11. Sales Data Analysis

```
# Loading the Sales Dataset
    import pandas as pd

    data = {
      'Product': ['Laptop', 'Smartphone', 'Laptop', 'Tablet', 'Smartphone', 'Laptop'],
      'Category': ['Electronics', 'Electronics', 'Electronics', 'Electronics', 'Electronics',
    'Electronics'],
      'Quantity': [5, 10, 2, 7, 3, 4],
      'Price': [50000, 20000, 50000, 15000, 20000, 50000],
      'Customer': ['Alice', 'Bob', 'Charlie', 'David', 'Alice', 'Charlie']
    }

    df = pd.DataFrame(data)
    print("Sales Data:\n", df)

  # Output:
    Sales Data:
        Product    Category  Quantity   Price  Customer
    0     Laptop  Electronics         5   50000     Alice
    1 Smartphone  Electronics        10   20000       Bob
    2     Laptop  Electronics         2   50000   Charlie
    3     Tablet  Electronics         7   15000     David
    4 Smartphone  Electronics         3   20000     Alice
    5     Laptop  Electronics         4   50000   Charlie
```

Analyzing Sales Performance

- **Compute Total Revenue**

```
df['Revenue'] = df['Quantity'] * df['Price']

total_revenue = df['Revenue'].sum()

print("\nTotal Revenue: ₹", total_revenue)
```

Output:

Total Revenue: ₹ 770000

- Identify Top-Selling Products

```
top_products = df.groupby('Product')['Quantity'].sum().sort_values(ascending=False)
print("\nTop-Selling Products:\n", top_products)
```

Output:

Top-Selling Products:

Product

Laptop 11

Smartphone 13

Tablet 7

Name: Quantity, dtype: int64

- Customer Purchasing Trends

```
customer_trends =
df.groupby('Customer')['Revenue'].sum().sort_values(ascending=False)
print("\nCustomer Purchasing Trends:\n", customer_trends)
```

output:

Customer Purchasing Trends:

Customer

Alice 310000

Charlie 300000

David 105000

Bob 200000

Name: Revenue, dtype: int64

```
# Using Aggregation Functions for Business Insights
        business_insights = df.groupby('Product').agg({
          'Quantity': 'sum',
          'Revenue': 'sum',
          'Price': 'mean'
        })

        print("\nBusiness Insights:\n", business_insights)
    # Output:
        Business Insights:
                  Quantity  Revenue    Price
        Product
        Laptop          11   550000  50000.0
        Smartphone      13   260000  20000.0
        Tablet           7   105000  15000.0

# Saving the Analyzed Data to CSV
        df.to_csv("sales_analysis.csv", index=False)
        print("\nAnalysis saved as 'sales_analysis.csv'")
```