UTM

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

SEMESTER 2 2024/2025

SECJ2154 OBJECT ORIENTED PROGRAMMING

SECTION 03

MINI PROJECT

ONLINE SHOPPING CART

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Video Presentation Link:
https://drive.google.com/file/d/17-Dbb2TPiXqPb0uQNWTDTSZNkf_Hsoqc/view?usp=sharing
GitHub Repository Link:
https://github.com/jygoe/The-GHL-Shooopppping-Glicchedd-Carrrt

1.0 Project Description

This project is a console-based online shopping cart system built in Java. It supports:

- Customers browse and add items to the shopping cart
- Administrators manage items and view/update customer orders (shopping cart)

The system uses object-oriented design principles to simulate real e-commerce scenarios, and applies Java's collection framework and exception handling to enhance functionality and stability.

2.0 Functional Requirement

The Online Shopping Cart System provides role-based functionality for both administrators and customers.

2.1 Admin Functionalities

1. View All Carts
    - Admins can view all shopping carts created by customers.
    - Each cart displays customer ID, item IDs, names, variant details, prices, and status.

2. Update Cart Status
    - Admins can select a cart by its ID and update its status.
    - Each cart's status can be changed to either Processing, Shipped, or Completed.

3. View Items
    - Admins can view the item catalog in a table.
    - Each item shows its ID, name, description, variants, price, and quantity.

4. Update Items
    - Admins can select an item by ID and:
        - Change the item's name, OR
        - Change the item's description, OR
        - Update a specific variant (name, price, quantity), OR
        - Add new variants to the item

5. Add New Item
    - Admins can add new items to the catalog by entering:
        - Item name and description
        - One or more variants (name, price, quantity)

2.2 Customer Functionalities

1. Add Cart (Place Order)
    - Customers can view available items and their variants.
    - Customers select items by their item ID and choose a variant.
    - The system checks if the selected variant is in stock.
    - Once confirmed, the item is added to the customer's cart.
    - Multiple items can be added before confirming the cart.

3.0 Topic Implemented

3.1 Chapter 5 Vectors & Collections

The ArrayList class is used to manage dynamic collections of objects. It stores different objects, such as users, items, and cart records without predefining the number of entries. The use of ArrayList allows the system to easily add, remove, and loop through elements.

Examples:

- `ArrayList<User> users`: stores both Customer and Admin accounts
- `ArrayList<Item> items`: stores the list of items
- `ArrayList<Integer> variantIndex`: stores different variant of a product

3.2 Chapter 6 Class Relationships

3.2.1 Association

The `Cart` class has an association with the `Customer` class with each cart belonging to a specific customer and customer is stored as a reference within the `Cart` object.

Example:

In `Cart` class, "`private Customer customer;`" exists.

3.2.2 Aggregation

The `CartHistory` class stores all `Cart` objects in an `ArrayList`. These carts can exist independently from the history, which shows a "has-a" but not "owns" relationship.

Example:

In `CartHistory` class, "`private ArrayList<Cart> carts`" exists.

3.2.3 Composition

The `Cart` class holds selected items and variant indices. When a `Cart` is destroyed, its combination of items and selections no longer holds meaning.

Example:
In `Cart` class, "`private ArrayList<Item> items; private ArrayList<Integer> variantIndex;`"

3.3 Chapter 7 Inheritance

Inheritance is used in this system to promote code reuse and reduce redundancy. A base class `User` is defined with shared attributes and methods such as `userId`, `password`, and `role`. The `Customer` and `Admin` classes extend the User class to inherit these common features.

Example:
```
class User {
    protected String userId;
    protected String password;
    protected int role;
    ...
}
class Customer extends User { ... }
class Admin extends User { ... }
```

3.4 Chapter 8 Polymorphism

Polymorphism allows a single variable of a superclass type to refer to objects of different subclasses. In this system, both `Customer` and `Admin` objects are stored in an `ArrayList<User>`.

Example:
```
ArrayList<User> users = new ArrayList<>();
users.add(new Customer("C1", "123"));
users.add(new Admin("A1", "123"));
```

3.5 Chapter 9 Exception Handling

Exception handling is used in the program to manage errors that occur during user input. This prevents the program from crashing and improves user experience. try-catch blocks are used to catch exceptions such as `InputMismatchException` and `NumberFormatException`.

Example:
```
try {
    choice = scanner.nextInt();
```

```
    scanner.nextLine();
} catch (InputMismatchException e) {
    System.out.println("Invalid input. Please enter a number.");
    scanner.nextLine(); }
```

4.0 Sample Output

4.1 Admin View

4.1.1 Admin Login

```
The GHL Shooopppping Glicchedd Carrrt
<<<<< Login >>>>>
UserID: A1
Password: 123
Sucessfully logged in.
```

4.1.2 Admin Main Menu

```
<<<<< Menu >>>>>
1. View Carts
2. Update Cart Status
3. View Items
4. Update Item
5. Add Item
6. Logout
7. Quit
```

4.1.3 Admin View Carts (Choice 1)

```
Enter choice: 1

CartId   | CustomerId     | ItemId    | Items           | Variants        | Price      | Status
CART0    | C1             | I0        | Notebook        | Blue Cover      |       2.49 | Pending
         |                | I1        | Backpack        | Gray            |      34.99 |
CART1    | C2             | I2        | Water Bottle    | Blue            |      10.49 | Completed
CART2    | C3             | I1        | Backpack        | Black           |      29.99 | Shipped
         |                | I2        | Water Bottle    | Clear           |       8.99 |
```

4.1.4 Admin Update Cart Status (Choice 2)

```
Enter choice: 2

<<<<< Update Cart Status >>>>>
CartId: CART0
CartId: CART0
CustomerId: C1
1. I0 Notebook  Variant: Blue Cover
2. I1 Backpack  Variant: Gray

Statuses
1. Processing
2. Shipped
3. Completed
New Status: 1
```

4.1.5 Admin View Items (Choice 3)

```
Enter choice: 3
```

ItemId	Items	Description	Variants	Price	Quantity
I0	Notebook	100 pages	Blue Cover	2.49	50
			Red Cover	2.49	75
I1	Backpack	Water-resistant	Black	29.99	20
			Gray	34.99	15
			Navy Blue	32.5	10
I2	Water Bottle	1-liter	Green	9.99	100
			Clear	8.99	80
			Blue	10.49	90

4.1.6 Admin Update Items (Choice 4)

```
Enter choice: 4

<<<<< Update Item >>>>>
ItemID: I2
I2 Water Bottle
Description: 1-liter
Variants
1. Green  Price: RM 9.99  Quantity: 100
2. Clear  Price: RM 8.99  Quantity: 80
3. Blue  Price: RM 10.49  Quantity: 90

Update I2
1. Update Name
2. Update Description
3. Update Variant
4. Add Variant
5. Quit Updating
Choice: 2
New Description: 2-liter
```

4.1.7 Admin Add Item (Choice 5)

```
Enter choice: 5

<<<<< New Item >>>>>
Name: Pencil
Description: 2B
Number of variants: 1
Variant 1
Variant Name: Black
Variant Price: RM 0.50
Variant Quantity: 16
```

4.2 Customer View

4.2.1 Customer Login

```
The GHL Shooopppping Glicchedd Carrrt
<<<<< Login >>>>>
UserID: C1
Password: 123
Sucessfully logged in.
```

4.2.2 Customer Main Menu

```
<<<<< Menu >>>>>
1. Add Cart
2. Logout
```

4.2.3 Customer Add Cart (Choice 1)

```
Enter choice: 1

<<<<< Items Available >>>>>
ItemId     | Items           | Description       | Variants      |      Price | Quantity
I0         | Notebook        | 100 pages         | Blue Cover    |       2.49 | 50
           |                 |                   | Red Cover     |       2.49 | 75
I1         | Backpack        | Water-resistant   | Black         |      29.99 | 20
           |                 |                   | Gray          |      34.99 | 15
           |                 |                   | Navy Blue     |       32.5 | 10
I2         | Water Bottle    | 2-liter           | Green         |       9.99 | 100
           |                 |                   | Clear         |       8.99 | 80
           |                 |                   | Blue          |      10.49 | 90
I3         | Pencil          | 2B                | Black         |        0.5 | 16
<<<<< New Cart >>>>>
ItemId: I2
I2 Water Bottle
Description: 2-liter
Variants
1. Green  Price: RM 9.99  Quantity: 100
2. Clear  Price: RM 8.99  Quantity: 80
3. Blue  Price: RM 10.49  Quantity: 90

Variant Number: 3
Do you want to add another item? (0-No | 1-Yes): 1

ItemId: I3
I3 Pencil
Description: 2B
Variants
1. Black  Price: RM 0.5  Quantity: 16

Do you want to add another item? (0-No | 1-Yes): 0

CartId: CART3
CustomerId: C1
1. I2 Water Bottle  Variant: Blue
2. I3 Pencil  Variant: Black

Cart Added with ID: CART3
```

5.0 Class Diagram