

Declaration of Original Work for SC2002 Assignment

We hereby declare that the attached group assignment has been researched, undertaken, completed, and submitted as a collective effort by the group members listed below.

We have honored the principles of academic integrity and have upheld Student Code of Academic Conduct in the completion of this work.

We understand that if plagiarism is found in the assignment, then lower marks or no marks will be awarded for the assessed work. In addition, disciplinary actions may be taken.

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DESIGN CONSIDERATIONS

SOLID PRINCIPLE:

To avoid a rotting design characterised by rigidity, fragility and immobility, we anchored the design on our system on the SOLID principles. By doing so, we are able to improve reusability, extensibility and mobility of the system, enabling us to achieve loose coupling and high cohesion.

1. Single responsibility principle (SRP)

Using SRP, which states that a class should have only one reason to change, we created classes that only have a single responsibility. For instance, the ‘NewOrder’ class is only responsible for storing the order information as well as updating the order statuses. The only reason to change it is if new status types are introduced. The segregation of responsibilities among classes reduces coupling which increases flexibility and modularity of our system. As such, we are able to make changes to a class in the system with minimal impacts on the other classes.

2. Liskov substitution principle (LSP)

According to the LSP, objects of a superclass should be replaceable with objects of a subclass without affecting the application which means that subclasses should not require their methods to be used in a more restrictive way than the superclass. We created a ‘PaymentMethod’ abstract class which defines a contract for payment operations that all payment types within our system adhere to. The subclasses, ‘Cash()’, ‘OnlineBanking()’ and ‘CreditCard()’, will provide their own implementation of the method declared in ‘PaymentMethod’. As the method remains the same for the subclasses, they are able to replace ‘PaymentMethod’ without altering the correct functioning of the system.

3. Interface segregation principle (ISP)

As the ISP states that no client should be forced to depend on methods it does not use and many client specific interfaces are better than one general-purpose interface, we strategically created specific interfaces. This promotes reusability and extensibility of our system. For instance, the ‘BranchStaffList’ interface defines methods only necessary for ‘ConcreteBranchStaffList’.

4. Open/closed principle (OCP)

Considering OCP, we have designed our system such that the classes and functions are open for extension but closed for modification. One such abstract class, ‘PaymentMethod’, was created to facilitate addition of new payment options without modifying existing code. We are able to extend the functionality of payments without the need to change the classes that depend on the ‘PaymentMethod’ class.

5. Dependency inversion principle (DIP)

In line with the DIP, we ensured that the classes do not rely directly on concrete implementations but rather on interfaces and abstractions. We created interfaces such as branch staff list and concrete branch staff list class which implements the methods. Classes such as staff list are reliant on branch staff list instead of concrete branch staff list which ensures flexibility in introducing new functionalities. Another example is the payment method with the classes - online banking and credit card extensions. This inversion enables us to more easily add a new method of payment.

APPROACH TAKEN:

Abstraction:

Abstraction is achieved by the separation of implementation details from the abstract concepts and behaviours by using abstract classes and interfaces. For the reusability, extensibility, and modularity, as new branch types, payment methods, or staff management implementations can be added without modifications. Usage of Abstraction can be seen in:

1. Abstract Class ‘PaymentMethod’: It has an abstract method called processPayment(). Concrete classes like OnlineBanking(), CreditCard(), and Cash() extend this abstract class. These 3 classes have to implement processPayment().
2. Interface ‘BranchStaffList’: It declares methods like addStaffToBranch(Account Staff), promoteToManager(String username), etc. The ConcreteBranchStaffList class implements this interface and provides the actual implementation for these methods.

Inheritance:

Inheritance is a mechanism that allows a class to inherit properties and methods from another class, known as the superclass or parent class. The class that inherits is called the subclass or child class. The code promotes code reuse and avoids duplication of common properties and methods across related classes by the usage of inheritance. Subclasses can inherit and extend the functions of their superclasses, while also adding their own specific behaviour. The usage of inheritance can be seen in:

1. Account Class Hierarchy:

- a. ‘Account’ – ‘Name’, ‘age’, ‘gender’, ‘LoginUsername’, and ‘role’
- b. ‘ManagerStaff’ and ‘NormalStaff’ extends ‘Account’

2. Branch Class Hierarchy:

- a. ‘Branch’ – ‘location’, ‘staffQuota’ and ‘addOrderToBranchList(NewOrder order)’

- b. ‘NTUBranch’, ‘JPBranch’, ‘JEBranch’ extend ‘Branch’

Polymorphism:

Polymorphism is the ability of an object to take on many forms. It allows objects of different classes to be treated as objects of a common superclass. The code achieves flexibility and extensibility by the leverage of polymorphism. Objects of different classes can be treated as objects of a common superclass or interface, which allows code to reuse and the ability to write more generic and maintainable code. The usage of polymorphism can be seen in:

1. Method Overloading:

There are 2 editStaff methods: editStaff(String username, String newUsername) and editStaff(String username, int newAge). While both methods have the same name, different parameters are passed into them.

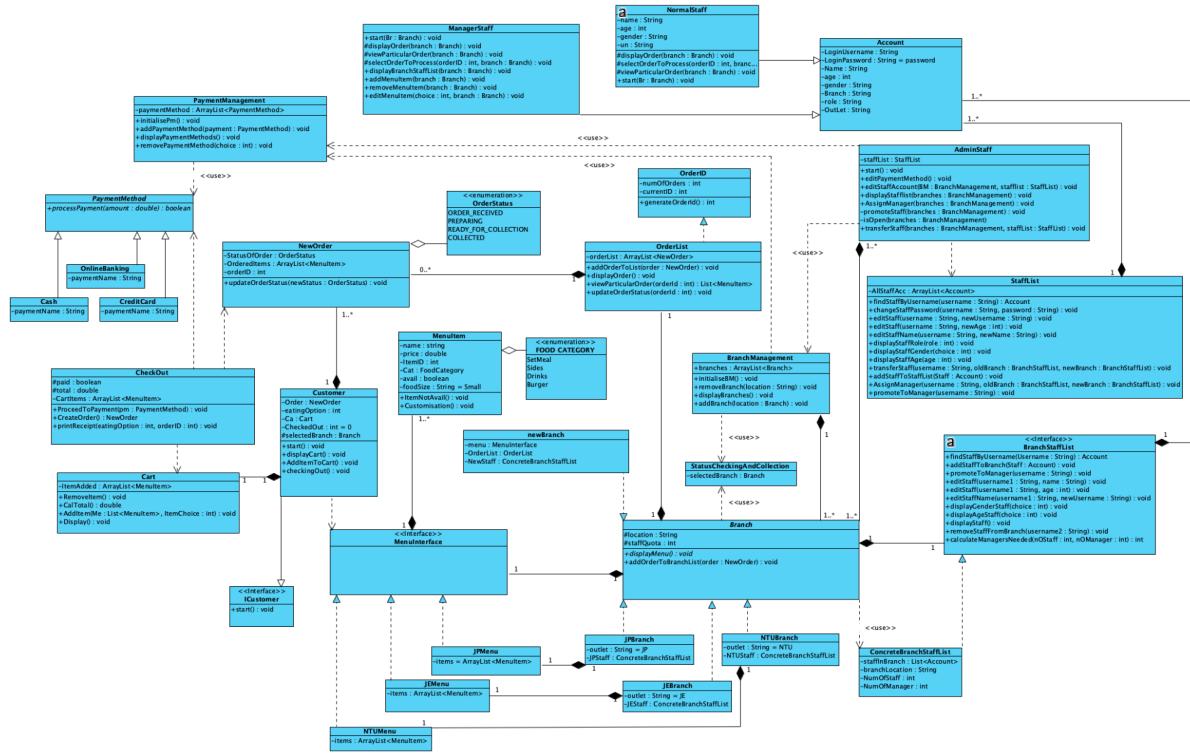
2. Method Overriding:

The PaymentMethod abstract class defines a contract (processPayment() method) that any payment implementation must follow. The ‘OnlineBanking’, ‘CreditCard’ and ‘Cash’ classes provide their own implementation of the ‘processPayment()’. Objects of these concrete classes can be treated as objects of the ‘PaymentMethod’ abstract class, allowing the polymorphic behaviour in the payment process.

Encapsulation:

Encapsulation was achieved by making class members private and providing public methods to access and modify them, ensuring data integrity and hiding the internal implementation.

UML DIAGRAM



Object oriented and design:

- The code uses object oriented learning with classes representing different entities in the restaurant management system.
 - Inheritance is used to create hierarchies of related classes.
 - Interfaces are used to define contracts and enable polymorphism.

Modular and Extensible Architecture:

- Designed in a modular way, with separate classes handling different responsibilities, such as account management, and payment processing.
 - This design allows for easier extension and maintenance of the system, as new features or changes can be implemented by adding or modifying specific components.

User Interfaces and interactions:

- The code includes interface-related classes which provide entry points for customer and staff interactions with the system.

- These user interface classes handle tasks like placing orders, collecting orders and managing staff accounts.

Administrative Functionality:

- The ‘AdminStaff’ class provides administrative functionalities such as managing staff accounts, managing payment methods and opening and closing branches.
- This centralised administrative functionality allows for the management of the overall restaurant operations.

Branch and Menu Management:

- ‘Branch’ class and its subclasses handle the management of different branch locations including their staff quota, order list and menus.
- ‘NTUMenu’, ‘JEMenu’ and ‘JPMenu’ manage the menu items for each branch allowing for branch-specific customization.

TEST CASES AND RESULT

Test Case 1: We first chose the ‘Add menu item’ option and entered ‘chicken’, ‘5.50’ and ‘Sides’ for the item name, price and category respectively. Test case passed and a new item ‘chicken’ was added to the menu list.

```

1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit
Enter your choice: 5
Enter item name
chicken
Enter item price
5.50
Enter item category
sides
1   FRIES      3.2
2   3PC set meal  9.9
3   chicken nugget 6.6
4   chicken     5.5

```

Test Case 2: We first chose the ‘Edit menu item’ option and updated the price of ‘FRIES’ from 3.20 to 5.50. Test case passed and the price was successfully updated and reflected in the menu.

```

1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit
Enter your choice: 7
1.Edit Menu Item Name
2.Edit Menu Item Price
3.Edit Menu Item Availability
1
1   FRIES      3.2
2   3PC set meal  9.9
3   chicken nugget 6.6
Which item are you editing
Key in the new price :
5.0
1   FRIES      5.0
2   3PC set meal  9.9
3   chicken nugget 6.6

```

Test Case 3: We chose the ‘Remove menu item’ option and removed ‘3PC set meal’ from the menu list.

Test case passed, item was successfully removed and not displayed in the menu anymore.

```
Enter your choice: 6
1   FRIES      3.2
2   3PC set meal    9.9
3   chicken nugget  6.6
Which item you want to remove?
2
Item removed!
1   FRIES      3.2
2   chicken nugget  6.6
```

Test case 4: We chose the option to takeaway and then chose the ‘Add item to cart’ option. We added 2 items to our cart, with the option to upsize being our customisation. The second item was upsized while the first was not. After paying successfully, the customer can check the order status which indicated ORDER_RECEIVED. Test case passed.

Test case 5: We chose the option to dine in and then chose the ‘Add item to cart’ option. We added 2 items to our cart, with the option to upsize being our customisation. The first item was upsized while the second was not. Test case passed since the receipt prints out the ordered items with their customisations.

```

Are you a 1)customer or 2)staff
Are you 1)loosering or 2)collecting order
1 Branch Name: North Spine Plaza
2 Branch Name: Jurong east
3 Branch Name: Jurong point
Choose the branch

Do you want to 1)Dine in or 2)Take-away
-----Branch Menu-----
1. COFFEE 2. BURGER 3. PIZZA 4
2. COLE SLAW
Do you want:
1)Add item to cart
2)Remove Item frst cart
3)View cart
4)Check out
5)quit

Key in the number to add item, Enter 0 to stop adding
Do you want to upsize? 1)Yes 2)No
Key in the number to add item, Enter 0 to stop adding
2
Do you want to upsize? 1)Yes 2)No

Key in the number to add item, Enter 0 to stop adding
0
Do you want to add item to cart
1)Add item to cart
2)Remove Item From cart
3)View cart
4)Check out
5)quit

Available payment methods:
1)Bank Transfer/DebitCard
2)CreditCard
3)CreditCard
1

Payment transferred successfully!
payment of $13.10 processed successfully
Receipt
Your order ID is 1
Dine In
Item Name.....Size.....Price
1) HFC set meal(LARGE) .....10.4
1) HFC set meal(SMALL) .....7.4
Total .....$13.10
Are you a 1)customer or 2)staff
Are you 1)loosering or 2)collecting order
1

1 Branch Name: North Spine Plaza
2 Branch Name: Jurong east
3 Branch Name: Jurong point
Choose the branch
2
Enter order id :
1
Your order is ORDER RECEIVED
Are you a 1)customer or 2)staff

```

Test case 6 : Test case passed since Visa (credit card) payment was successful and it is printed that the payment is processed successfully.

```

Are you a 1)customer or 2)staff
1 Are you 1)ordering or 2)collecting order

1 Branch Name: 1) Spine Plaza
2 Branch Name: 2) Jungsung east
3 Branch Name: Jungong point
Choose the branch

Do you want to 1)Dine in or 2)Take-away
2

-----Branch Menu-----
1 3PC set meal(SMALL) 10.4
2 COLE SLAW(SMALL) 2.7
3 Cole Slaw
4 Key number
5 Add item from cart
6 Remove item from cart
7 View cart
8 Check out
9 quit
0

Key in the number to add item, Enter 0 to stop adding
Do you want to upsize? 1)Yes 2)No
0

Key in the number to add item, Enter 0 to stop adding
0

Do you want: 
1)Add Item to cart
2)Remove Item from cart
3)View cart
4)Check out
5)quit
6)

Available payment methods:
1)Pin now
2)Cash
3)Visa
4)

Transaction approved!
credit card payment of $2.70 processed successfully
Receipt
-----
Your order ID is 2
Take-away
Item      Size       Price
1) COLE SLAW(LARGE) 2.7
Total----- 2.70

```

Test case 7: Test case passed since Paynow (online payment platform) payment was successful and it is printed that the payment is processed successfully.

```

Are you a 1)customer or 2)staff
1
Are you 1)ordering or 2)collecting order
1
1 Branch Name: North Spine Plaza
2 Branch Name: Jurong east
3 Branch Name: Jurong point
Choose the branch
1
Do you want to 1)Dine in or 2)Take-away
2
-----Branch Member-----
1 FRIES 3.2
2 3PC set meal 9.9
3 chicken nugget 6.6
Do you want:
1)Add item to cart
2)Remove Item from cart
3)View cart
4)Check out
5)quit
4
Available payment methods:
1)Paynow
2)Cash
3)Visa
1
payment of $3.20 processed successfully
Payment transferred successfully!
Receipt
-----
Your order ID is 1
Take-away
Item-----Size-----Price
1) FRIES(LARGE) 3.2
Total-----3.20
Key in the number to add item, Enter 0 to stop adding
1
Do you want to update? 1)Yes 2)No
1
Key in the number to add item, Enter 0 to stop adding
0

```

Test case 8: Test case passed since ‘ORDER_RECEIVED’ was displayed using the order ID of 1.

```

1 Branch Name: North Spine Plaza
2 Branch Name: Jurong east
3 Branch Name: Jurong point
Choose the branch
2
Enter order id :
1
Your order is ORDER_RECEIVED
Are you a 1)customer or 2)staff

```

Test case 9: Test case passed. Logged in as a staff member and we can see that there are new orders of order IDs 1 and 2. To view any particular order, we will choose the ‘View particular orders’ option.

```

Are you a 1)customer or 2)staff
2
Enter role choice
1. Staff
2. Manager
3. Admin
Enter your choice: 1
Enter UserName:
kumar
Enter password:
password
Login successful! Welcome Back to NTU kumar Blackmore
Enter new password
qwert
1. View all orders
2. View particular orders
3. Process order
4. Exit
Enter your choice: 2
Enter order ID
2
FRIES,3.2
3PC set meal,9.9

```

Test case 10: Staff processed the new order and the order status will be shown as ‘PREPARING’ for the customer. When the staff has finished processing the order, the customer will see that their order is ready for collection. Test case passed.

```

1. View all orders
2. View particular orders
3. Process order
4. Exit
Enter your choice: 3
Are you 1)ordering or 2)collecting order
2
1 Branch Name: North Spine Plaza
2 Branch Name: Jurong east
3 Branch Name: Jurong point
Choose the branch
1
1)Start Processing
2)Finished Processing
1
Order is processing.
1. View all orders
2. View particular orders
3. Process order
4. Exit
Enter your choice: 3
Enter order ID
1
1)Start Processing
2)Finished Processing
2
Your order is PREPARING

```

Test case 11: Logged in as ‘Alexei’, the manager in the NTU branch and successfully displayed the staff list in the NTU branch which includes Alexei and kumar Blackmore.

```

Are you a 1)customer or 2)staff
2
Enter role choice
1. Staff
2. Manager
3. Admin
Enter your choice: 2
Enter UserName:
Alexei
Enter password:
password
Login successful! Welcome Back to NTU Alexei
Enter new password
qwert
1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit
Enter your choice: 4
Displaying staff:
kumar Blackmore 32 M kumarB S NTU
Alexei 25 M Alexei M NTU

```

Test case 12: Test case passed since the manager was able to process an order successfully.

```
Login successful! Welcome Back to NTU Alexei
Enter new password
qwerty
1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit
Enter your choice: 3
Enter order ID
1
Order processed successfully.
```

Test case 13: NTU branch was closed. Test case passed since the NTU branch does not appear in the Customer interface anymore.

<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 7 Enter your choice: 1. Open Branch 2. Close Branch 2</pre>	<pre>Enter outletNTU NTU branch removed 1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 8 Enter your choice: 8 Exiting.....</pre>	<pre>Are you a 1)customer or 2)staff 1 Are you 1)ordering or 2)collecting order 1 1 Branch Name: Jurong east 2 Branch Name: Jurong point Choose the branch</pre>
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Test case 14: Test case passed. Staff list was successfully displayed according to the different filters.

<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 2 Enter your choice: 1. Display based on branch 2. Display based on role 3. Display based on gender 4. Display based on age 2 Select role 1.Staff 2.Manager 3.Admin 3 Displaying staff: kumar Blackmore 32 M kumarB S NTU Mary lee 44 F MaryL S JE Justin Loh 49 M JustinL S JP</pre>	<pre>Enter your choice: 1. Display based on branch2. Display based on role. Current staff List Select role 1.Staff 2.Manager 3.Admin 3 Displaying Admins: Boss G F boss A NONE</pre>	<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 2 Enter your choice: 1. Display based on branch 2. Display based on role 3. Display based on gender 4. Display based on age 3 Select gender 1.Female 2.Male 2 Alice Ang 27 F AliciaA M JE Mary lee 44 F MaryL S JE Boss G F boss A NONE</pre>	<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 2 Enter your choice: 1. Display based on branch 2. Display based on role 3. Display based on gender 4. Display based on age 3 Select gender 1.Female 2.Male 2 kumar Blackmore 32 M kumarB S NTU Alexei 25 M Alexei M NTU Tom Chan 56 M TomC M JP Justin Loh 49 M JustinL S JP</pre>	<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 2 Enter your choice: 1. Display based on branch 2. Display based on role 3. Display based on gender 4. Display based on age 4 Select age 1. Below 30 years old 2. 30-50 year olds 3.Above 50 years old 2 Current staff List kumar Blackmore 32 M kumarB S NTU Tom Chan 56 M TomC M JP Boss G F boss A NONE</pre>	<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 2 Enter your choice: 1. Display based on branch 2. Display based on role 3. Display based on gender 4. Display based on age 1 Select branch NTU JE JP JP Displaying staff : kumar Blackmore 32 M kumarB S NTU Alice Ang 27 F AliciaA M JE Mary lee 44 F MaryL S JE</pre>	<pre>1. Add/Edit/Remove Staff Accounts 2. Display Staff list 3. Assign Managers 4. Promote Staff to branch Manager 5. Transfer staff/Manager 6. Add/remove Payment method 7. Open/close Branch 8. Exit Enter your choice: 2 Enter your choice: 1. Display based on branch 2. Display based on role 3. Display based on gender 4. Display based on age 1 Select branch NTU JE JP JP Displaying staff : Tom Chan 56 M TomC M JP Justin Loh 49 M JustinL S JP</pre>
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Test case 15: Alexei was originally a manager in the NTU branch but she was assigned manager in the JP branch. However, since the JP branch only has 2 staff in total, only 1 manager is needed and therefore Alexei cannot be assigned to the JP branch. Test case passed.

```
1. Add/Edit/Remove Staff Accounts
2. Display Staff list
3. Assign Managers
4. Promote Staff to branch Manager
5. Transfer staff/Manager
6. Add/remove Payment method
7. Open/close Branch
8. Exit
Enter your choice: 3
Enter name of staff to assign as manager Alexei
Enter old branch NTU
Enter new branchJP
```

```
Enough managers
1. Add/Edit/Remove Staff Accounts
2. Display Staff list
3. Assign Managers
4. Promote Staff to branch Manager
5. Transfer staff/Manager
6. Add/remove Payment method
7. Open/close Branch
8. Exit
```

Test case 16: Test case passed since kumar Blackmore was promoted to Manager in the NTU branch and it is displayed in the staff list.

```

1. Add/Edit/Remove Staff Accounts      1. Add/Edit/Remove Staff Accounts
2. Display Staff list                2. Display Staff list           Select role
3. Assign Managers                  3. Promote Staff to branch Manager
4. Promote Staff to branch Manager   4. Transfer staff/Manager
5. Transfer staff/Manager          5. Transfer Staff to branch method
6. Add/remove Payment method       6. Open/close Branch
7. Open/close Branch               7. Exit
8. Exit
Enter your choice: 4
Enter name of staff to promote: kumarB
Enter branchNTU
  
```

```

  Enter your choice: 2
  Displaying Manager:
  kumar Blackmore 32 M kumarB M NTU
  Alexei 25 M Alexei M NTU
  Tom Chan 56 M TomC M JP
  Alicia Ang 27 F AliciaA M JE
  
```

Test case 17: Test case passed since kumar Blackmore was transferred from the NTU to JP branch and his name is not displayed in the NTU staff list anymore, instead it is displayed in the JP staff list.

```

1. Add/Edit/Remove Staff Accounts
2. Display Staff list
3. Assign Managers
4. Promote Staff to branch Manager
5. Transfer staff/Manager
6. Add/remove Payment method
7. Open/close Branch
8. Exit
Enter your choice: 5
Enter username of staff to transfer: kumarB
Enter old branch: NTU
Enter new branch: JP
Staff removed from the branch.
  
```

```

  Enter your choice: 2
  Select branch
  NTU
  JP
  JP
  Displaying staff :
  Alexei 25 M Alexei M NTU
  1. Add/Edit/Remove Staff Accounts
  2. Display Staff list
  3. Assign Managers
  4. Promote Staff to branch Manager
  5. Transfer staff/Manager
  6. Add/remove Payment method
  7. Open/close Branch
  8. Exit
  
```

```

  Enter your choice: 2
  Enter your choice:
  1. Display based on branch
  2. Display based on role
  3. Display based on gender
  4. Display based on age
  1
  Select branch
  NTU
  JP
  JP
  Displaying staff :
  Tom Chan 56 M TomC M JP
  Justin Loh 49 M JustinL S JP
  Kumar Blackmore 32 M kumarB S NTU
  
```

Test case 18: Customer places a new order and is given an order ID of 1. After staff processes the order, the customer uses the ID to check the status, which is that it is ready for collection. After the customer collects the order, the order status shows that it is collected.

```

1. View all orders
2. View particular orders
3. Process order
4. Exit
Enter your choice: 3
Enter order ID
1
1) Start Processing
2) Finished Processing
1
Order is processing.
  
```

```

  Are you a 1)customer or 2)staff
  1
  Are you 1)ordering or 2)collecting order
  1
  Enter order ID
  1
  1 Branch Name: North Spine Plaza
  2 Branch Name: Jurong east
  3 Branch Name: Jurong point
  Choose the branch
  1
  Enter order id :
  1
  Your order is PREPARING.
  
```

```

  1. View all orders
  2. View particular orders
  3. Process order
  Enter your choice: 3
  Are you a 1)customer or 2)staff
  1
  Are you 1)ordering or 2)collecting order
  1
  Enter order ID
  1
  1 Branch Name: North Spine Plaza
  2 Branch Name: Jurong east
  3 Branch Name: Jurong point
  Choose the branch
  1
  Enter order id :
  1
  Order processed successfully.
  
```

```

  Are you a 1)customer or 2)staff
  2
  Are you 1)ordering or 2)collecting order
  2
  Enter order id :
  1
  Your order is ready for collection! 1)Collect now or 2)Collect later
  1
  Your order is COLLECTED
  
```

Test case 19: Test case passed since an error message was displayed when ‘FRIES’ was added but it already exists in the NTU menu and cannot be added into the menu.

```

1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit
Enter your choice: 5
Enter item name
FRIES
Item already exists!
  
```

```

  Are you a 1)customer or 2)staff
  1
  Are you 1)ordering or 2)collecting order
  1
  Enter order ID
  1
  1 Branch Name: North Spine Plaza
  2 Branch Name: Jurong east
  3 Branch Name: Jurong point
  Choose the branch
  1
  Do you want to 1)Dine in or 2)Take-away
  1
  -----Branch Menu-----
  1   FRIES    3.2
  2   3 piece meal    9.9
  3   chicken nugget    6.6
  
```

```

  Do you want:
  1)Add item to cart
  2)Remove Item from cart
  3)View cart
  4)Check out
  5)quit
  4
  Cart is empty! Please add items!
  Do you want:
  1)Add Item to cart
  2)Remove Item from cart
  3)View cart
  4)Check out
  5)quit
  
```

Test case 20: Test case passed since an error message was printed and customer was prompted to add an item again when the customer tried to cart out when there was nothing in the cart.

```

  Are you a 1)customer or 2)staff
  1
  Are you 1)ordering or 2)collecting order
  1
  1 Branch Name: North Spine Plaza
  2 Branch Name: Jurong east
  3 Branch Name: Jurong point
  Choose the branch
  1
  Do you want to 1)Dine in or 2)Take-away
  1
  -----Branch Menu-----
  1   FRIES    3.2
  2   3 piece meal    9.9
  3   chicken nugget    6.6
  
```

```

  Do you want:
  1)Add item to cart
  2)Remove Item from cart
  3)View cart
  4)Check out
  5)quit
  
```

Test case 21: New payment method ‘paylah’ was added. Test case passed since it is displayed when the customer checks out their cart.

```

1. Add/Edit/Remove Staff Accounts
2. Display Staff list
3. Assign Managers
4. Promote Staff to branch Manager
5. Transfer staff/Manager
6. Add/remove Payment method
7. Open/close Branch
8. Exit
Enter your choice: 5
Enter your choice:
1. Add Payment method
2. Remove Payment method
3. Enter new Payment type:
4. Online Banking
5. Card
6. Enter your choice: 8
7. Enter name of online banking method
8. Enter your choice: paylah
9. Enter your choice: 1
10. Are you 1)customer or 2)staff
11. Enter staff quota10
12. Enter role choice
13. 1. Staff
14. 2. Manager
15. 3. Admin
16. Enter your choice: 1
17. Enter UserName:
18. qq
19. Error! Please enter credentials again
20. Enter UserName:
21. Are you 1)customer or 2)staff
22. Enter role choice
23. 1. Staff
24. 2. Manager
25. 3. Admin
26. Enter your choice: 3
27. Enter UserName:
28. Enter password:
29. qwq
30. Login successful! Welcome Back to NONE Boss
31. Enter new password
32. qwe
33. Login successful! Welcome Back to NONE Boss
34. 1. Add/Edit/Remove Staff Accounts
35. 2. Display Staff list
36. 3. Assign Managers
37. 4. Promote Staff to branch Manager
38. 5. Transfer staff/Manager
39. 6. Add/remove Payment method
40. 7. Open/close Branch
41. 8. Exit
42. Enter your choice: 8
43. Are you 1)customer or 2)staff
44. Are you 1)ordering or 2)collecting order
45. 1 Branch Name: North Spine Plaza
46. 2 Branch Name: Jurong Point
47. 3 Branch Name: Singapore East
48. 4 Branch Name: Cwp
49. Enter your choice: 1
50. Do you want to 1)Dine In or 2)Take-away
51. 1)Dine In
52. 2)Take-away
53. Branch Menu-----
54. 1)PC set meal 9.9
55. 2)chicken nugget 6.6
56. Do you want to add item to cart
57. 1)Add item to cart
58. 2)View cart
59. 3)Check out
60. 4)quit
61. 4
62. Available payment methods:
63. 1)Paynow
64. 2)Cash
65. 3)Visa
66. 4)paylah
67. 4

```

Test case 22: Opened a new branch called ‘Cwp’. Test case passed since the new branch ‘Cwp’ was successfully displayed in the Customer interface along with the original 3 branches.

```

1. Add/Edit/Remove Staff Accounts
2. Display Staff list
3. Assign Managers
4. Promote Staff to branch Manager
5. Transfer staff/Manager
6. Add/remove Payment method
7. Open/close Branch
8. Exit
Enter your choice: 7
Enter location:Cwp
Enter your choice:
1. Open Branch
2. Close Branch
1

```

Test case 24: Test case passed since an error message was displayed when an incorrect staff username was entered.

```

Are you a 1)customer or 2)staff
2
Enter role choice
1. Staff
2. Manager
3. Admin
Enter your choice: 1
Enter UserName:
qq
Error! Please enter credentials again
Enter UserName:

```

Test case 25: Logged in as admin, changed her default password and logged in again. Test case passed since she was able to log in successfully with the new password.

```

Are you a 1)customer or 2)staff
1
Enter role choice
2
Enter role choice
1. Staff
2. Manager
3. Admin
Enter your choice: 3
Enter UserName:
Enter password:
password
Enter password:
qwq
Login successful! Welcome Back to NONE Boss
Enter new password
qwe
Login successful! Welcome Back to NONE Boss
1. Add/Edit/Remove Staff Accounts
2. Display Staff list
3. Assign Managers
4. Promote Staff to branch Manager
5. Transfer staff/Manager
6. Add/remove Payment method
7. Open/close Branch
8. Exit
Enter your choice: 8
Exiting....

```

Test case 26: Test case passed since it correctly prints out the information of all staff.

kumar Blackmore	32	M	kumarB	S	M	32	NTU
Alexei	25	M	Alexei M	M	M	25	NTU
Tom Chan	56	M	TomC M	M	M	56	JP
Alica Ang	27	F	AlicaA M	M	F	27	JE
Mary lee	44	F	MaryL S	S	F	44	JE
Justin Loh	49	M	JustinL S	S	M	49	JP
Boss	62	F	boss A	A	F	62	NONE

Test case 27: Test case passed since new menu item ‘fried’ was added, price of chicken nugget was changed from 6.60 to 7.20 and these changes are still visible in subsequent sessions.

```

1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit

Enter your choice: 5
Enter item name
FRIES
Enter item price
5.50
Enter item category
Sides
1 FRIES 3.2
2 3PC set meal 9.9
3 chicken nugget 6.6
4 fried 5.5

1. View all orders
2. View particular orders
3. Process order
4. Display branch staff list
5. Add menu item
6. Remove menu item
7. Edit menu item
8. Exit

Enter item name
fried
Enter item price
7.20
Enter item category
Sides
1 FRIES 3.2
2 3PC set meal 9.9
3 chicken nugget 7.2
4 fried 5.5

Are you a 1)customer or 2)staff
1
Are you 1)ordering or 2)collecting order
1 Branch Name: North Spine Plaza
2 Branch Name: Jurong east
3 Branch Name: Jurong point
Choose the branch
1
Do you want to 1)Dine in or 2)Take-away
1
-----Branch Menu-----
1 FRIES 3.2
2 3PC set meal 9.9
3 chicken nugget 7.2
4 fried 5.5
Do you want:
1)Add item to cart
2)Remove item from cart
3)View cart
4)Check out
5)quit

```

REFLECTION

In the early stages of developing the Fast Food Ordering and Management System (FOMS), we encountered several challenges in distilling complex, real-world processes into a clear and concise UML class diagram. The task of breaking down the system into more specific and well-defined classes - categorised as concrete, abstract or interface - also proved to be tedious. Additionally, we struggled with assigning the most suitable attributes and methods for each class which was vital as we wanted our system to achieve loose coupling and high cohesion.

Initially, we did a rough outline of the class diagram before diving into coding. However, it soon proved to be a mistake as we are not sure of the relationships between each class since we did not have a clear blueprint to develop the system. Furthermore, as we separated the classes and did the code individually, we found it difficult to ensure that each class not only performed its function in isolation but also integrated harmoniously with others to form a fully functional system. Recognising our mistake, we adopted a more iterative approach to design by continuously refining it after various discussions. Through debates and communications between team members, we were able to correct the mistakes and enhance our understanding of the relationship between the various classes. We also learnt how to apply the SOLID principles for the design of our system.

Although the system has been continuously refined as we work on it, there is still room for improvements. We wanted to make sure that the system worked before we improved on its efficiency and design; however as we were tight on time, the system exhibits higher coupling than ideal and each class was closely linked to other classes. Moreover, we did not manage to test out more test cases on top of what has been provided to us hence we missed the opportunity of correcting potential errors in our system. Lastly, we could have used more interfaces and abstract class instead of concrete class.

In conclusion, throughout the course of this project, the practical application of Object-Oriented Programming (OOP) concepts have deepened our understanding and we learnt how to adapt the knowledge garnered from SC2002 to tackle this complex project.