Hong Kong Institute of Vocational Education (ST)
Department of Information Technology
The higher diploma of Software Engineering (IT114105)

Contemporary Topics in Software Engineering Assignment (ITP4507)

(2020/2021)

Business Set Lunch Ordering System Report

We declare that this is a group project and that no part of this submission has been copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part been written for us by another person.

Student	Student No.	Contribution to the project(%) (Total 100%)	Signature
Lau Man Chun	190382372	100%	

Problem Context

A company has a staff canteen which provides catering service for its staff. Both eat-in and takeaway services are provided by the canteen. Recently, due to the COVID-19, restrictions about canteen accommodations for eat-in service have to be observed. The company management wants to encourage the staff to stay in the company for lunch in order to lower the risk of infection. Therefore, the company has decided to subsidize the canteen to provide low-price and high-quality Business Lunch Sets via a new ordering system called Business Set Lunch Ordering System (BSLOS). Staff can order Business Lunch Set at an attractive price and the canteen will deliver the meal to the staff office directly.

Initially, the company will provide two kinds of Business LunchSet: Chinese style and Western Style. The Chinese style set includes a main dish with rice, a cup of Chinese style soup, and a cup of Oolong tea(hot or iced). The Western-style set includes a main dish with one starch side dish which could be chosen from rice, spaghetti or French fries, a cup of Western-style soup, and a cup of coffee or tea(hot or iced). Only a limited number of lunch set of each style will be available each day. The main dish of each style of lunch set will be changed on each day and the price of a lunch set may also be changed depending on the main dish.

The menu will be available at 9:00 am every day, showing the details including the price and the available count. After viewing the menu, the staff can choose either the Chinese style or the Western-style and specify the relevant options, then enter staff number and office location to make an order. The available count will be updated accordingly when an order is received or cancelled. The orders will be handled on a first-come-first-served basis and the delivery will start at 1:00 PM.

BSLOS should provide the following functions:
1. Edit menu
2. Show menu(display lunch sets with available counts)
3. Make order
4. Cancel order
5. List outstanding orders (orders which have not been completed)
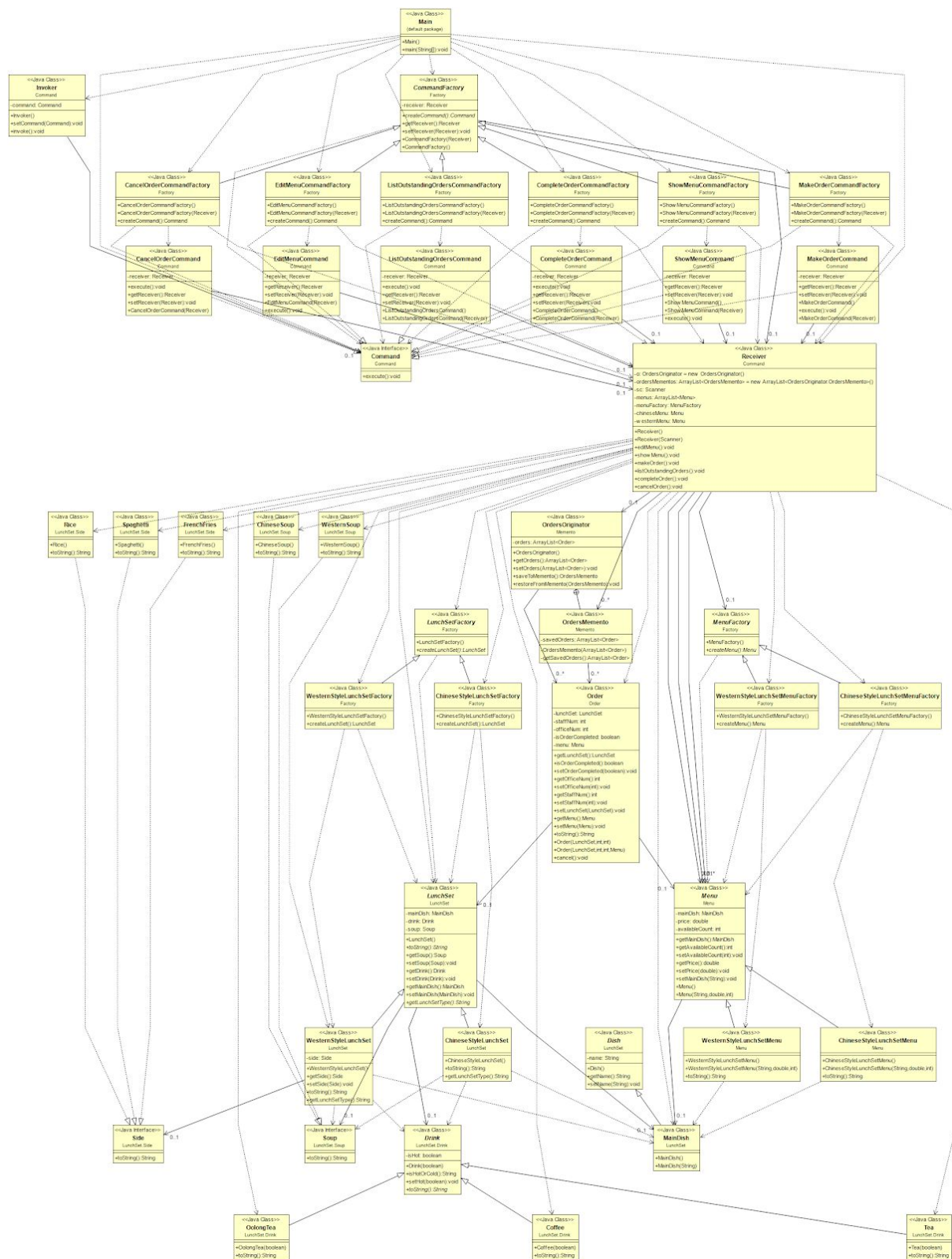6. Mark order as completed

Required to apply the following patterns in the system design
● Command Pattern to provide the "Edit menu", "Show menu", "Make order", "Cancel order", "List outstanding orders", "Mark order as completed" functions
● Factory Method or abstract Factory Pattern to create different kinds of Command objects and different kinds of Lunch Set.
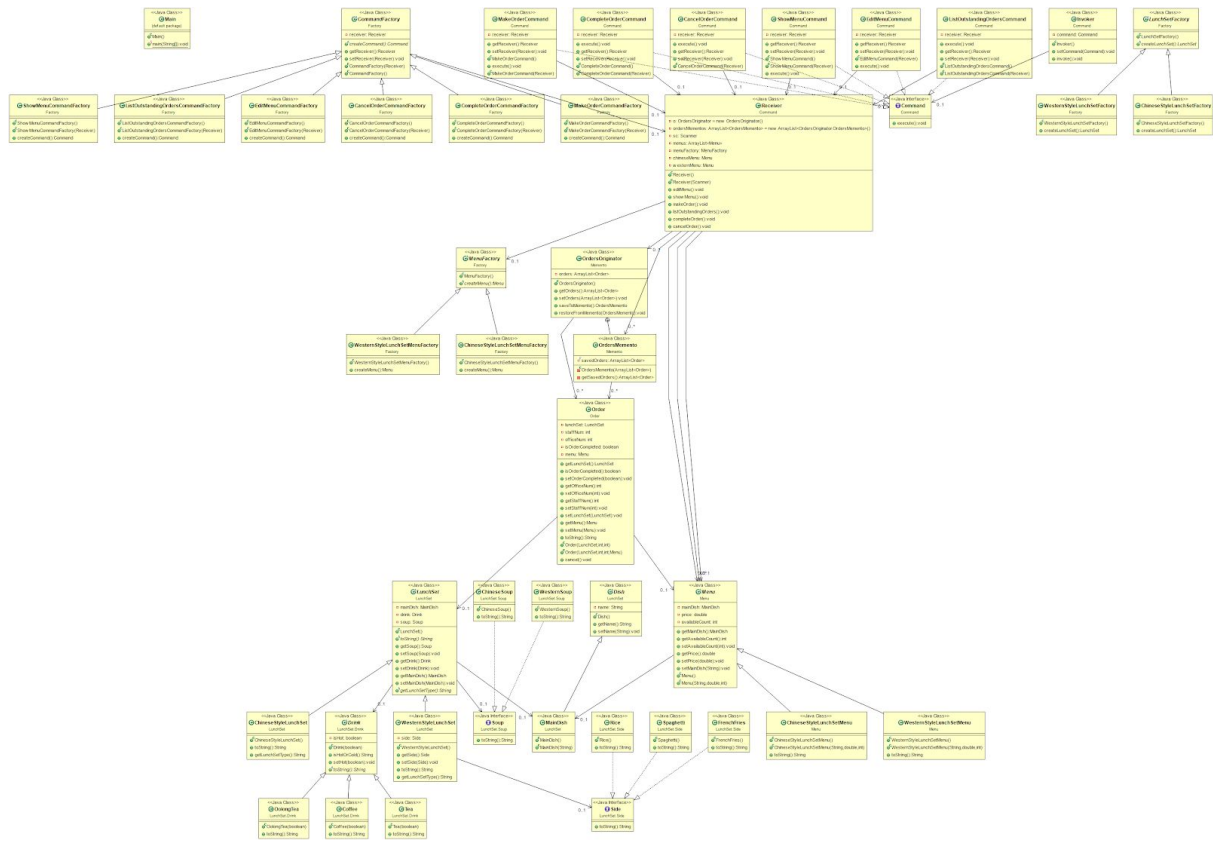● Memento Pattern to support the "Cancel order" function

Assumptions

1.   Recommended to use JDK15.0.1
java version "15.0.1" 2020-10-20
Java(TM) SE Runtime Environment (build 15.0.1+9-18)
Java HotSpot(TM) 64-Bit Server VM (build 15.0.1+9-18, mixed mode, sharing)

Application Design(Class diagram with dependencies)

Application Design(Class diagram without dependencies)

Discussion and explanation of each of the design patterns applied to the application

Command patterns

Command patterns are used for doing actions such as Edit menu, show menu, make order, list outstanding orders, etc. I design six classes which implement the Interface Command that provides one main method including execute. The name and description of the classes are shown below:

- EditMenuCommand
  The EditMenuCommand defines a binding between the editMenu() and the Receiver. When the Invoker calls execute() the EditMenuCommand will run editMenu() on the Receiver
- ShowMenuCommand
  The ShowMenuCommand defines a binding between the showMenu() and the Receiver. When the Invoker calls execute() the ShowMenuCommand will run showMenu() on the Receiver
- MakeOrderCommand
  The ShowMenuCommand defines a binding between the makeOrder() and the Receiver. When the Invoker calls execute() the ShowMenuCommand will run makeOrder() on the Receiver
- ListOutstandingOrdersCommand
  The ListOutstandingOrdersCommand defines a binding between the listOutstandingOrders() and the Receiver. When the Invoker calls execute() the ListOutstandingOrdersCommand will run listOutstandingOrders() on the Receiver
- CompleteOrderCommand
  The CompleteOrderCommand defines a binding between the completeOrders() and the Receiver. When the Invoker calls execute() the ListOutstandingOrdersCommand will run completeOrders() on the Receiver
- CancelOrderCommand
  The CancelOrderCommand defines a binding between the cancelOrders() and the Receiver. When the Invoker calls execute() the CancelOrderCommand will run cancelOrders() on the Receiver
- Invoker
  The Invoker holds a command and can get the Command to execute a request by calling the execute method.
- Receiver
  Used to performs the action(Edit Menu, Show Menu, Make Order, List Outstanding Orders, Complete Order, and Cancel Order)
- Command
  The command is an object that encapsulates a request to the receiver. Command

declares an interface for all commands, providing a simple execute() method which asks the Receiver of the command to carry out an operation.

Invoker:	● Invoker
Command:	● Command
Receiver:	● Receiver
Concrete Command:	● EditMenuCommand ● ShowMenuCommand ● MakeOrderCommand ● ListOutstandingOrdersCommand ● CompleteOrderCommand ● CancelOrderCommand

Factory patterns

Factory patterns are used to create different kinds of Command objects and different kinds of Lunch Set. The name and description of the classes are shown below:

- CommandFactory
  Declares the factory method, which returns an object of type Command.
- EditMenuCommandFactory
  Overrides the factory method to return an instance of an EditMenuCommand.
- ShowMenuCommandFactory
  Overrides the factory method to return an instance of a Show Menu Command.
- MakeOrderCommandFactory
  Overrides the factory method to return an instance of a MakeOrderCommand.
- ListOutstandingOrdersCommandFactory
  Overrides the factory method to return an instance of a List Outstanding Orders Command.
- CompleteOrderCommandFactory
  Overrides the factory method to return an instance of a CompleteOrderCommand.
- CancelOrderCommandFactory
  Overrides the factory method to return an instance of a CancelOrderCommand.
- LunchSetFactory
  Declares the factory method, which returns an object of type LunchSet(Chinese style lunch set / Western style lunch set)
- ChineseStyleLunchSetFactory
  Overrides the factory method to return an instance of a ChineseStyleLunchSet.
- WesternStyleLunchSetFactory
  Overrides the factory method to return an instance of a WesternStyleLunchSet.
- MenuFactory
  Declares the factory method, which returns an object of type Menu(Chinese style lunch set menu / Western style lunch set menu)
- ChineseStyleLunchSetMenuFactory
  Overrides the factory method to return an instance of a ChineseStyleLunchSetMenu.
- WesternStyleLunchSetMenuFactory
  Overrides the factory method to return an instance of a WesternStyleLunchSetMenu

Product:	- Command - Lunchset - Menu
Concrete Product:	- EditMenuCommand - ShowMenuCommand - MakeOrderCommand - ListOutstandingOrdersCommand - CompleteOrderCommand - CancelOrderCommand - ChineseStyleLunchSet

	● WesternStyleLunchSet ● ChineseStyleLunchSetMenu ● WesternStyleLunchSetMenu
Creator:	● CommandFactory ● LunchSetFactory ● MenuFactory
Concrete Creator:	● EditMenuCommandFactory ● ShowMenuCommandFactory ● MakeOrderCommandFactory ● ListOutstandingOrdersCommandFactory ● CompleteOrderCommandFactory ● CancelOrderCommandFactory ● ChineseStyleLunchSetFactory ● WesternStyleLunchSetFactory ● ChineseStyleLunchSetMenuFactory ● WesternStyleLunchSetMenuFactory

Memento Pattern

Memento Pattern to support the "Cancel order" function. The name and description of the classes are shown below:

1. OrdersOriginator
   Is the object whose state orders that we want and need to save.
2. OrdersMemento
   Is another object that saves the orders of the OrdersOriginator.
3. Receiver
   Manages the timing of the saving of the state, saves the OrdersMemento and, if needed, uses OrdersMemento to restore the state of the OrdersOriginator.

Originator:	●	OrdersOriginator
Memento:	●	OrdersMemento
Caretaker:	●	Receiver

The system design conforms to the Open-Closed Principle so that the system can easily be extended to support new functions and the creation of new LunchSets, Soups and Drinks.

User Guide

Installation

Setup

```
$ cd ITP4507_Assignment
$ cd source code
$ javac @sources.txt
```

Run the program

```
$ java Main
```

(Or installation and run by using run.bat)

Program Manual

```
E:\git_repo\ITP4507_Assignment>java Main
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
```

Actions	Way
Edit Menu	Input e
Show Menu	Input s
Place Order	Input p
List Outstanding Orders	Input l
Complete Order	Input d
Exit System	Input q

Edit Menu(Command "e")

● Press e to edit menu

```
E:\git_repo\ITP4507_Assignment\source code>java Main
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
e

Edit Menu:
Chinese or Western (c | w):
```

● When the user enters the corresponding command key "e", the system will execute the edit menu command, the system will require the user to input "c" or "w" to select chinese or western style lunch set menu to edit.

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
e

Edit Menu:
Chinese or Western (c | w):c
Enter main dish: Steamed Fish
Enter price: 50
Enter available count:5
Menu Updated
```

● If the user needs to edit chinese style lunch set menu, that he must enter the main dish name, price, and available count. After the edit menu success, the system will display "Menu Updated".

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
e

Edit Menu:
Chinese or Western (c | w):w
Enter main dish: Fish
Enter price: 40
Enter available count:4
Menu Updated
```

● If the user needs to edit chinese style lunch set menu, that he must enter the main dish name, price, and available count. After the edit menu success, the system will display "Menu Updated".

Show Menu(Command "s")

- Press "s" to show menu

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
s

Chinese Style Business Set Lunch
main dish: Steamed Fish
with rice, Chinese soup, Chinese tea
price: 50.0
available count: 5


Western Style Business Set Lunch
main dish: Fish
with rice/spaghetti/French fries
price: 40.0
available count: 4
```

- When the user enter the corresponding command key "s", the system will display all the menus(Chinese Style Lunch Set Menu, Western Style Lunch Set Menu)

Place Order(Command "p")

- Press "p" to Place Order

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
p

Place Order
Chinese or Western (c | w):
```

- When the user enters the corresponding command key "s", the system will ask the user to input "c" or "w" to select chinese or western style lunch set menu to place order.

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
p

Place Order
Chinese or Western (c | w):c
Oolong Tea: hot or iced (h | i): h
Staff Number:123
Office Location:123
Order Placed
```

- If the user needs to place order of chinese style lunch set, input "c", that user must enter the hot or iced Oolong Tea, staff number, and office location. After Place Order success, the system will display "Order Placed".

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
p

Place Order
Chinese or Western (c | w):w
side: rice, spaghetti, French fries (r | s | f): r
tea or coffee, hot or iced (ht| it | hc | ic): ht
Staff Number:2
Office Location:2
Order Placed
```

- If the user needs to place order of western style lunch set, input "w", that user must enter the side(rice, spaghetti, french fries), tea or coffee, hot or iced, staff number, and office location. After Place Order success, the system will display "Order Placed".

List Outstanding Orders(Command "l")

- Press "l" to List Outstanding Orders

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
l

Outstanding Orders
C: 123, 123, Steamed Fish, Chinese Soup, Hot Oolong Tea
W: 2, 2, Fish, rice, Western Soup, Hot Tea
```

- When the user enters the corresponding command key "s", the system will display all the orders with type of lunch set, staff number, office location, lunch set detail.

Complete Order(Command "d")

- Press "d" to Complete Order

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
d

Complete Orders
C: 123, 123, Steamed Fish, Chinese Soup, Hot Oolong Tea
Order marked as done
```

- When the user enters the corresponding command key "d", the system will finish the first Outstanding Orders. After complete order success, the system will display "Order marked as done".

Cancel Order(Command "c").

- Press "c" to Complete Order

```
Please enter command: [e | s | p | c | l | n | d | q]
e = Edit menu, s = Show menu, p = Place order, c = Cancel order,
l = List orders, d = order is Done, q = Quit
c
Input the number:
```

- When the user enters the corresponding command key "c", the system will ask the user to input the staff number to cancel the order. After canceling order success, the system will display order detail and "Order Cancelled".
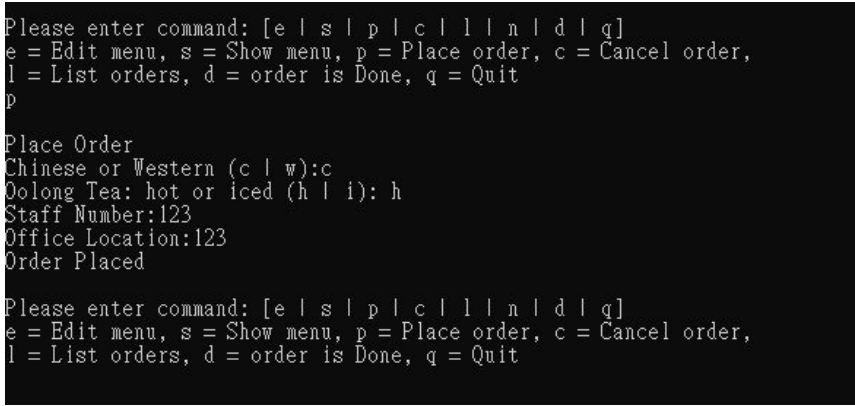
Test Plan and Test Cases

I will use Black Box Testing to test the system because the system is not complex.
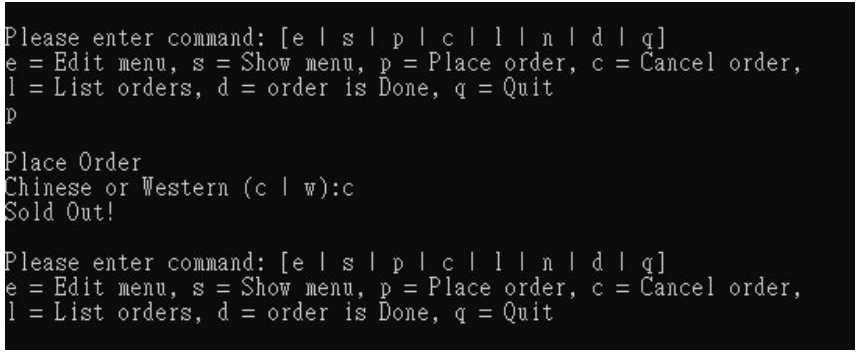Below are the test cases:

Test case	Edit The Chinese Style Lunch Set Menu
Case ID	T01
User	Staff
Test Flows	1. Input e 2. Input c 3. Input Steamed Fish 4. Input 30 5. Input 3
Input Data	1. The command of Edit the Menu. 2. Type of the Menu 3. Information on the Menu. Main Dish, price, available count
Expected Results	The Menu has edited. Display: ``` Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit e Edit Menu: Chinese or Western (c | w):c Enter main dish: Steamed Fish Enter price: 30 Enter available count:3 Menu Updated Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	Edit The Western Style Lunch Set Menu
Case ID	T02
User	Staff
Test Flows	1. Input e 2. Input w 3. Input Steak 4. Input 40 5. Input 3
Input Data	1. The command of Edit the Menu. 2. Type of the Menu 3. Information on the Menu. Main Dish, price, available count
Expected Results	The Menu has edited. Display: ``` Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit e Edit Menu: Chinese or Western (c | w):w Enter main dish: Steak Enter price: 40 Enter available count:3 Menu Updated Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	Show Menu
Case ID	T03
User	Staff
Test Flows	1. Input s
Input Data	1. The command of show menu
Expected Results	Show the Chinese and Western Lunch Set Menu Display: ``` Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit s Chinese Style Business Set Lunch main dish: Steamed Fish with rice, Chinese soup, Chinese tea price: 30.0 available count: 3 Western Style Business Set Lunch main dish: Steak with rice/spaghetti/French fries price: 40.0 available count: 3 Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	Place Order(Chinese Style Lunch Set, Hot Oolong Tea)
Case ID	T04
User	Staff
Test Flows	1. Input p 2. input c 3. input h 4. input 123 5. input 123
Input Data	1. The command of place order 2. Select Chinese Lunch Set 3. Select Hot Oolong Tea 4. Staff Number 5. Office Location
Expected Results	Place Order successful Display: ``` Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit p Place Order Chinese or Western (c | w):c Oolong Tea: hot or iced (h | i): h Staff Number:123 Office Location:123 Order Placed Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	Place Order(Western Style Lunch Set, French fries, ice coffee)
Case ID	T05
User	Staff
Test Flows	1. input p 2. input w 3. input f 4. input ic 5. input 987 6. input 987
Input Data	1. The command of Place order 2. Western Lunch Set 3. Select Side(French fries) 4. Select Drink(ice coffee) 5. Enter Staff Number 6. Enter Office Location
Expected Results	Place Order successful Display: ``` Please enter command: [e	s	p	c	l	n	d	q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit p Place Order Chinese or Western (c | w):w side: rice, spaghetti, French fries (r | s | f): f tea or coffee, hot or iced (ht| it | hc | ic): ic Staff Number:987 Office Location:987 Order Placed Please enter command: [e	s	p	c	l	n	d	q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	Place Order(Sold Out)
Case ID	T06
User	Staff
Test Flows	1. input p 2. input c
Input Data	1. The command of place order 2. select lunch set(Chinese)
Expected Results	Display Sold Out message Display: ``` Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit p Place Order Chinese or Western (c | w):c Sold Out! Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	Cancel Order
Case ID	T08
User	Staff
Test Flows	1. input l 2. input c 3. input 234 4. input l
Input Data	1. The command of List Outstanding Orders 2. The command of the cancel order 3. enter the staff number to cancel the order 4. The command of List Outstanding Orders
Expected Results	Order Cancelled Display: ``` Outstanding Orders C: 123, 123, Steamed Fish, Chinese Soup, Hot Oolong Tea W: 987, 987, Steak, French fries, Western Soup, Iced Coffee C: 234, 234, Steamed Fish, Chinese Soup, Iced Oolong Tea C: 345, 345, Steamed Fish, Chinese Soup, Hot Oolong Tea Please enter command: [e	s	p	c	l	n	d	q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit c Cancel Order Staff number: 234 C: 234, 234, Steamed Fish, Chinese Soup, Iced Oolong Tea Order Cancelled Please enter command: [e	s	p	c	l	n	d	q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit l Outstanding Orders C: 123, 123, Steamed Fish, Chinese Soup, Hot Oolong Tea W: 987, 987, Steak, French fries, Western Soup, Iced Coffee C: 345, 345, Steamed Fish, Chinese Soup, Hot Oolong Tea Please enter command: [e	s	p	c	l	n	d	q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass

Test case	List Outstanding Orders
Case ID	T09
User	Staff
Test Flows	1. input l
Input Data	1. The command of the List Outstanding Orders
Expected Results	List all outstanding orders Display:
Pass/Fail	Pass

Test case	Complete Order
Case ID	T10
User	Staff
Test Flows	1. input l 2. input d 3. input l
Input Data	1. The command of the List Outstanding Orders 2. The command of the Complete Order 3. The command of the List Outstanding Orders
Expected Results	Complete the order Display: ``` Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit l Outstanding Orders C: 123, 123, Steamed Fish, Chinese Soup, Hot Oolong Tea W: 987, 987, Steak, French fries, Western Soup, Iced Coffee C: 345, 345, Steamed Fish, Chinese Soup, Hot Oolong Tea Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit d Complete Orders C: 123, 123, Steamed Fish, Chinese Soup, Hot Oolong Tea Order marked as done Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit l Outstanding Orders W: 987, 987, Steak, French fries, Western Soup, Iced Coffee C: 345, 345, Steamed Fish, Chinese Soup, Hot Oolong Tea Please enter command: [e | s | p | c | l | n | d | q] e = Edit menu, s = Show menu, p = Place order, c = Cancel order, l = List orders, d = order is Done, q = Quit ```
Pass/Fail	Pass