Task 1: Exploratory Data Analysis (EDA) and Business Insights

1. Objective

To perform Exploratory Data Analysis (EDA) on the provided dataset and derive actionable business insights to guide decision-making.

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2. Dataset Overview

The dataset includes the following components:

- **Customers.csv**: Contains customer details such as ID, region, and signup date.
- **Products.csv**: Includes product information like name, category, and price.
- **Transactions.csv**: Records customer transactions, including product purchases, quantities, and total transaction values.

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3. Business Insights from EDA

Insight 1: Regional Distribution of Customers

- **South America** holds the largest customer base, contributing **58%** of the total customers, followed by **Europe** (50%), **North America** (47%), and **Asia** (45%).
- This regional distribution presents a significant opportunity to enhance market strategies focused on **South America** and **Europe**, which should include localized promotions and campaigns tailored to regional preferences. Expanding brand presence in these regions can drive customer engagement and revenue.

Insight 2: High-Performing Product Categories

- The product categories of **Books** and **Electronics** each contribute **25%** to the total product sales. This demonstrates their strong customer demand.
- To capitalize on this, targeted promotional campaigns, discounts, and seasonal offers focused on these high-performing categories can further increase sales. Additionally, product diversification or bundling options could attract a broader customer base within these categories.

Insight 3: Declining Transaction Trends

- The month-by-month transaction analysis reveals that **Month 1** has the highest transaction rate, contributing **10.97%** of total sales, while **Month 11** shows a significant decline to **5.98%**.
- To counter this decline, businesses should implement strategies to maintain momentum during off-peak months. Consider offering exclusive deals, early access to

sales, and loyalty rewards to keep customers engaged throughout the year, particularly in **Month 11**.

Insight 4: Monthly Transaction Variability

- **Months 7-9** show steady transaction percentages of around **9.5%**, indicating a period of stable customer engagement.
- Businesses should maintain consistent promotional activity during these months, ensuring that customers remain engaged with new arrivals, regular discounts, and ongoing sales events. This strategy can prevent sales stagnation during mid-year periods.

Insight 5: Strong Customer Engagement in South America

- **South America** is the dominant region in terms of customer engagement, with **58%** of the total customer base located here.
- Increased investment in marketing and product localization in **South America** can further boost customer loyalty and brand recognition. Establishing partnerships with regional distributors and offering products suited to local tastes could drive greater customer retention and acquisition in the region.

Insight 6: Price Distribution of Products

- The product prices vary significantly, with a **mean price** of **267.55** and a **range** from **16.08** to **497.76**. The **interquartile range (IQR)** is between **147.77** and **397.09**.
- This price distribution suggests that the product portfolio includes both affordable and premium items. To maximize sales, introducing **mid-range priced products** could cater to a larger segment of customers. Offering discounts on premium products, especially during high-traffic sales periods, can help attract budget-conscious customers while maintaining high-margin sales for premium offerings.

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4. Recommendations

Based on the above insights, the following business recommendations are suggested:

- **Regional Focus:** Strengthen regional marketing efforts in **South America** and **Europe** to expand market penetration.
- **Product Promotions:** Introduce exclusive promotions for **Books** and **Electronics**, leveraging their high sales potential.
- **Sales Strategy for Declining Periods:** Develop marketing campaigns to boost engagement and transactions during months showing a decline in sales, such as **Month 11**.
- **Mid-Year Stability:** Increase promotional efforts during **Months 7-9** to capitalize on steady sales trends.
- **South American Market:** Invest in localized marketing and regional partnerships to enhance customer engagement and brand loyalty in **South America**.

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5. Deliverables

- **EDA Code**: Includes detailed visualizations and descriptive statistics for revenue distribution, product demand, regional sales, customer segmentation, and signup trends.

Visualization Highlights:

1. Bar chart showing revenue distribution by product categories.
2. Regional revenue contribution pie chart.
3. Spending distribution histogram for customer segmentation.
4. Line graph showing product demand by pricing tiers.
5. Seasonal trends in customer signups.