FACULTY OF COMPUTING

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SECJ2154 – OBJECT ORIENTED PROGRAMMING

SECTION 2

PROJECT REPORT

MINI PROJECT TITLE: MyPerfume Ordering and Billing System

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INTRODUCTION

Small-scale perfume businesses often rely on manual processes such as handwritten logs, basic calculators, and spreadsheets for managing customer orders and billing. While manageable during low sales volume, this approach becomes increasingly inefficient and error-prone as the business grows. Key operational issues include:

1. **Inefficient Sales Tracking**
   Without a centralized system, tracking customer orders and identifying best-selling perfumes is cumbersome and lacks real-time insights.

2. **Frequent Billing Errors**
   Manual calculation of totals, especially for multiple items, increases the risk of human error, leading to inaccurate charges and potential customer dissatisfaction.

3. **Disorganized Inventory Monitoring**
   Manual stock updates can result in overselling or stockouts, harming customer trust and business reliability.

4. **Lack of Receipt Documentation**
   Verbal confirmations or paper receipts are prone to loss, miscommunication, and poor record-keeping.

To overcome these limitations, an automated solution is essential. The proposed **MyPerfume Ordering and Billing System** is a Java-based application that leverages object-oriented programming principles to streamline core business operations such as customer management, order processing, billing, inventory tracking, and digital receipt generation. By automating these functions, the system reduces human error, increases efficiency, enhances scalability, and provides better customer service.

PROBLEM STATEMENT

Manual implementation of perfume sales in small business typically relies on handwritten records, spreadsheets, or basic calculators. While this method may work for low-volume sales, it quickly becomes inefficient, error-prone, and difficult to scale as the business grows. Below are several significant challenges encountered in such a manual environment.

1. **Lack of Organized Sales Tracking**

   Perfume sales usually recorded manually without a centralized system. This leads to difficulty in retrieving past records, calculating overall performance, or monitoring the popularity of certain products over time.

2. **Manual Bill Calculation Errors**

   Calculations for total costs are done by hand or calculator, especially when multiple perfume types are purchased at once. This increases the likelihood of arithmetic errors, undercharging or overcharging customers.

3. **Poor Inventory Awareness**

   Manual sales tracking does not automatically reflect stock levels. Employees must manually update inventory, which increases the chance of running out of stock unknowingly or ordering excess supply.

4. **No Automated Receipt Generation**

   Paper receipts or verbal confirmations are used instead of digital receipts. These are easy to lose and difficult to organize, leading to poor documentation and accountability.

To address the limitations of manual processes, the MyPerfume Ordering and Billing System application introduces a structured, object-oriented solution developed using Java. This system automates key processes such as order placement, billing, and sales tracking to improve business efficiency and reduce human error. The following functionalities are included in the system:

1. **Automated Sales Tracking per Perfume**

   Each perfume item is represented as a Perfume object with built-in attributes for tracking quantity sold and total sales. This allows for real-time monitoring of product performance

and simplifies sales reporting

2. **Order handling with Quantity Management**

   Orders are captured using an abstract Order class that allows for adding multiple perfumes with specific quantities. This ensures flexibility and efficiency when processing different types of purchases.

3. **Total Cost Calculation via Interface**

   By implementing a Bill interface, the system provides a clean structure to calculate the total amount due. This ensures billing consistency and avoids calculation errors.

4. **Bill Generation in Text Files**

   The system generates digital receipts by writing bill details into a .txt file, ensuring each transaction is properly documented. These receipts can be stored, shared, or printed as needed.

5. **Object-Oriented Design for Scalability**

   The modular code structure using classes, interfaces, and abstraction allows easy enhancement of features, such as integrating discounts, applying tax, or transitioning to a graphical interface in the future.

OBJECTIVES

The primary objective of the MyPerfume Ordering and Billing System is to design and develop an efficient, automated solution for managing perfume sales operations in small businesses using Java and object-oriented programming. Specifically, this project aims to:

1. **Automate Sales and Order Management**
   Develop a system that allows users to input and process multiple perfume orders efficiently, minimizing manual work and errors.

2. **Ensure Accurate Billing and Receipt Generation**
   Calculate total order cost using standardized logic via an interface, and generate clear, organized digital receipts in text file format for every transaction.

3. **Track Inventory and Sales Performance**
   Enable the system to keep track of how many units of each perfume are sold, allowing for performance monitoring and inventory planning.

4. **Enhance Business Efficiency and Customer Satisfaction**
   Reduce operational inefficiencies and billing inaccuracies, thereby improving customer experience and supporting business scalability.

5. **Lay Foundation for Future Feature Expansion**
   Design the system with scalability in mind, allowing future integration of advanced features such as discount calculation, tax application, or graphical user interfaces (GUIs).

PROJECT DESIGN (CLASS DIAGRAM)

The following diagram is the class diagram for the MyPerfume Ordering and Billing System.
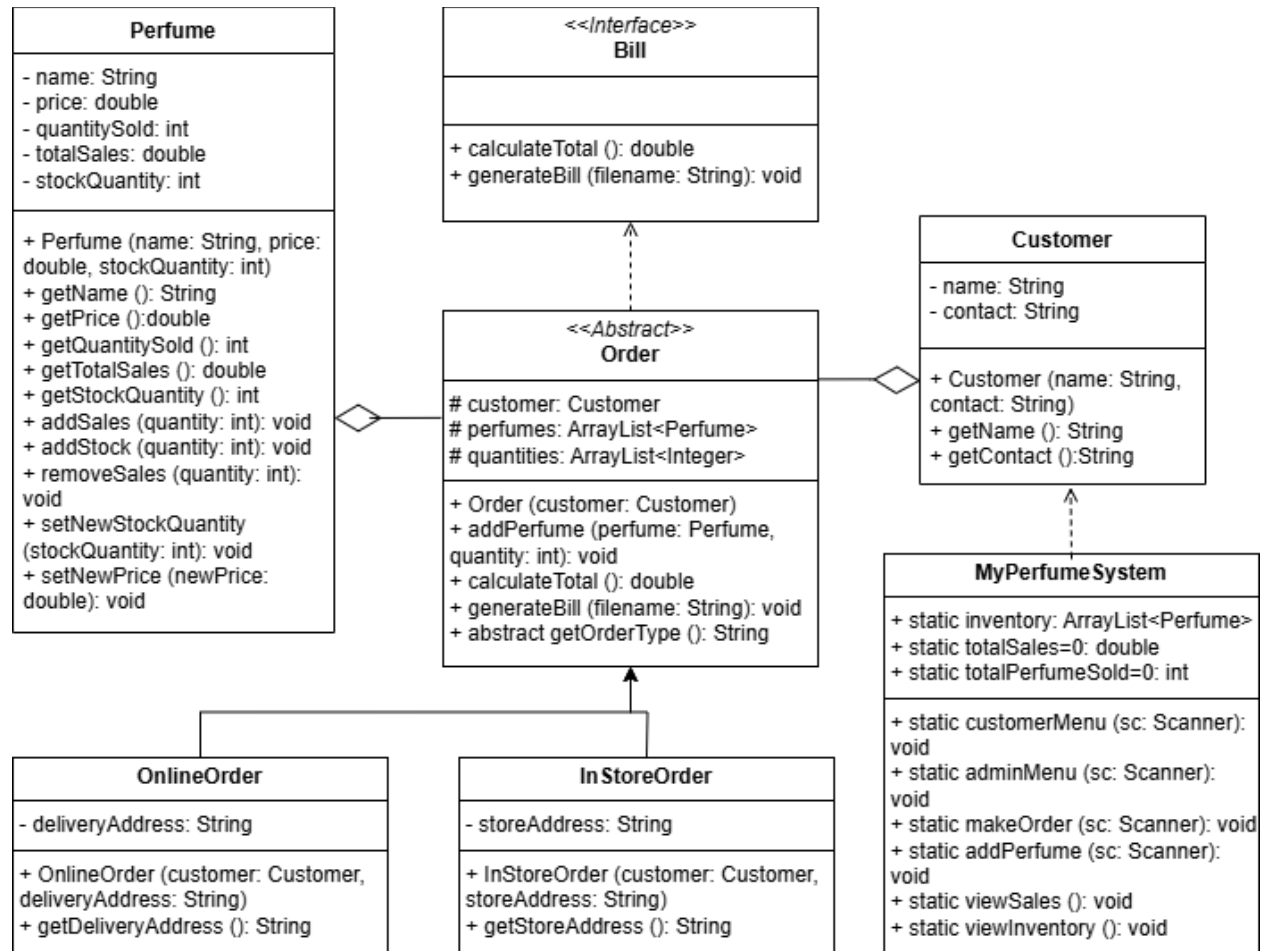

Figure 1 Class Diagram of MyPerfume Ordering and Billing System

PROJECT OUTPUT (SCREENSHOTS)

```
Welcome to MyPerfume Ordering and Billing System

===== Login Menu =====
1. Customer Login
2. Admin Login
3. Exit
Choose option: 1
Enter username: cust123
Enter password: 1234

===== Customer Menu =====
1. Make new order
2. Logout
Enter choice: 1
Enter customer name: MEERASHNI
Enter customer contact: 0111133445
Is this order Online or InStore? (O/I): I
```

```
Available Perfumes:
1. Rose Essence (RM50.00) - Stock: 20
2. Lavender Bliss (RM60.00) - Stock: 15
Enter perfume number to order (Enter -1 to end order): 2
Enter quantity: 3

Available Perfumes:
1. Rose Essence (RM50.00) - Stock: 20
2. Lavender Bliss (RM60.00) - Stock: 12
Enter perfume number to order (Enter -1 to end order): 1
Enter quantity: 7

Available Perfumes:
1. Rose Essence (RM50.00) - Stock: 13
2. Lavender Bliss (RM60.00) - Stock: 12
Enter perfume number to order (Enter -1 to end order): -1

=== Bill for MEERASHNI (InStore Order) ===
Contact: 0111133445
Store Address: 123, Taman University

Lavender Bliss         x3   @ RM60.00 = RM180.00
Rose Essence           x7   @ RM50.00 = RM350.00

Total: RM530.00

Bill generated: MEERASHNI_bill.txt
```

```
=== Bill for MEERASHNI (InStore Order) ===
Contact: 0111133445
Store Address: 123, Taman University

Lavender Bliss          x3   @ RM60.00 = RM180.00
Rose Essence            x7   @ RM50.00 = RM350.00

Total: RM530.00
```

```
===== Customer Menu =====
1. Make new order
2. Logout
Enter choice: 2
Logging out...

===== Login Menu =====
1. Customer Login
2. Admin Login
3. Exit
Choose option: 2
Enter username: admin123
Enter password: 1234
```

```
===== Admin Menu =====
1. View total sales
2. View inventory
3. Logout
Enter choice: 1
Total sales: RM530.0
Total perfumes sold: 10
Rose Essence - Units Sold: 7, Total Sales: RM350.00
Lavender Bliss - Units Sold: 3, Total Sales: RM180.00

===== Admin Menu =====
1. View total sales
2. View inventory
3. Logout
Enter choice: 2

=== Perfume Inventory ===
No.   Name                 Price       Quantity Sold   Stock Left
1     Rose Essence         RM50.00     7               13
2     Lavender Bliss       RM60.00     3               12

Inventory Management Options:
1. Manage existing perfume
2. Add new perfume
3. Back to main menu
```

```
Choose option: 1
Enter perfume number: 1
1. Add stock
2. Remove stock
3. Set new stock quantity
4. Update price

Choose action: 1
Enter quantity to add: 10
Stock updated. New stock: 23

=== Perfume Inventory ===
No.   Name                  Price       Quantity Sold   Stock Left
1     Rose Essence          RM50.00     7               23
2     Lavender Bliss        RM60.00     3               12

Inventory Management Options:
1. Manage existing perfume
2. Add new perfume
3. Back to main menu

Choose option: 1
Enter perfume number: 2
1. Add stock
2. Remove stock
3. Set new stock quantity
4. Update price

Choose action: 3
Enter new stock quantity: 48
Stock updated. New stock: 48

=== Perfume Inventory ===
No.   Name                  Price       Quantity Sold   Stock Left
1     Rose Essence          RM50.00     7               23
2     Lavender Bliss        RM60.00     3               48
```

```
Inventory Management Options:
1. Manage existing perfume
2. Add new perfume
3. Back to main menu

Choose option: 1
Enter perfume number: 2
1. Add stock
2. Remove stock
3. Set new stock quantity
4. Update price

Choose action: 4
Enter new price: RM2
Price updated. New price: RM2.0

=== Perfume Inventory ===
No.  Name                Price      Quantity Sold   Stock Left
1    Rose Essence        RM50.00    7               23
2    Lavender Bliss      RM2.00     3               48
```

```
Inventory Management Options:
1. Manage existing perfume
2. Add new perfume
3. Back to main menu

Choose option: 2
Enter perfume name: Black pearl essence
Enter perfume price: 200.00
Enter stock quantity: 39
Perfume added.

=== Perfume Inventory ===
No.  Name                Price      Quantity Sold   Stock Left
1    Rose Essence        RM50.00    7               23
2    Lavender Bliss      RM2.00     3               48
3    Black pearl essence RM200.00   0               39
```

```
Inventory Management Options:
1. Manage existing perfume
2. Add new perfume
3. Back to main menu

Choose option: 3

===== Admin Menu =====
1. View total sales
2. View inventory
3. Logout
Enter choice: 1
Total sales: RM530.0
Total perfumes sold: 10
Rose Essence - Units Sold: 7, Total Sales: RM350.00
Lavender Bliss - Units Sold: 3, Total Sales: RM180.00

===== Admin Menu =====
1. View total sales
2. View inventory
3. Logout
Enter choice: 3
Logging out...
```

```
===== Login Menu =====
1. Customer Login
2. Admin Login
3. Exit
Choose option: 3
Exiting system...
PS C:\Users\ASUS>
```

CONCLUSION

The MyPerfume Ordering and Billing System successfully addresses the operational challenges commonly faced by small-scale perfume business that rely on manual processes. By implementing object-oriented principles in Java, the system offers an organized, modular, and scalable solution to streamline key business functions such as order placement, customer management, billing, inventory tracking, and receipt generation.

Through features like automated sales tracking, structured customer data handling, accurate billing via interface implementation, and digital receipt creation, the system reduces human error, enhances operational efficiency, and improves the overall customer and worker experience. Furthermore, the use of abstract classes, interfaces, and encapsulation ensures that the system is easily maintainable and expandable for future enhancements.

Overall, the project demonstrates the practical application of object-oriented programming concepts in solving real-world problems and lays a strong foundation for continued development and adaptation to more advanced business needs.

APPENDICES (JAVA FILES)

Link to view full coding:

https://drive.google.com/file/d/1YldfHvUomH0_3sGKL2Bopj5ey_179w8Q/view?usp=sharing