Assignment Code: DA-AG-013

Introduction to Power BI, Charts, DAX & Creating Reports

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Drive Link:-N/A

Github Link:- Link

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

Answer :

Power BI Desktop: A Windows tool to build, visualize, and model data as interactive reports.

Power BI Service: A cloud platform for sharing, collaborating on, and publishing Power BI reports and dashboards.

Power BI Mobile: A mobile app for accessing and interacting with Power BI content anywhere.

Power BI Gateway: A connector ensuring secure, automated refresh of on-premises data to Power BI cloud services.

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.

Answer :

Pie Chart:
A Pie Chart is used to show how each category makes up a part of the whole, represented as slices of a circle.
Prefer a Pie Chart when you want to display simple part-to-whole relationships and have only a few categories.
Example: Showing the percentage of students in each department (e.g., Science, Commerce, Arts).

Donut Chart:
A Donut Chart is similar to a Pie Chart but has a hollow center, which can be used to display additional information such as total value.
Prefer a Donut Chart if you need a cleaner look or want to place summary numbers in the center.
Example: Displaying product sales share with total sales in the middle.

Bar Chart vs Column Chart

Bar Chart:
A Bar Chart uses horizontal bars to compare categories.
Prefer a Bar Chart when your category names are long or you have many items to compare side by side.
Example: Comparing sales of products with long names, like "Chocolate Chip Cookie" and "Double Chocolate Brownie".

Column Chart:
A Column Chart uses vertical bars to show data, making it useful for displaying data changes over time.
Prefer a Column Chart when you need to show trends or changes, such as time series data.
Example: Showing monthly sales figures for January, February, March, etc.

Question 3 :

Explain the significance of:

- Star schema vs Snowflake schema

- Primary key vs Foreign key in relationships (Power BI)

Why is cardinality important?

Answer :

Star schema vs Snowflake schema:

Star schema: Central fact table linked directly to dimension tables; simple and fast for Power BI analytics.

Snowflake schema: Dimension tables broken into sub-tables; normalized structure, but more complex and slower.

2. Primary key vs Foreign key in relationships:

Primary key: Uniquely identifies rows in a table.

Foreign key: Connects to a primary key in another table to create relationships.

3. Why is cardinality important?

Correct cardinality (e.g., one-to-many) ensures Power BI aggregates and relates data accurately; wrong cardinality can cause errors or duplicate results.

Question 4 :

Differentiate between:

- Calculated column vs Measure
  Also, define Row context and Filter context with simple examples.

Answer :

Calculated Column vs Measure:

Calculated Column: Computes a value for each row as data is loaded; static, row-by-row.
Example: Discounted price per sale.

Measure: Calculates results on-the-fly, responding to filters or visuals; dynamic summary values.
Example: Total sales in a selected month.

Row Context vs Filter Context:

Row Context: Applies a calculation to each individual row (like for a calculated column).

Filter Context: Determines what data is included in calculations, based on filters or slicers (like for a measure).

Question 5:

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

Answer:

Report:
A report is a multi-page collection of interactive visualizations based on datasets, allowing deep analysis and exploration in Power BI.

Dashboard:
A dashboard is a single-page, summary view that displays selected visual tiles (often from various reports) for quick monitoring and insights.

Summary:
Reports enable detailed data analysis across several pages; dashboards provide a snapshot overview on one page for fast decision-making.

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.

DATASET LINK : Global_superstore2

Answer :

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.

DATASET LINK : Global_superstore2

Answer :

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

Answer :

```
% of Total Sales =
DIVIDE(
    SUM('Table'[Sales_Amount]),
    CALCULATE(SUM('Table'[Sales_Amount]), ALL('Table'))
)
```

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.

Provide a steps, screenshot of the Waterfall chart and the DAX formula

DATASET LINK : Global_superstore2

Answer :

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**.

Your Task:

Using the provided dataset (includes Age, Gender, BMI, Steps, Calories, Sleep, Heart Rate, Blood Pressure, Smoking, Alcohol, Exercise, Diabetic & Heart Disease status):

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 LINK: Health_activity_data

Answer: