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# ==============================
# Course-End Project
# Analyzing Customer Orders Using Python
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# Task 1: Create a list of customer orders & Store the orders
#customer's order details (customer name, product, price, category) as tuples inside a list
# Dictionary is used, where keys are customer names and values are lists of ordered products

# Each order = (customer name, product, price, category)
orders = [
    ("John", "Laptop", 900, "Electronics"),
    ("John", "Headphones", 50, "Electronics"),
    ("Jack", "T-Shirt", 25, "Clothing"),
    ("Jack", "Jeans", 40, "Clothing"),
    ("Michael", "Vacuum Cleaner", 120, "Home Essentials"),
    ("Michael", "Laptop", 900, "Electronics"),
    ("Danny", "Notebook", 10, "Home Essentials"),
    ("Danny", "Pen", 5, "Home Essentials"),
    ("Amy", "Smartphone", 700, "Electronics"),
    ("Amy", "Dress", 60, "Clothing")
]

# Dictionary: customer -> list of orders (product, price, category)
customer_orders = {}
for name, product, price, category in orders:
    customer_orders.setdefault(name, []).append((product, price, category))


# Task 2: Classify products by category ---
# Dictionary: product -> category
product_category = {product: category for _, product, _, category in orders}

# Unique product categories
categories = set(product_category.values())
print(" Available Product Categories:", categories)


# Task 3: Analyze customer spending & classification ---
customer_spending = {}
customer_classification = {}

for customer, items in customer_orders.items():
    total = sum(price for _, price, _ in items)
    customer_spending[customer] = total
```

Variables Terminal

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# Task 3: Analyze customer spending & classification ---
customer_spending = {}
customer_classification = {}

for customer, items in customer_orders.items():
    total = sum(price for _, price, _ in items)
    customer_spending[customer] = total

    if total > 100:
        customer_classification[customer] = "High-Value"
    elif 50 <= total <= 100:
        customer_classification[customer] = "Moderate"
    else:
        customer_classification[customer] = "Low-Value"


#Task 4: Generate business insights
# Revenue per category
category_revenue = {}
for _, product, price, category in orders:
    category_revenue[category] = category_revenue.get(category, 0) + price

# Unique products across all orders
unique_products = {product for _, product, _, _ in orders}

# Customers who purchased electronics
electronics_customers = [name for name, items in customer_orders.items()
                         if any(cat == "Electronics" for _, _, cat in items)]

# Top 3 highest-spending customers
top_customers = sorted(customer_spending.items(),
                       key=lambda x: x[1], reverse=True)[:3]

# Customers who purchased from multiple categories
multi_category_customers = {name for name, items in customer_orders.items()
                            if len({cat for _, _, cat in items}) > 1}

# Customers who purchased both electronics and clothing
electronics_buyers = {name for name, items in customer_orders.items()
                      if any(cat == "Electronics" for _, _, cat in items)}
clothing_buyers = {name for name, items in customer_orders.items()
                   if any(cat == "Clothing" for _, _, cat in items)}
common_customers = electronics_buyers & clothing_buyers
```

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# --- Step 5: Display results ---
print("\n--- Customer Spending & Classification ---")
for customer, total in customer_spending.items():
    print(f"{customer}: ${total} ({customer_classification[customer]})")

print("\n--- Revenue by Category ---")
for cat, revenue in category_revenue.items():
    print(f"{cat}: ${revenue}")

print("\n--- Key Insights ---")
print("Top 3 Customers:", top_customers)
print("Unique Products:", unique_products)
print("Electronics Customers:", electronics_customers)
print("Multi-Category Customers:", multi_category_customers)
print("Common Customers (Electronics & Clothing):", common_customers)
```

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Available Product Categories: {'Clothing', 'Home Essentials', 'Electronics'}

--- Customer Spending & Classification ---
John: $950 (High-Value)
Jack: $65 (Moderate)
Michael: $1020 (High-Value)
Danny: $15 (Low-Value)
Amy: $760 (High-Value)

--- Revenue by Category ---
Electronics: $2550
Clothing: $125
Home Essentials: $135

--- Key Insights ---
Top 3 Customers: [('Michael', 1020), ('John', 950), ('Amy', 760)]
Unique Products: {'Pen', 'Vacuum Cleaner', 'Headphones', 'Notebook', 'Dress', 'Jeans', 'Laptop', 'T-Shirt', 'Smartphone'}
Electronics Customers: ['John', 'Michael', 'Amy']
Multi-Category Customers: {'Michael', 'Amy'}
Common Customers (Electronics & Clothing): {'Amy'}
```