Question 1 : Define Power BI and What are the key components of the Power BI ecosystem? Briefly explain:

- Power BI Desktop
- Power BI Service
- Power BI Mobile
- Power BI Gateway

Ans: Power BI is Microsoft's business intelligence and analytics platform that helps users visualize data, share insights, and make data-driven decisions through dynamic dashboards and interactive reports.

Main Components of Power BI:

- **Power BI Desktop:** A Windows-based application used to design reports, transform data, and create analytical models.
- **Power BI Service:** A cloud-based SaaS platform where users can publish, share, and collaborate on reports and dashboards online.
- **Power BI Mobile:** An app available on Android, iOS, and Windows that allows users to view and interact with their reports anytime, anywhere.
- **Power BI Gateway:** A connector that links on-premises data with the Power BI Service, enabling real-time updates and scheduled data refreshes.

Question 2 : Compare the following Power BI visuals:

- Pie Chart vs Donut Chart
- Bar Chart vs Column Chart

When would you prefer one over the other? Give one example for each pair.

Ans: Power BI Visuals Comparison :

Pie Chart vs Donut Chart

- **Similarity**: Both show part-to-whole relationships using slices.

Difference: Donut Chart has a blank center (better for adding labels or totals).

When to prefer:

- **Pie Chart**: Use for simple part-to-whole comparisons with few categories.
  Example: Showing sales share by product category.
- **Donut Chart**: Prefer when you want to display total value in the center or need a cleaner look.
  Example: Showing budget distribution with total in the middle.

Bar Chart vs Column Chart

- **Similarity**: Both display data using rectangular bars.
- **Difference**:
  - **Bar Chart**: Horizontal bars
  - **Column Chart**: Vertical bars

When to prefer:

- **Bar Chart**: Better for long category names or many categories.
  Example: Comparing revenue across different countries.
- **Column Chart**: Better for showing trends over time.
  Example: Monthly sales performance.

Question 3 : Explain the significance of:
● Star schema vs Snowflake schema
● Primary key vs Foreign key in relationships (Power BI)
Why is cardinality important?

Ans: Power BI Data Modelling

Star Schema vs Snowflake Schema

- **Star Schema:** Features one main fact table connected directly to several denormalized dimension tables.
  Best suited for quick analysis and simple reporting.

- **Snowflake Schema:** Involves normalized dimension tables that are further divided into sub-tables.
  Saves storage but adds complexity to queries.

Significance: The **Star Schema** is the preferred structure in Power BI because it enhances performance and simplifies relationship management.

Primary Key vs Foreign Key

- **Primary Key:** Serves as a unique identifier for each record within a table (e.g., CustomerID in a Customer table).
- **Foreign Key:** References a primary key from another table to establish a relationship (e.g., CustomerID in the Sales table).

Significance: Together, these keys maintain referential integrity and allow accurate connections between datasets.

Why Cardinality Matters

- **Cardinality** defines the relationship type between tables.
  - **One-to-Many (1:*):** Most commonly used in Power BI for efficient modeling.
  - **Many-to-Many (:):** Can complicate relationships and impact performance.

Significance: Setting correct cardinality ensures data accuracy and prevents errors in visualizations or aggregated results.

Question 4 : Differentiate between:

● Calculated column vs Measure

Also, define Row context and Filter context with simple examples.

Ans: Power BI DAX Concepts:

Calculated Column vs Measure

Feature	Calculated Column	Measure
Definition	Adds a new column to a table	Calculates a value based on context
Stored in Model	Yes (takes up space)	No (calculated on the fly)
Uses Row Context	Yes	No (uses filter context)
Example	FullName = FirstName & " " & LastName	TotalSales = SUM(Sales[Amount])

When to use:

- **Calculated Column**: When you need a new data field.
- **Measure**: When you need dynamic aggregation or calculations in visuals.

Row Context

- Applies to **each row** in a table (mainly in calculated columns or iterators).
- **Example**:
  Sales[Total] = Sales[Quantity] * Sales[Price]
  → Calculated row by row.

Filter Context

- Comes from report filters, slicers, or visual context.

Example:
A measure like TotalSales = SUM(Sales[Amount])

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- → Changes based on selected year or region in a visual.

Question 5: What is the difference between a report and a dashboard in Power BI?

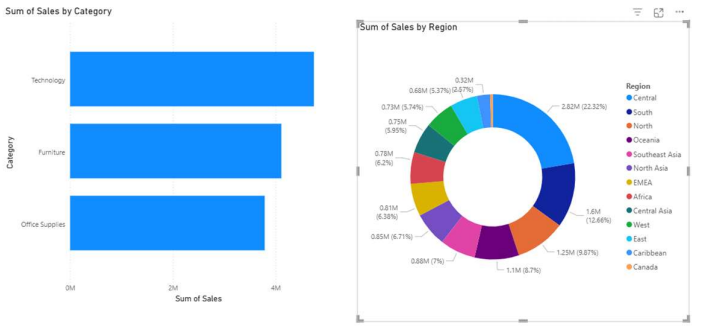
Ans: In Power BI, a **report** is a detailed, multi-page canvas that contains a variety of visuals (charts, tables, maps, etc.) built from a single dataset. Reports allow deep data analysis and support rich interactivity like slicers, drill-through, and filtering. They are usually created in Power BI Desktop and published to the Power BI Service.

On the other hand, a **dashboard** is a single-page summary that displays key insights using visual tiles, which can come from **multiple reports or datasets**. Dashboards are created only in the Power BI Service and are designed for quick, high-level overviews rather than in-depth analysis. While they offer limited interactivity, dashboards are ideal for monitoring key metrics at a glance.

Question 6 : Using the Sample Superstore dataset:

- Create a Clustered Bar Chart to display Total Sales by Sub-Category
- Create a Donut Chart for Sales % by Region

(Provide screenshots of both visuals.)



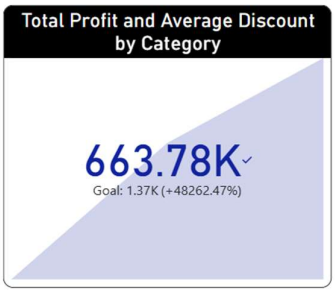
Question 7 : Write and apply the following measures:

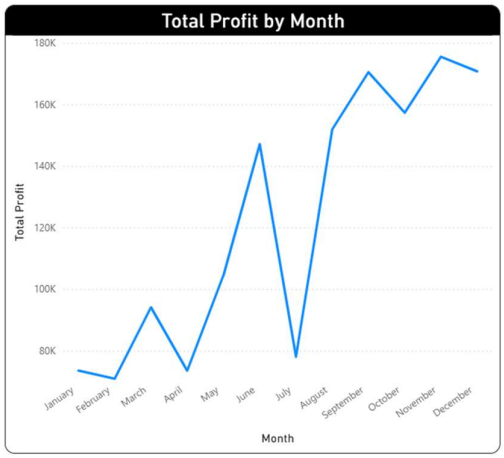
- Total Profit = SUM([Profit])
- Average Discount = AVERAGE([Discount])

Display both in a KPI Card, and use a Line Chart to show profit trend over months.
Add visuals and DAX formulas.

Average Discount = SUM(Global_Superstore[Discount])

Total Profit = SUM(Global_Superstore[Profit])



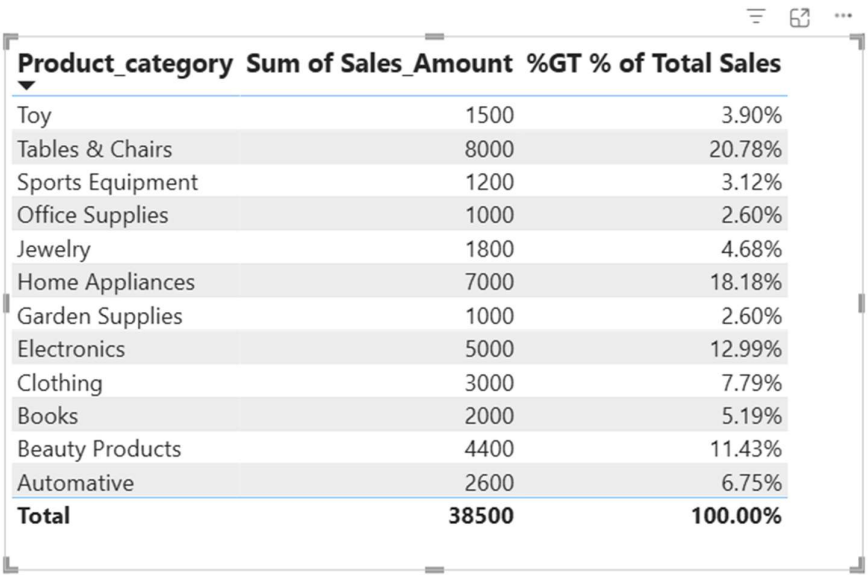


Question 8 :

Implement a DAX measure that calculates the percentage of total sales by product category.

Product_category	Sales_Amount
Electronics	5000
Clothing	3000
Home Appliances	7000
Books	2000

Tables & Chairs	8000
Toy	1500
Sports Equipment	1200
Office Supplies	1000
Beauty Products	4400
Garden Supplies	1000
Jewelry	1800
Automative	2600

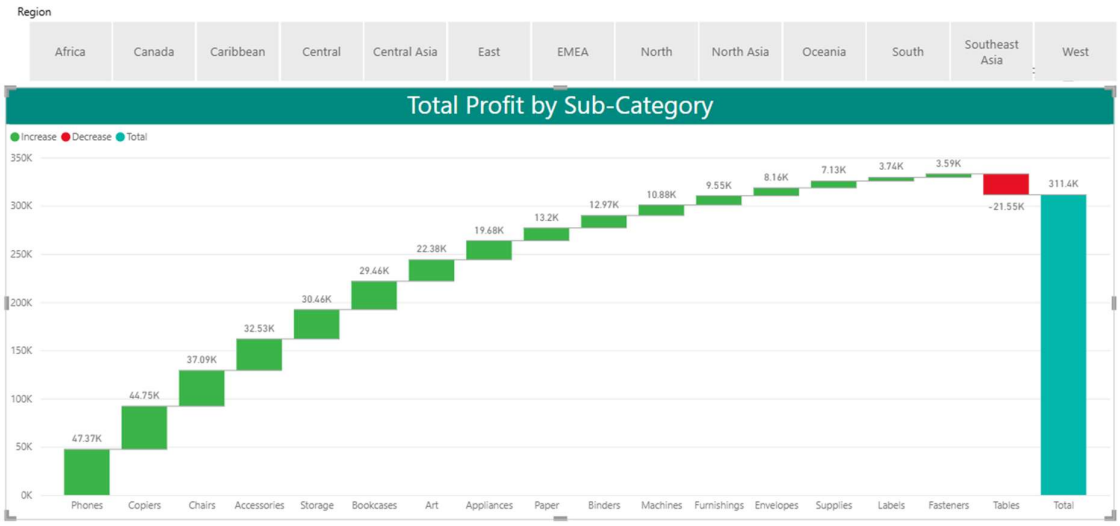


Product_category	Sum of Sales_Amount	%GT % of Total Sales
Toy	1500	3.90%
Tables & Chairs	8000	20.78%
Sports Equipment	1200	3.12%
Office Supplies	1000	2.60%
Jewelry	1800	4.68%
Home Appliances	7000	18.18%
Garden Supplies	1000	2.60%
Electronics	5000	12.99%
Clothing	3000	7.79%
Books	2000	5.19%
Beauty Products	4400	11.43%
Automative	2600	6.75%
Total	**38500**	**100.00%**

Question 9 :

- Create a DAX Measure for Total Profit
- Use it in a Waterfall Chart to analyze how different Sub-Categories contribute to overall profit
- Add a Slicer for Region to filter the visual
- Write brief business insights (4–5 lines) from the chart and provide 2–3 data-driven recommendations to improve profit.

ANS: From the Waterfall Chart, it's clear that *Copiers* and *Phones* are major contributors to profit, while *Tables* drag the figures down.
By boosting growth in top categories and controlling losses in weaker ones, the company can achieve better overall profit results.



Question 10 : Scenario:

VitaTrack Wellness, a digital health company in FitZone, has collected data on users' daily habits and health vitals. The analytics team is tasked with drawing actionable insights from this data to improve lifestyle suggestions and prevent heart-related risks.

Build a one-page Power BI dashboard that answers:

1. Are users maintaining a balanced lifestyle (Steps, Sleep, Calories)
2. What lifestyle patterns (Smoking, Alcohol, BMI, etc.) indicate heart disease risk?
3. Is there any visible relationship between Sleep and Physical Activity?
4. How does BMI vary across Age Groups and Genders?
5. What is the impact of smoking and alcohol on heart rate and blood pressure?
6. Segment people based on their health activity to suggest lifestyle changes DATASET


Vita Track Wellness
Health & Lifestyle Insights
Daily Steps
10.72K
Sleep Hours
10
Calories
810
Smoker
Select all
No
Yes
Select all
Female
Male
Gender By Smoker
Age (groups) 18-32 33-47 48-63 60+
Gender
Female
0K
1K
2K
Daily Steps
971
Sleep Hours by Daily Steps
0.3M
0.2M
0.1M
Age (groups) 18-32 33-47 48-63 60+
Count of BMI
500
0
Male
Female
Gender
BMI by Age Group, Gender
Gender Female Male
300
200
100
0
Count of BMI
107
107
131
112
124
128
161
130
18-32
33-47
48-63
60+
Age (groups)
Alcohol by Heart Rate
45K
40K
34K
20K
0K
7K
Sum of Heart_Rate
Low
Medium
None
Alcohol_Category