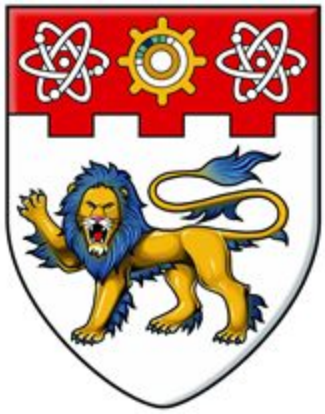


NANYANG TECHNOLOGICAL UNIVERSITY

School of Computer Science and Engineering

CZ2002
Object Oriented Design Programming

Building an OO Application: Restaurant Reservation and Point Of Sale System (RRPSS)

Name: Chua Peng Hong(U1721262B), Joseph Fung King Yiu(U1822415L), Lim WenWei, Elvin(U1822943H), Qwek Zhi Hui(U1822304C), Tay Jaslyn(U1721893B)

Group: FSP6 Group 1

APPENDIX B:

Declaration of Original Work for CE/CZ2002 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.

Name	Course (CE2002 or CZ2002)	Lab Group	Signature /Date
Qweh ZhiHui	CZ2002	FSP6	180419
Joseph Fung King Yiu	CZ2002	FSP6	180419
Lim WenWei Elvin	CZ2002	FSP6	180419
Chua Peng Hong	CZ2002	FSP6	180419
Tay Jaslyn	CZ2002	FSP6	180419

Important notes:

1. Name must **EXACTLY MATCH** the one printed on your Matriculation Card.

Design Considerations

The very first step we take is identifying important classes for the system and group them into Entity Class, Control Class and Boundary Class.

Assumptions (On top of those stated in Assignment Brief):

- 1 customer can only make 1 reservation for the same session and on the same day, but he can have multiple reservations. E.g He can book morning session and afternoon session
- Allocation of tables based on best fit and first come first served. 3 pax will be allocated to 4-seats table, and if there are no more 4-seats table, allocated to 6-seats table, and so on.
- The program runs 365 days a year with no breaks in between from 11am - 3pm (AM Session) and 6pm-10pm (PM Session).
- The staff will always print the bill invoice for every table, to mark the sale as complete.
- Calling of Remove Reservation will remove all Reservations linked to a particular contact number.

We used a 4-Layered Architecture for our system to hide our implementation of methods from users and to also prevent them from directly interacting with the data files.

1. [Boundary] Presentation Layer (main application interface)
2. [Control] Business Layer (control classes i.e. MenuMgr, ReservationMgr, OrderMgr etc.)
3. [Entity] Persistent Layer (entity classes i.e. Menu, Reservation, Order etc.)
4. Database Layer (data text files i.e. MenuItems.txt, Reservations.txt, Orders.txt)

We have decided to use this architecture because

1. It increases flexibility and reusability. Any changes that are made to a class in a specific layer would not affect the other classes from other layers. For example, if we were to change our interface from a CLI (Command Line Interface) to GUI (Graphical User Interface), we just need to update the main application interface class in the presentation layer. All other classes from other layers remain the same.
2. It also encourages extensibility and maintainability. The layers in the architecture are independent, they can be individually updated, deployed and maintained.

3. It makes the system loosely coupled since the layers must communicate via top-down approach.

To further bolster the 4-layered system architecture, Access Level Modifiers are used. Access level modifiers determine whether other classes can use a particular field or invoke a particular method. Methods in our project that prevents access from other classes have a `protected` modifier. The `protected` modifier specifies that the member can only be accessed within its own package "Control" and, in addition, by a subclass of its class in another package,

```
protected void updateTableStatus(int tableNo, String status) {
    int index = getTableIndex(tableNo);
    tableAl.get(index).setTableStatus(status);
    System.out.println("Table " + tableNo + " set to " + status);
}
```

```
private double computeTotalPrice(Order o) {
    double price = 0;
    for (Menu menu : o.getFoodAL()) {
        price += menu.getPrice();
    }
    return price;
}
```

Within each class, a `private` modifier is used to restrict access to itself. The `private` modifier specifies that the member can only be accessed in its own class "InvoiceMgr".

Use of OOP Design Principles

1. Single Responsibility Principle

   We make sure that every single class has only a single responsibility. For example, the ReservationMgr class has methods relating with reservations only. Methods within ReservationMgr handles reservations exclusively and not other areas of the system.

2. Open-Closed Principle

   We implement this principle for the Menu class. The Menu class has a "Category" interface. To add more food categories into the menu, we do not need to edit code of the class, we just add a new food category class realizing "category" interface.

3. Interface Segregation Principle

   The 4-layered architecture allows proper segregation of classes. These classes are grouped together and connected to a specific interface. All of the classes are connected to interfaces that they rely on, each interface serving a specific purpose.

Consideration for Further Enhancements

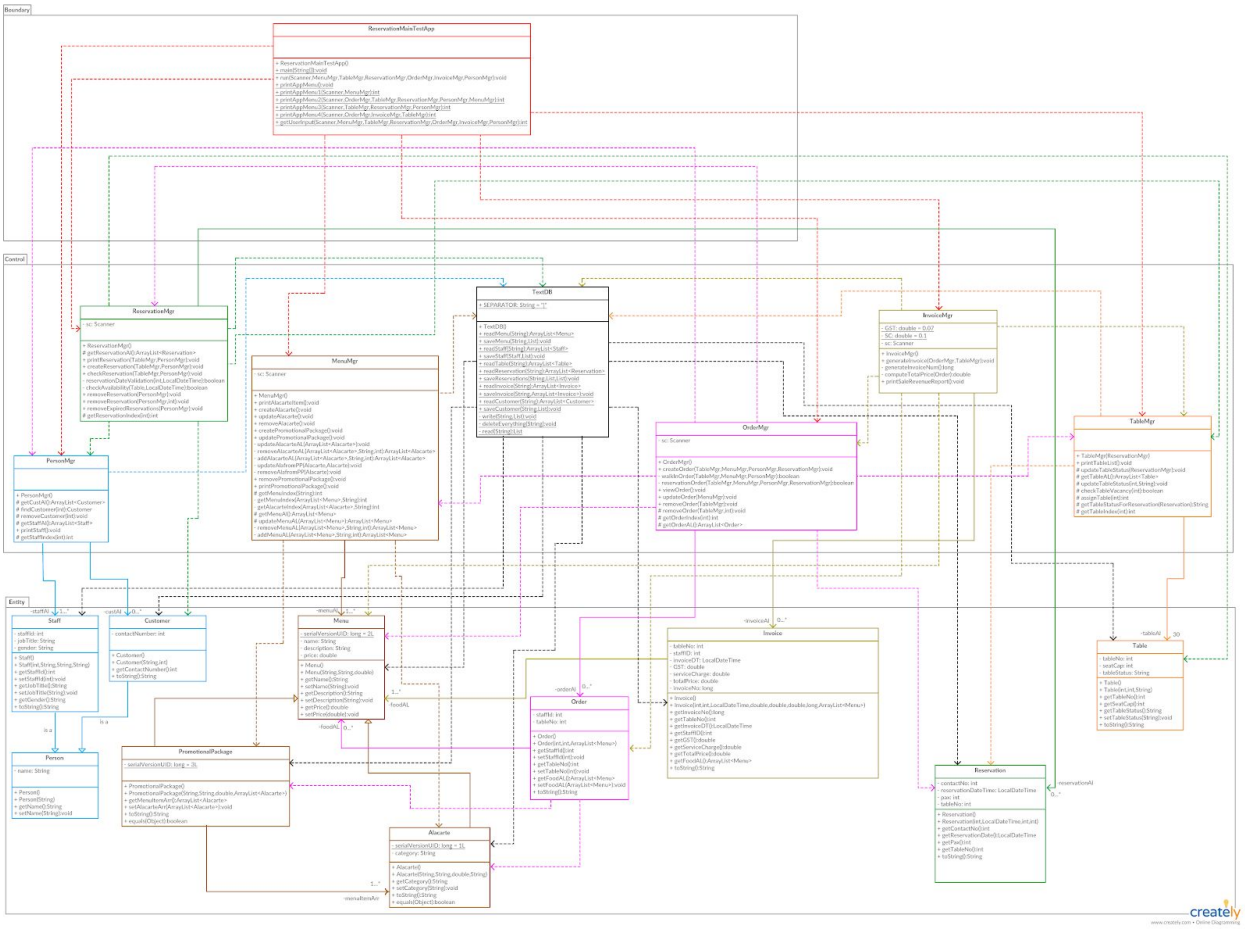
1. Block-booking of entire session for private events [flexibility]

By implementing a system whereby block-booking for events can take place, it will become easier to facilitate high capacity reservations. Our existing system is flexible as the addition of another method to reserve the whole venue would not impact the functionality of other classes in any layers. The 4-layered architecture results in loose coupling between entity and control classes as it promotes interaction via interfaces.

2. Waiting list for tables [extensibility]

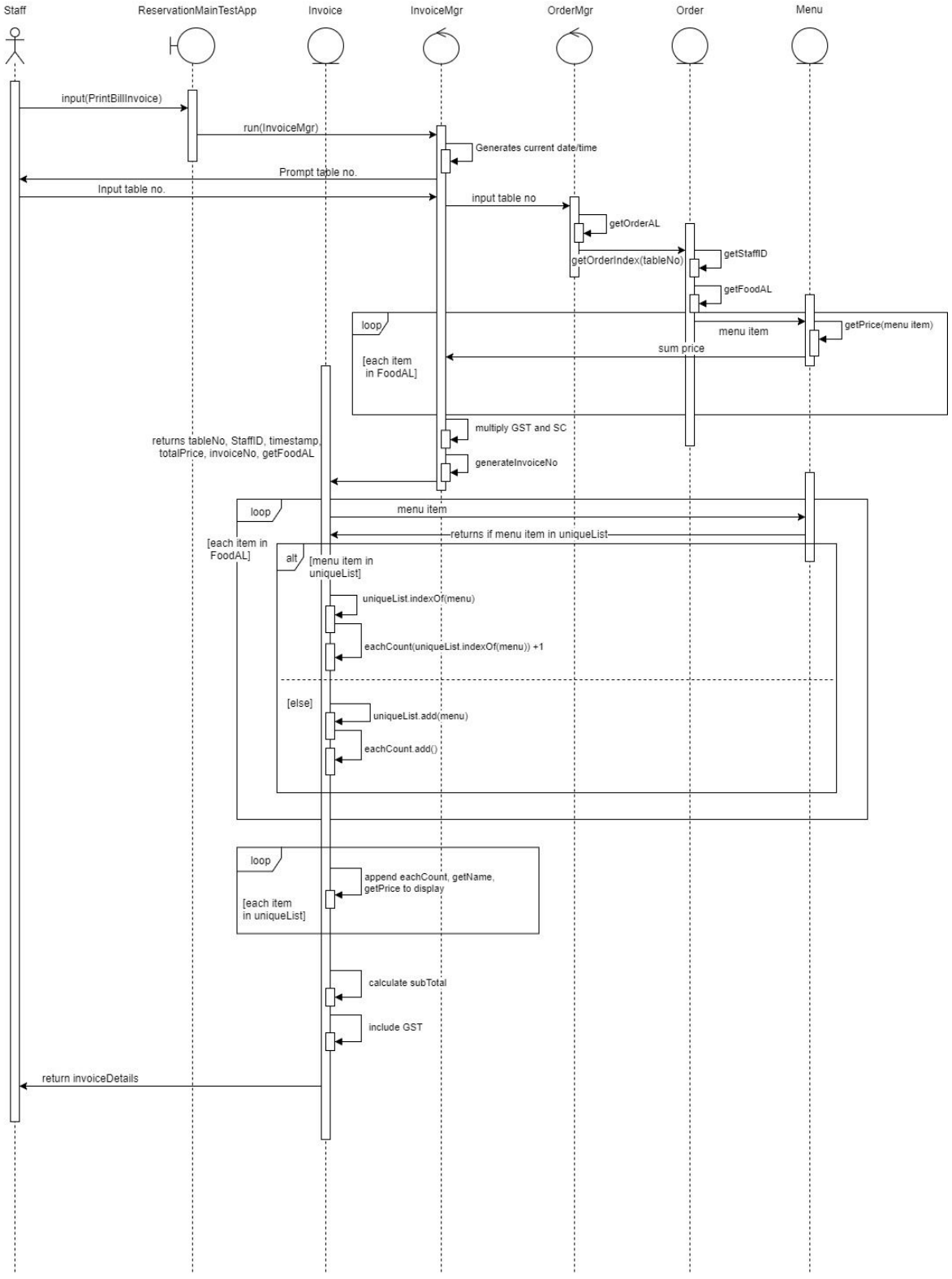
A waiting list system for diners looking to book a reservation during peak hours/when the restaurant is fully booked. If tables are fully booked, customer may opt to be put on a waiting list. Implementation of this system would be easy as the 4-layered architecture improves extensibility. Creation of an additional class within a layer is an independent action and would not impact other classes in other layers.

Detailed UML Class Diagram



Due to the large image resolution, please view the image inside the folder (Class Diagram.jpg)

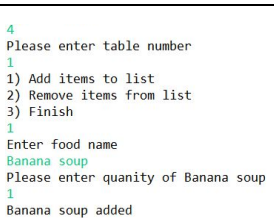
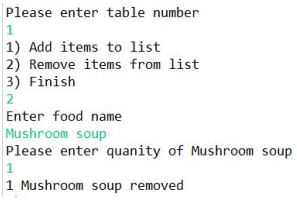
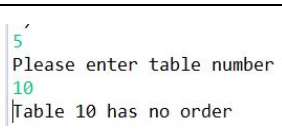
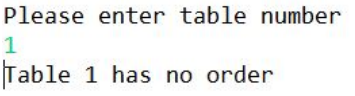
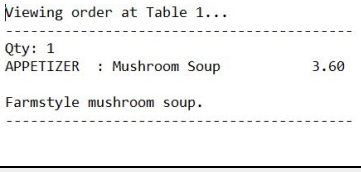
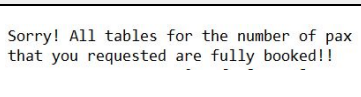
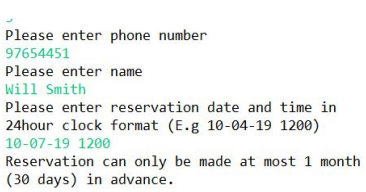
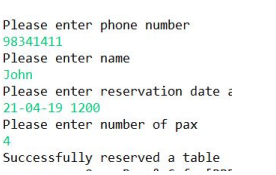
Detailed UML Sequence Diagram of “Print invoice”

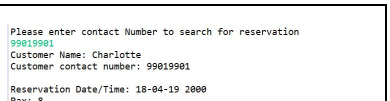
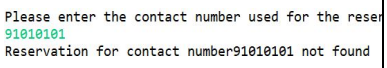
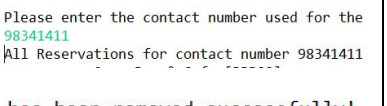
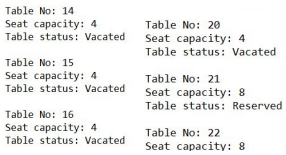
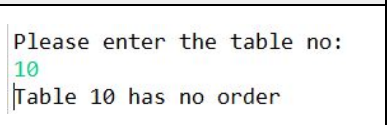
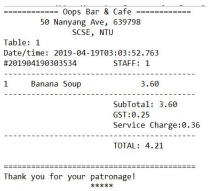
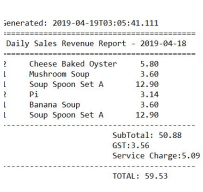


Test cases and results

No.	Test Cases	Input	Expected Results	Actual Results	Test Case Result (Pass/Fail) /Screenshots
1.	View menu	View menu	Success	Success	[] [][][] M E N U [][][] --- - MAINCOURSE- MAINCOURSE : Carbonara Pasta 6.90 Italian Cuisin --- MAINCOURSE : Pi 3.14 Freshly made raspberry Pi.
Create/Update/Remove menu item					
2a.	Creating menu item	Add fried rice at $3	Creation of menu object is successful	Creation of menu object is successful	Please enter food category Main Course Please enter food name Fried Rice Please enter description of food Tasty fried rice Please enter price 3 Main Course : Fried Rice 3.00 Tasty fried rice --- Creation of menu object is sucessful!
2b.	Updating non-existential menu item	Update fried noodles to $4	Display Error Message	Display Error Message	Please enter the name of the f Fried noodles Food not found
2c.	Updating existing menu item	Update fried rice to $5	Success	Success	Enter updated price 5 Main Course : Fried Rice 5.00
2d..	Removing existing menu item	Remove fried rice	Success	Success	Please enter the food object that y Fried Rice Removed ala carte menu object succe
Create/Update/Remove promotions					
3a.	Creating new promotion	Create lunch promotion	Success	Success	PROMO : lunch promo 10.00 ** 2 Pi **
3b.	Updating non-existing promotion	Update dinner promotion	Display Error Message, brought back to main page	Display Error Message, brought back to main page	Please enter the name of the promotional pac Dinner promotion Search term Dinner promotion Promotional Package not found, please try ag
3c.	Updating existing promotion	Add 2 drinks to lunch promo	Success	Success	PROMO : lunch promo 10.00 ** 2 Pi 2 Orange Juice **

3d.	Removing non-existential promotion	Remove dinner promo	Display Error Message, brought back to main	Display Error Message, brought back to main	Please enter the name of the p dinner promo Promotional package not found
3e.	Removing existing promotion	Remove lunch promo	Success	Success	Please enter the name of the promo lunch promo Promotional package removed
Create/Update/Remove Order					
4ai.	Walk-in	Create walk-in order of Carbonara Pasta and Milkshake.	Success	Success	1 Enter food name Milkshake Please enter quanity of Milkshake 1 Milkshake added 1) Add items to list 2) Remove items from list 3) Finish 3 Table 11 set to Occupied Creation of order is successful!
4aii.	Walk-in (fully-booked)	Walk-in order when tables are occupied	Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	Sorry! All tables for the number of pax that you requested are fully booked!!
4bi.	Reservation	Order based on reservation (contact's phone number)	Success	Success	Enter food name Mushroom soup Please enter quanity of Mushroom soup 1 Mushroom soup added 1) Add items to list 2) Remove items from list 3) Finish 3 Table 21 set to Occupied Creation of order is successful!
4bii	Reservation (invalid phone number)	Enters wrong reservation number	Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	3 Create order for Walk in or Reservation? 1) Walk in 2) Reservation 2 Please enter staff ID: 2002 Enter reservation phone number 91231234 Reservation not found. Please try again.
4c	Invalid staff ID	Enters wrong staff ID	Display Error message, goes back to mains screen.	-Display Error message, goes back to mains screen.	Please enter staff ID: 2 Staff not found << Oops Bar & Cafe [RRPSS] >> ~~~~~~ 1) Menu 2) Order
4d.	Update vacant table		Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	Please enter table number 1 Table 1 has no order << Oops Bar & Cafe [RRPSS] >> ~~~~~~

4ei.	Add items to order (occupied)	Add banana soup to table 1	Success	Success	
4fii.	Remove items from order (occupied)	Remove mushroom soup	Success	Success	
4g	Remove order from vacant table	Remove table 10, vacant table	Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	
View Order					
5a.	View vacant table	Views vacant table	Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	
5b.	View occupied table	Views table 1, with mushroom soup order	Success	Success	
Create/Check/Remove reservation booking					
6a.	Create reservation booking when fully-booked	Create when fully booked	Display Error Message	Display Error Message	
6b.	Create reservation booking with wrong time (ahead)	Input date as 10-07-19	Display Error Message	Display Error Message	
6c.	Create reservation booking successfully	Create reservation with correct time	Success	Success	

6d.	Check existing booking	Checks using reserved phone no.	Success	Success	
6e.	Remove non-existent booking	Use wrong phone number to remove	Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	
6f..	Remove existing booking	Use correct number to remove	Removes all reservations under the phone number.	Removes all reservations under the phone number	
View Tables					
7a.	Table Availability	Shows table availability	Success	Success	
Print bill invoice					
8a.	Print invalid table invoice	Print wrong table	Display Error Message, Prompt to re-enter	Display Error Message, Prompt to re-enter	
8b.	Print valid table invoice	Print correct table	Success	Success	
Print sale revenue report by period(e.g day/month)					
9a..	Print day report	Print today's report	Success	Success	
9b.	Print month report	Print monthly report	Success	Success