dimension is "Date" and the column dimension is "Device/Item" and the metric is "Units of energy consumed".

Date	Air Conditio...	Television	Fan 1	Fan	Pedestal Fan	Fan 3	F
1 Oct 2021	1,126	1,078	642	56	-	-	
13 Jan 2021	362	540	138	82	-	-	
1 Mar 2021	200	-	181	125	72	-	
null	172	153	122	-	-	-	
1 Jul 2021	93	104	87	147	-	-	
1 Jan 2021	92	110	5	26	40	84	
1 Dec 2021	55	76	87	45	-	-	
1 Feb 2021	30	-	90	5	36	-	

Device / Units of energy consumed(A)

DATA STUDIO IMPLEMENTATION FOR PIVOT TABLE

iii)Example 3: Electricity Bills for Houses (ENERGY SECTOR)

Date	Air Conditioner	Fan 1	Television	Fan	Pedestal Fan	Fan 2	Device/ Item / Record Count Fan 3
13 Jan 2021	6	4	6	1	-	-	-
1 Oct 2021	3	4	5	1	-	1	-
1 Mar 2021	4	3	-	2	3	-	-
1 Jul 2021	3	3	2	3	-	-	-
1 Jan 2021	2	1	2	1	1	1	1
null	3	2	4	-	-	-	-
1 Feb 2021	1	2	-	1	1	-	-
1 Aug 2021	2	1	1	1	-	-	-
1 Dec 2021	1	1	2	1	-	-	-
14 Jan 2021	-	3	-	1	-	-	-
1 Apr 2021	2	1	-	-	1	-	-
1 Jun 2021	-	1	-	-	-	-	-

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APPENDIX

Link to view the Data Studio

🔗 <u>Click here</u>

CONCLUSION

We used Data Studio to analyze different types of charts and visualized data successfully

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