

# Code Summary :

## 1. Data Import and Preparation:

- Loaded three datasets (Transactions.csv, Products.csv, and Customers.csv) into separate DataFrames using Pandas.
- Performed an initial inspection using .head(), .info(), .isnull().sum(), and .describe() to understand the data structure and check for missing values (none found).

## 2. Initial Data Analysis:

- Products DataFrame: Contains 100 products with attributes like ProductID, ProductName, Category, and Price. Categories include Books, Electronics, etc.
- Transactions DataFrame: Contains 1000 transaction records with details like TransactionID, CustomerID, ProductID, Quantity, and TotalValue. Insights show:
  - Average transaction quantity: 2.54
  - Highest price of products: \$497.76
- Customers DataFrame: Contains 200 customer records with details like CustomerID, CustomerName, Region, and SignupDate. Insights show:
  - Largest customer base in South America (29.5%).

## 3. Visualization:

- Created a pie chart showing customer distribution by region. South America accounts for the highest share of customers (29.5%).

## 4. Data Merging:

- Merged the three datasets on CustomerID and ProductID to create a unified DataFrame with all customer, product, and transaction details.

## 5. Refining the Dataset:

- Dropped unrelated columns (CustomerID, CustomerName, etc.).
- Renamed the Price\_y column to Price.

## 6. Revenue and Category Analysis:

- Regional Revenue: South America generates the highest revenue, contributing \$219,352.56.
- Category-wise Sales:

- Highest quantity of products sold: Books (681 units).
- Strong demand in Books and Home Decor categories.

#### **7. Region-Specific Insights:**

- Filtered data for South America, North America, Europe, and Asia.
- South America:
  - Dominant categories: Books and Home Decor with high sales quantities.
  - Average quantity per category: Books (2.68), Home Decor (2.67).

### **Key Findings:**

#### **1. Region Performance:**

- South America leads in customer count (304 customers) and revenue.
- Focused marketing efforts in South America could yield higher returns.

#### **2. Category Demand:**

- Books have the highest sales overall, suggesting strong customer interest.
- Electronics and Home Decor also show significant contributions.

#### **3. Strategic Recommendations:**

- Invest in promoting books and home decor, especially in South America.
- Analyze customer preferences for targeted campaigns in underperforming regions like Asia.