Implementation of Facade Design Pattern

We have implemented the Facade Design Pattern to show the implementation of one of the Structural Patterns. We have implemented a feature similar to the “Buy Now” in Amazon, where when the customer enters a product ID, the system completes the entire order (if the item is available), including the payment, before letting the customer buy another item. If the item (product ID) is not available, the customer will see the following message: “***Item is out of stock. Order cannot be completed.***”

The product ID to be entered by the user must be between 1 and 5000 or the status (number of products) must be greater than 0 to successfully complete the order.

Facade design pattern provides a unified interface to a set of interfaces in a subsystem. Facade defines a higher-level interface that makes the subsystem easier to use.

Subsystems in our code:

- inventorySubsystem
    - Class 1: Stock
    - Class 2: Product
- orderSubsystem
    - Class 1: ShoppingCart
    - Class 2: Order
- paymentSubsystem
    - Class: Payment
- shipmentSubsystem
    - Class: Shipment

Implementation inside the classes:

1. **Stock class:** product IDs from 1 to 5000 are available in stock. For each product ID, the quantity of the product is 5. Hashmap is used to keep track of the product IDs and product availability.
2. **Product class:** This class returns the price of the product ordered. As of now it returns $40 for each product.
3. **ShoppingCart class:** adds the product to the cart and initiates the check out feature.
4. **Order class:** creates the order and shows the price to be paid by the client.
5. **Payment class:** verifies payment details and checks whether payment is completed or not.
6. **Shipment class:** creates the shipment of the order.

Steps to compile and run the code:

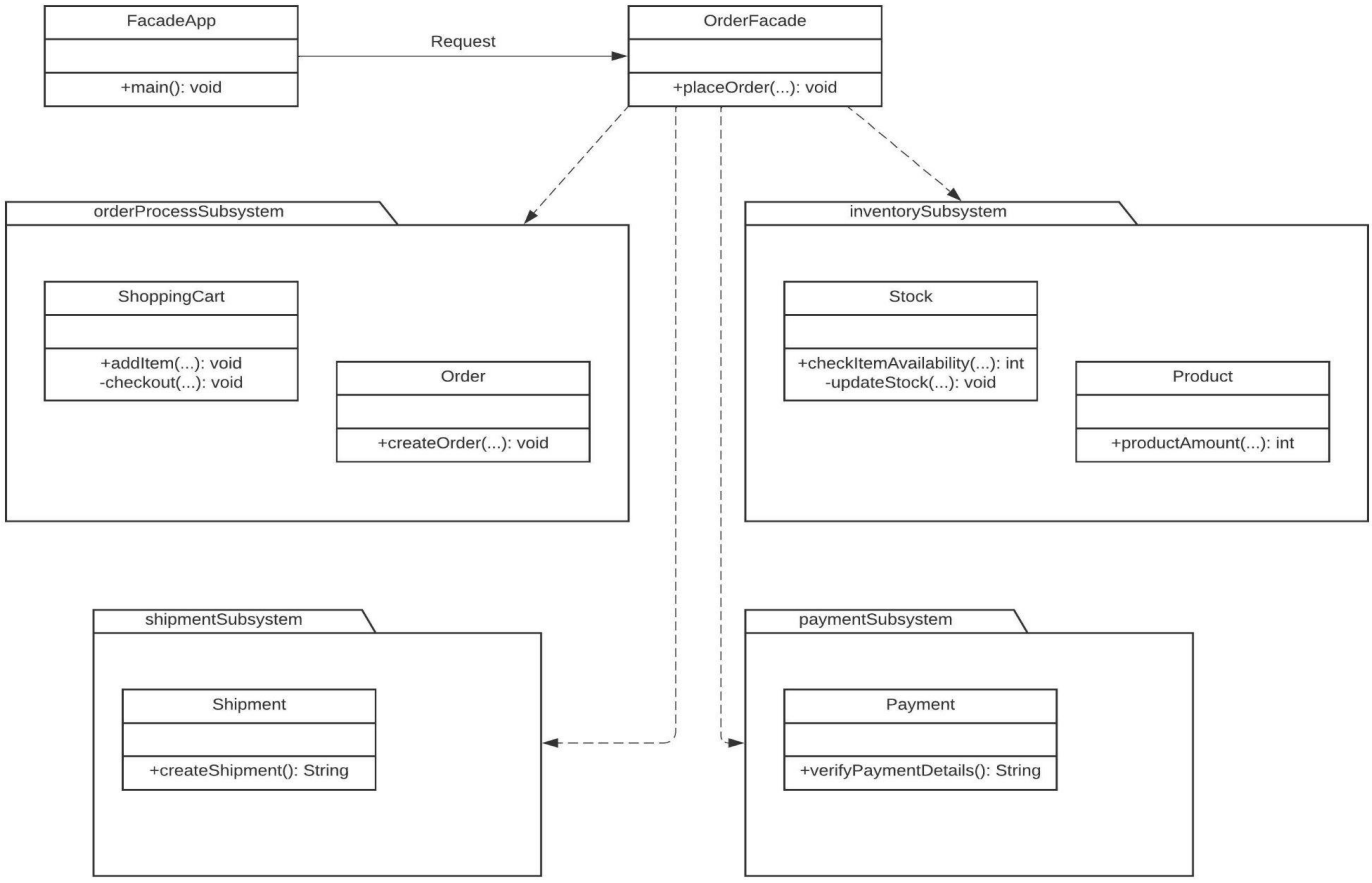
1. javac FacadeApp.java
2. Java FacadeApp

Output Screenshot:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL                                   Java Process Console

(base) pragyas@Pragyas-MBP facadePattern %  cd /Users/pragyas/Desktop/facadePattern ; /usr/bin/env /Library/Java/JavaVirtualMachines/jdk-16.0.1.jdk/Contents/Home/bin/java -XX:+ShowCodeDetailsInExceptio
nMessages -cp "/Users/pragyas/Library/Application Support/Code/User/workspaceStorage/d9363a027bf36229d01a5adefff61188/redhat.java/jdt_ws/facadePattern_23823701/bin" FacadeApp
Enter the product ID to be purchased:
90
Item is available.
Item is added to the cart.
Checkout initiated.
Order is created. Processing payment of $40.
Payment details are verified. Payment process completed.
Shipment is created.
===== ORDER SUCCESSFULL =====
Do you want to enter more (y/n):
y
Enter the product ID to be purchased:
6732
Item is out of stock. Order cannot be completed.
Do you want to enter more (y/n):
n
(base) pragyas@Pragyas-MBP facadePattern %
```

Facade Pattern Class Diagram:



Sequence Diagram (Implementation of Facade Design Pattern):