### **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.