Part 4: Scenario-Based Questions

9. Real-World Problem Solving

Question: Imagine you are given a large dataset with customer transactions. How would you approach the task of identifying key customer segments and their behaviours? Describe the steps and tools you would use.

Real-World Problem Solving: Customer Segmentation

Objective: Identify key customer segments and their behaviours from a large dataset with customer transactions.

Approach:

1. Understanding the Data

- **Initial Exploration:**
  - **Load and Inspect Data:** Importing the dataset Python. Examining the structure, types of data, and missing values.
  - **Descriptive Statistics:** Getting basic statistics (mean, median, distribution) to understand data ranges and distributions.
- **Identify Key Variables:**
  - Determining which variables are relevant for segmentation

2. **Data Pre-processing**

- **Handle Missing Values:**
  - Imputing missing values or removing incomplete records.
- **Normalize and Scale Data:**
  - Normalizing continuous variables to ensure they are on the same scale.
- **Feature Engineering:**
  - Creating new features if needed.

3. Segmentation Techniques

- **Clustering:**
  - **K-Means Clustering:**
    - Applying K-Means to segment customers based on their behaviours. Determining the optimal number of clusters using methods like the Elbow Method or Silhouette Score.
  - **Hierarchical Clustering:**
    - Using hierarchical clustering for a different perspective.
- **Segmentation Analysis:**
  - Analysing the segments to identify distinct customer behaviours and profiles. Comparing key metrics (e.g., average transaction value, frequency) across segments.

4. Visualization and Interpretation

- **Visualize Segments:**
  - Using scatter plots, bar charts, and pie charts to visualize segment characteristics.

- **Profile Each Segment:**
    - Summarizing the key attributes and behaviours of each segment. Preparing reports highlighting customer profiles, needs, and potential marketing strategies.

5. Tools and Software

- **Python:**
    - Using libraries such as pandas, scikit-learn, and seaborn in Python for analysis and visualization.
- **Tableau/Power BI:**
    - For visualization and dashboard creation, using Tableau or Power BI to present segments interactively and derive actionable insights.
- **Excel:**
    - For smaller datasets or preliminary analysis, Excel can be used for data exploration and basic visualizations.

Summary

1. **Data Preparation:** Load, clean, and pre-process the data.
2. **Segmentation:** Apply clustering techniques like K-Means or Hierarchical Clustering to identify customer segments.
3. **Analysis and Visualization:** Analyse the segments to understand their characteristics and visualize findings.
4. **Tools:** Utilize Python for analysis and tools like Tableau/Power BI for visualization.

10. Data-Driven Decision Making

Question: A company wants to launch a new product and has collected survey data on

customer preferences. How would you use this data to help the company make an informed decision?

Data-Driven Decision Making: Launching a New Product

Objective: Using survey data on customer preferences to help the company make an informed decision about launching a new product.

Approach:

1. Understand the Survey Data

2. Data Cleaning and Preparation

3. Analyse Customer Preferences

- **Descriptive Analysis:**
    - **Frequency Distribution:** Determining how often each preference or rating appears.
    - **Cross-Tabulation:** Exploring relationships between different survey questions (e.g., product features preferred by different age groups).
- **Statistical Analysis:**
    - **Hypothesis Testing:** Conducting tests to determine if differences in preferences are statistically significant.

4. Visualize Findings

- **Charts and Graphs:**
  - **Bar Charts:** Displays the frequency of each preference or rating.
  - **Pie Charts:** Shows the proportion of each preference or feature interest.
  - **Heat maps:** Illustrates correlations or preference patterns across different groups.
- **Dashboard:**
  - **Interactive Dashboard:** Creating an interactive dashboard in Tableau or Power BI to allow stakeholders to explore the data dynamically.

5. Derive Insights and Recommendations

- **Summarize Key Findings:**
  - **Customer Preferences:** Identifying the most preferred product features and any significant trends or segments.
  - **Demographic Insights:** Highlighting preferences across different demographics (e.g., age groups, income levels).
- **Make Recommendations:**
  - **Product Features:** Recommending features or improvements based on the most popular preferences.
  - **Marketing Strategy:** Suggesting targeted marketing strategies for different customer segments.
  - **Pricing and Positioning:** Advising on pricing strategies based on customer willingness to pay and preferences.

6. Present the Results

- **Report:** Preparing a detailed report summarizing the analysis, insights, and recommendations.
- **Presentation:** Creating a presentation with key visualizations and findings to communicate effectively with stakeholders.