

Industry Problem Statement

Online Order & E-Commerce Checkout System (Python)

Business Background

An e-commerce company wants to build a Python-based checkout system to manage:

- Customer orders
- Product pricing and quantities
- Discounts and coupons
- Shipping charges
- Final invoice generation

The system should simulate a **real-world online shopping checkout flow**, implemented incrementally using clean coding practices.

Task 1: Capture Customer Details (Input Validation)

Objective

Collect and validate customer information.

Requirements

Write a program to accept:

- Customer ID
- Customer Name
- Delivery City

Business Rules

- Customer name must contain only alphabets
- Delivery city must not be empty

Expected Outcome

Validated customer profile for order processing.

Task 2: Capture Product Order Details

Objective

Record items added to the cart.

Requirements

Accept:

- Product ID
- Product Name
- Price per unit
- Quantity ordered

Business Rules

- Price must be **greater than 0**
- Quantity must be **at least 1**

Expected Outcome

Valid cart items ready for billing.

Task 3: Cart Subtotal Calculation

Objective

Calculate total cost of all cart items.

Formula

$$\text{Subtotal} = \Sigma (\text{Price} \times \text{Quantity})$$

Expected Outcome

Accurate cart subtotal.

Task 4: Coupon Code Validation

Objective

Validate promotional coupon codes.

Rules

- Coupon `SAVE10` → 10% discount
- Coupon `SAVE5` → 5% discount
- Any other code → Invalid

Expected Outcome

Validated coupon status.

Task 5: Discount Amount Calculation

Objective

Calculate discount based on valid coupon.

Formula

$$\text{Discount} = \text{Subtotal} \times \text{Discount Percentage}$$

Expected Outcome

Correct discount amount (0 if invalid).

Task 6: Shipping Charge Calculation

Objective

Apply shipping charges based on order value.

Rules

Subtotal	Shipping Charge
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≥ ₹5,000 Free

< ₹5,000 ₹100

Expected Outcome

Correct shipping charge applied.

Task 7: Final Payable Amount

Objective

Compute final amount payable by the customer.

Formula

Final Amount = Subtotal - Discount + Shipping Charge

Expected Outcome

Accurate checkout total.

Task 8: Order Summary (Procedural)

Objective

Generate an order summary before payment.

Summary Should Include

- Customer Name
- Cart Items
- Subtotal
- Discount
- Shipping Charge
- Final Amount

Task 9: Store Order History

Objective

Maintain order history for customers.

Requirements

- Store order details in a list of dictionaries

Expected Outcome

Structured order data storage.

Task 10: Order Class Design (OOP)

Objective

Model an online order as a real-world object.

Create class **Order** with:

Attributes

- order_id
- customer_name
- cart_items
- subtotal
- discount
- shipping_charge

Task 11: Cart Calculation Method

Objective

Encapsulate cart calculation logic.

Method

- calculate_subtotal()

Task 12: Discount Application Method

Objective

Encapsulate discount logic.

Method

- apply_coupon()

Task 13: Shipping Calculation Method

Objective

Encapsulate shipping logic.

Method

- calculate_shipping()

Task 14: Invoice Generation Method

Objective

Generate a professional invoice.

Method

- generate_invoice()

Task 15: Final Order Invoice Output

Objective

Display final invoice details.

Output Format (Example)

Order ID : ORD789

Customer Name : Neha Gupta
Subtotal : ₹4,200
Discount : ₹210
Shipping Charge : ₹100
Final Amount : ₹4,090
Order Status : Confirmed