ICT 162

Object Oriented Programming

Tutor-Marked Assignment

July 2023 Presentation

TUTOR-MARKED ASSIGNMENT (TMA)

This assignment is worth 24% of the final mark for ICT162, Object Oriented Programming.

The cut-off date for this assignment is **Sunday, 22 October 2023, 2355 hrs.**

<u>Note to Students:</u>

Submit your solution document in the form of a single MS Word file. You are to include the following particulars in your submission: Course Code, Title of the TMA, SUSS PI No., Your Name, and Submission Date. Put this information in the first page of your solution document. Use the template word document provided – **SUSS_PI_No-FullName_162TMA.docx.** Rename the file with your SUSS_PI_No, FullName, and read the submission details under Module\TMA01 in the ICT162 L01**. Do NOT submit as a pdf document**.

You should make only one submission for TMA.

You are to copy and paste Python source code into your solution document as text. If you submit source code as image, no marks will be awarded to your program. Submit screenshots for **only** output of your program, where applicable.

Assignment Requirements:

- Unless specified in the question, you CANNOT use packages not covered in this module, e.g., re, collections, numpy, pandas etc.
- All classes must be documented. Provide sufficient comments to your code and ensure that your program adheres to good programming practices such as not using global variables.
- Failing to do so can incur a penalty of as much as 50% of the mark allotted.

Read the following introduction before attempting this TMA.

Healthier SG is a national initiative by the Ministry of Health (MOH) focusing on preventive health. Singaporeans can take proactive steps to manage their health, prevent the onset of chronic diseases and have strong support to lead healthier lifestyles.

Eat-Right-Programme (ERP) is a pilot programme of Healthier SG. The key objective of ERP is to encourage Singaporeans to take charge of their diets, leading to healthier lifestyles and see better health outcomes. Singaporeans above 12 years old can enrol in ERP.

To debunk the myth that Healthy food is expensive, bland, and boring. ERP will offer Delis that are deliciously prepared by food providers/agencies, using recipes with strict requirements on calories and fat content.

In ERP, participants can "Order" their next-day meals by selecting Delis to form a DeliSet When assembling the DeliSet, ERP also request participants to indicate which diet plan they are following. In the pilot phase, these DeliSets will be offered: Low Carb, Low Fat and Econ.

To further subsidised and encourage participation, there are discount schemes for Pioneer and Merdeka generation, or price discount for other participants. Promotional discounts like National Day discount, or Early Bird discount can apply too when required.

For a start, every participant can order not more than twice per day (daily quota of 2) and each "Order" will contain one DeliSet only. The order will be delivered to the participant's address at a flat fee of $1.99, or waived if the participant has physical impairments or disabilities.

In this TMA, you will develop a prototype application to help ERP participants create their "Order". To reduce complexity,

- ERP enrolment is out-of-scope, instead MOH will provide the participant list via a text file (Appendix A).
- Deduction of CDC vouchers/digital wallet is out-of-scope.

However, your prototype application must produce the order file (Appendix C), so that ERP's partners and CDC can process accordingly.

Below are snapshots of order creation and enquiry:

```
Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S4096807E
You are entitled to the following discount(s):
        Pioneer citizen: $1 discount

Enter your customised set name: Heng Heng Snack
Available Deli:
===============
C001 - Smoked Duck Salad               Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding              Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                  Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                   Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie         Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                   Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                  Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                       Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                     Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                      Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg         Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart               Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup    Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie               Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                 Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut  Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes              Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice         Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup         Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce        Price: $2.50   Fat:  3.3   Calories:  97.7

Select Deli by entering the code. <Enter> to stop
Deli <1>: C003
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet? : C
Deli <2>: H003
Add Deli failed. LowCarbSet should not have more than 500 calories
Deli <2>: C007
Deli <3>:

Order ID: 20230826003
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: Heng Heng Snack    Price: $3.50    Consume in 0.5 hrs
```

```
             with Chocolate Cake, Beetroot Raita
Discounts:    $1.00
Delivery Fee: $0.00
Final Price:  $2.50



Healthier SG: Eat-Right Programme
==================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S5572364H
You are entitled to the following discount(s):
        Merdeka citizen: $0.50 discount, or $1 discount when order is more than $7
        National Day Bonus: enjoy 50% off


Enter your customised set name: Mok Meal
Available Deli:
===============
C001 - Smoked Duck Salad               Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding              Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                  Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                   Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie         Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                   Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                  Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                       Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                     Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                      Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg         Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart               Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup    Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie               Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                 Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut  Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes              Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice         Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup         Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce        Price: $2.50   Fat:  3.3   Calories:  97.7

Select Deli by entering the code. <Enter> to stop
Deli <1>: C001
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet ?? F
Deli <2>: H013
Deli <3>: H009
Deli <4>:

Order ID: 20230826004
ID: S5572364H    Name: Sharon Mok        Age: 68
DeliSet: Mok Meal              Price: $7.50      Consume in 1.0 hrs
        with Smoked Duck Salad, Beancurd With Bean Sauce, Boiled Banana with Grated Coconut
Discounts:    $4.75
Delivery Fee: $1.99
Final Price:  $4.74



Healthier SG: Eat-Right Programme
==================================
1. Order DeliSet
```

```
2. List Orders
3. Quit
Enter choice: 2
Enter NRIC to list your order(s): S4096807E

Your order(s) for 2023-08-26:
=============================
Order ID: 20230826001
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: My Breakfast        Price: $7.00      Consume in 1.5 hrs
        with Croissant, Smoked Duck Salad, Banana Pancakes
Discounts: $1.00
Delivery Fee: $0.00
Final Price: $6.00


Order ID: 20230826003
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: Heng Heng Snack      Price: $3.50      Consume in 0.5 hrs
        with Chocolate Cake, Beetroot Raita
Discounts: $1.00
Delivery Fee: $0.00
Final Price: $2.50
```
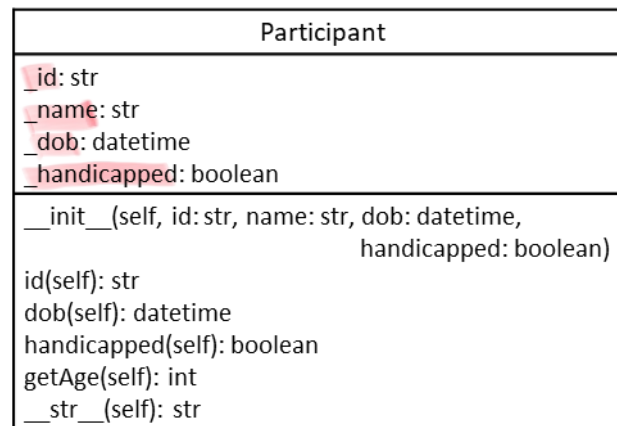
This TMA contains 5 questions, that will guide you gradually to create the required classes, and eventually build the prototype application demonstrated above.

Question 1 (7 marks)

Implement the Participant class according to the specification in the class diagram shown below in Figure Q1.

Participant
_id: str _name: str _dob: datetime _handicapped: boolean
__init__(self, id: str, name: str, dob: datetime,   handicapped: boolean) id(self): str dob(self): datetime handicapped(self): boolean getAge(self): int __str__(self): str

1) Get participant input from .txt.

2) Show output.

Figure Q1

The Participant class has:
- FOUR instance variables:
  - _id (str): the NRIC or FIN of Eat-Right-Programme (ERP) participant.
  - _name (str): name of participant.
  - _dob (datetime): the date of birth (datetime object) of the participant.
  - _handicapped (boolean): this attribute is True if the participant has physical impairments or disabilities.
- Constructor initialises all the instance variables with the corresponding given parameters.
- Getter methods for these instance variables: _id, _dob and _handicapped. Use the property decorator.
- The method getAge returns an integer representing the age of the participant.
  - The computation of age will only use the current year deduct by the participant's year of birth.
- The __str__ method returns a string representation of a Participant object, in the following order: id, name and age. Some examples are:

```
ID: S4096807E    Name: Wong Yong Heng    Age: 83

ID: S5572364H    Name: Sharon Mok        Age: 68

ID: S7004670I    Name: Soh Yuan Tai      Age: 53
```

(7 marks)

Question 2 (18 marks)

Demonstrate your understanding of how class hierarchy and association are used to organize information, and then construct the class hierarchy and association according to specification.

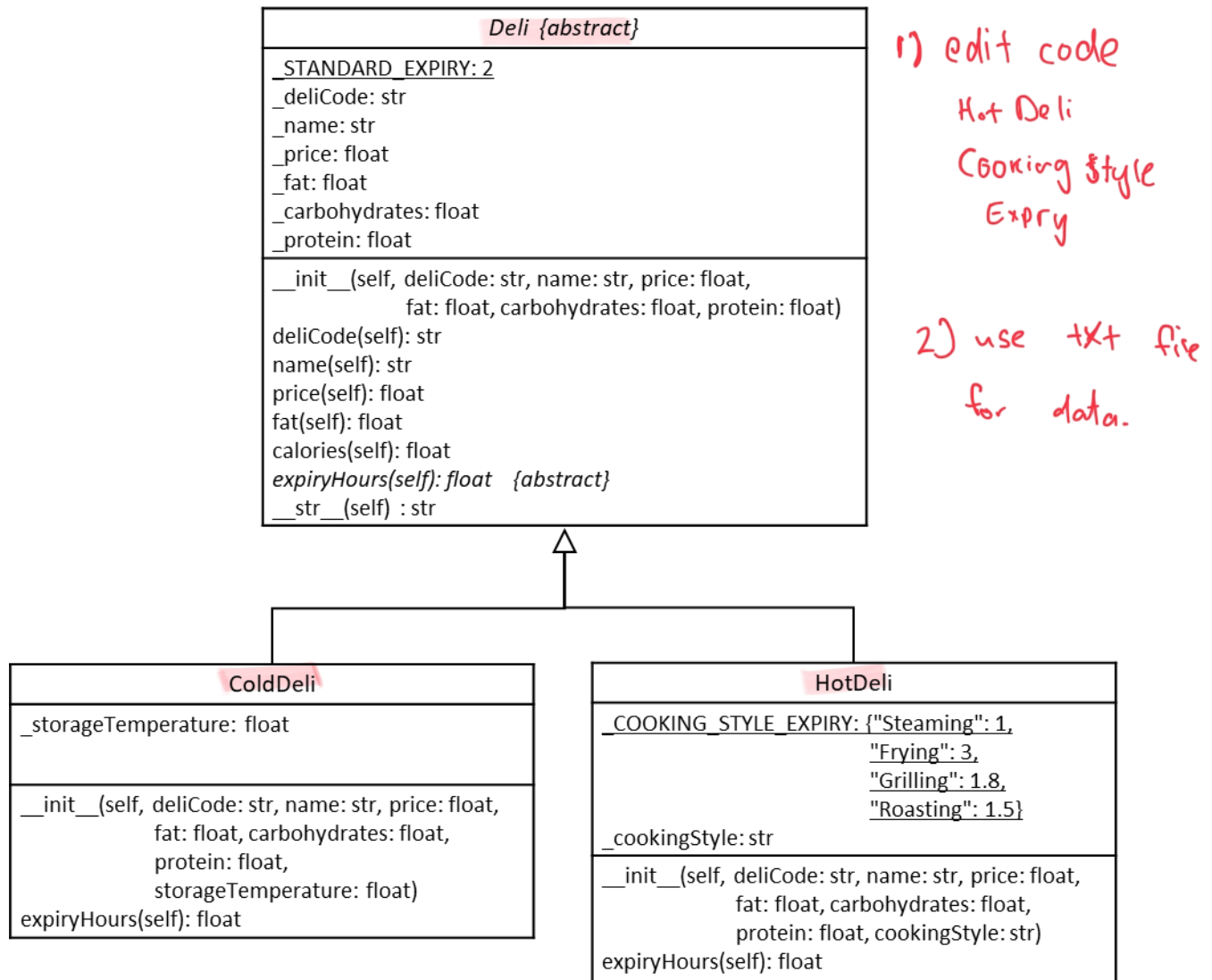The class diagram in Figure Q2 shows the specifications of the Deli class and its subclasses: HotDeli and ColdDeli.

1) edit code
   Hot Deli
   Cooking Style
   Expry

2) use txt file
   for data.

Figure Q2

(a)   Implement the abstract class – Deli.

The Deli class represents a food item that the ERP is offering.
- ONE class variable that defines the standard expiry hours as 2.
- SIX instance variables:
  - _deliCode (str): unique code for this deli item, e.g., "H001".
  - _name (str): name of the deli, e.g., "Croissant".
  - _price (float): the price for this deli.
  - _fat (float): per serving of fat in grams.
  - _carbohydrates (float): per serving of carbohydrates in grams.

- o _protein (float): per serving of protein in grams.
- Constructor initialises these 6 instance variables using the given parameters.
- Getter methods for these instance variables: _deliCode, _name, _price and _fat. Use the property decorator.
- Define getter method for calories. Use the property decorator. To compute calories, use the following formula:
  - o Fat provides 9 calories per gram while carbohydrates and protein each provide 4 calories per gram.
- One abstract method, expiryHours which returns the standard expiry hours.
- The __str__ method returns a string representation of a Deli object, with selected attributes in the following order – deliCode, name, price, fat, and calories, in the suggest format below:

```
C001 - Smoked Duck Salad    Price: $4.00   Fat: 12.5   Calories: 264.5

H001 - Croissant            Price: $2.50   Fat: 15.0   Calories: 260.2
```

(7 marks)

(b)   Write the Python class definitions for the ColdDeli and HotDeli.

The ColdDeli class is a subclass of Deli, and it has
- One additional instance variable, _storageTemperature (float) that will help determine how long this cold food item can last.
- Implement the method expiryHours by examining the following table to define the expiry hours for ColdDeli:

Storage Temperature	Expiry hours
<= 10 °c	0.5
<= 15 °c	1.0
<= 20 °c	1.5

If the storageTemperature is above 20 °c, the standard expiry hours should apply.

The HotDeli class is also a subclass of Deli. The HotDeli class has:
- One class variable _COOKING_STYLE_EXPIRY that defines the cooking styles and its corresponding expiry hours.
- One additional instance variable _cookingStyle.
- The method expiryHours check if _cookingStyle is one of those in the class variable _COOKING_STYLE_EXPIRY. If it is, the method returns corresponding value as expiry hours. Otherwise, the standard expiry hours should apply.

(7 marks)

(c)   Explain what type of overriding you have implemented for method expiryHours in class HotDeli and ColdDeli. What is the OO concept that allows for overriding?

(2 marks)

(d)   Write Python statements to create the appropriate Deli objects using the information below:

Code	Name	Price	Fat	Carbohydrates	Protein	Storage Temperature	Cooking Style
C001	Smoked Duck Salad	$3.00	12.5	23	15	16°C	-
H001	Croissant	$2.00	7.5	13.4	2.3	-	Baking

Print the details of the Deli objects created.

(2 marks)

Question 3 (25 marks)

As mentioned in the introduction, ERP currently offers these 3 sets: EconSet, LowFatSet and LowCarbSet. Participants can select their preferred Delis to form a DeliSet, as long as the Deli selections fit the criteria of these 3 sets.

Figure Q3 shows the specifications of the DeliSet class and its subclasses: EconSet, LowFatSet and LowCarbSet.
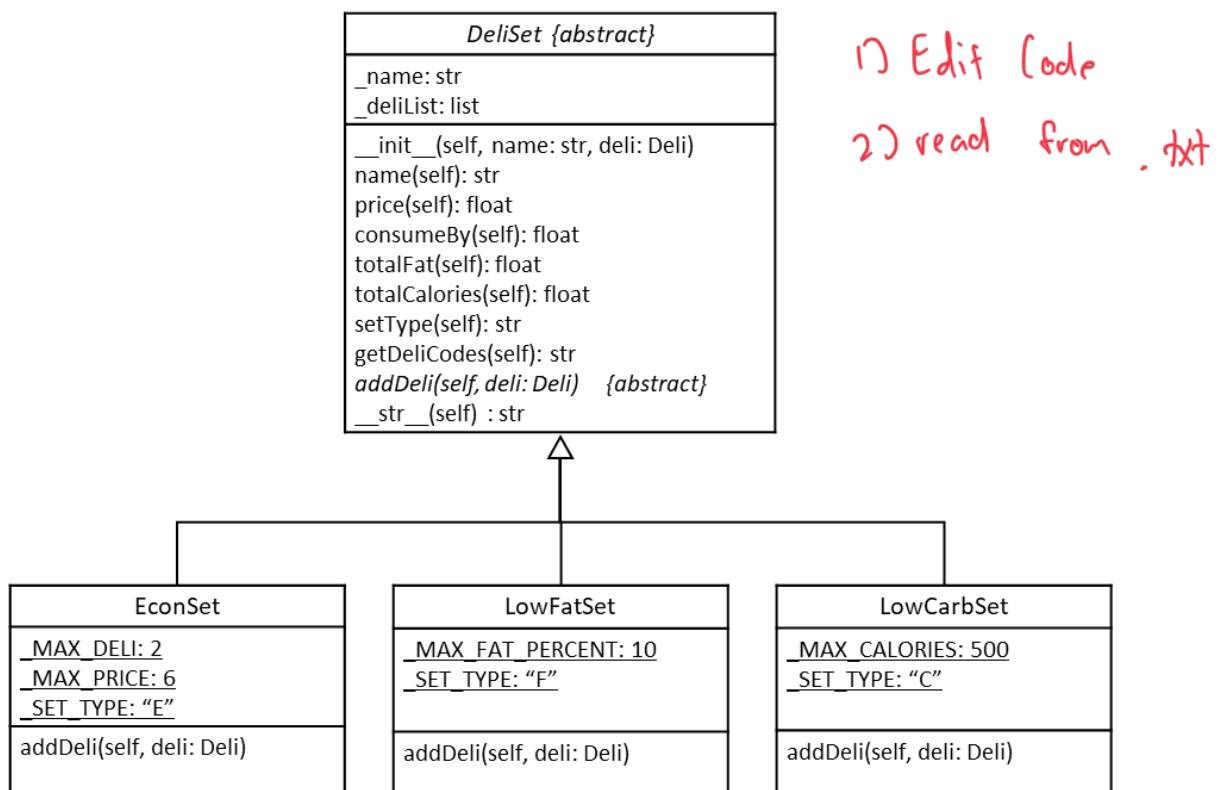

Figure Q3

(a)   Write a Python class definition for the exception class ERPException – subclass of the Exception class. This class has no added attribute or method. When the application encounters ERP rules violation, your application will raise an exception from this class.

(1 mark)

(b)   Implement the abstract class – DeliSet.

The DeliSet class has:

- TWO instance variables:
  - _name (str): represents the customer defined name for this meal set.
  - _deliList (list): a list containing the participant's selection of Deli objects for this meal set.
- The constructor performs the following:
  - Initialise _name with the given parameter name.
  - Initialise the _deliList as a list with one Deli object, which is the given parameter deli.
- Getter method for instance variable: _name. Use the property decorator.
- In addition, define getter methods for the following. Use the property decorator.
  - price: returns the sum of all delis' price.
  - consumeBy: returns the lowest expiry hours of all delis.
  - totalFat: returns the sum of all delis' fat content.
  - totalCalories: returns the sum of all delis' calories.
- The method setType returns the subclasses' class variable _SET_TYPE. Hint: use type(self).
- getDeliCodes is a method that returns all the deliCode of the Deli objects in _deliList, separated by commas. E.g., "H001,C004,H009"
- One abstract method: addDeli that has a Deli object as parameter and adds it into the _deliList, only if the following condition is met:
  - There is no duplicated Deli within this DeliSet (i.e., cannot have same deliCode). Otherwise, raise ERPException with appropriate message.
- The __str__ method returns a string representation of a DeliSet object, including the name of the DeliSet, price, consumeBy, then follow by the name of the Deli objects. This is an example in the suggested format:

```
DeliSet: My Lunch Set        Price: $6.00        Consume in 1.5 hrs
          with Smoked Duck Salad, Strawberry Pudding
```

(9 marks)

(c)   Write the Python class definitions for the 3 subclasses of DeliSet: EconSet, LowFatSet and LowCarbSet.

The EconSet class has:
- THREE class variables: _MAX_DELI, _MAX_PRICE and _SET_TYPE.
- Implement the method addDeli by checking the following rules:
  - With this addition, the number of delis should not be more than _MAX_DELI. Otherwise, raise ERPException with appropriate message.
  - With this addition, the price of the DeliSet should not be more than _MAX_PRICE. Otherwise, raise ERPException with appropriate message.
  - If the above rules are met, invoke the parent's class addDeli to proceed with the addition.

The LowFatSet class has:
- TWO class variables: _MAX_FAT_PERCENT and _SET_TYPE.
- Implement the method addDeli by ensuring that this condition is met:
  - With this addition, the total fat content for the DeliSet should not be more than _MAX_FAT_PERCENT. I.e., LowFatSet must not have total fat > 10% of total calories. Otherwise, raise ERPException with appropriate message.
  - If the above condition is met, invoke the parent's class addDeli to proceed with the addition.

The LowCarbSet class has:
- TWO class variables: _MAX_CALORIES and _SET_TYPE.
- Implement the method addDeli by enforcing the following rule:
  - With this addition, the total calories for this DeliSet should not be more than _MAX_CALORIES. Otherwise, raise ERPException with appropriate message.
  - If the above rule is met, invoke the parent's class addDeli to proceed with the addition.

(12 marks)

(d)   Write a main() function with exception handling for the following:

Referring to Appendix B for the list of Delis, create the following **THREE** DeliSet using the information below:

- EconSet, with any name and H006, then add the following Delis in this order:
  - C005
  - H010

- LowFatSet, with any name and H003, then add the following Delis in this order:
  - H002
  - C003
  - C001

- LowCarbSet, with any name and C004, then add the following Delis in this order:
  - C007
  - H013
  - H012
  - H009

Print the string representation of the created DeliSet objects.

(3 marks)

Question 4 (20 marks)

This question is a continuation of Question 1, 2 & 3, hence will make use of the classes in Question 1, 2 & 3.

(a)   To encourage participant to order DeliSet from ERP regularly, a discount scheme will be implemented. For a start, there will be discounts for Pioneer generation, Merdeka generation and a standard discount based on price. Other promotional discounts can be added when necessary, e.g., National Day discount.

Implement the Discount class and subclasses, as shown in Figure Q4a.

Figure Q4a

The Discount class is an abstract class, with abstract methods: getDiscount and description, which currently have no implementations.

For PioneerDiscount class, implement these methods:
- getDiscount by returning $1
- description by returning the string "Pioneer citizen: $1 discount"

For MerdekaDiscount class, implement these methods:
- getDiscount by returning $1 if the given parameter price (of DeliSet) is more than $7. Otherwise, returns $0.5
- description by returning the string "Merdeka citizen: $0.50 discount, or $1 discount when order is more than $7"

For PriceDiscount class, implement these methods:
- getDiscount by returning $0.5 if the given parameter price (of DeliSet) is more than $10. Otherwise, returns $0
- description by returning the string ""All citizen: $0.50 discount when order is more than $10"

For NationalDayDiscount class, implement these methods:
- getDiscount by returning 50% of the given parameter price (of DeliSet).
- description by returning the string "National Day Bonus: enjoy 50% off"

(6 marks)

(b)   To purchase a DeliSet, participant need to make an Order. As this is a pilot programme, each Order can only have 1 DeliSet, belongs to 1 participant, but may be able to enjoy multiple discounts.

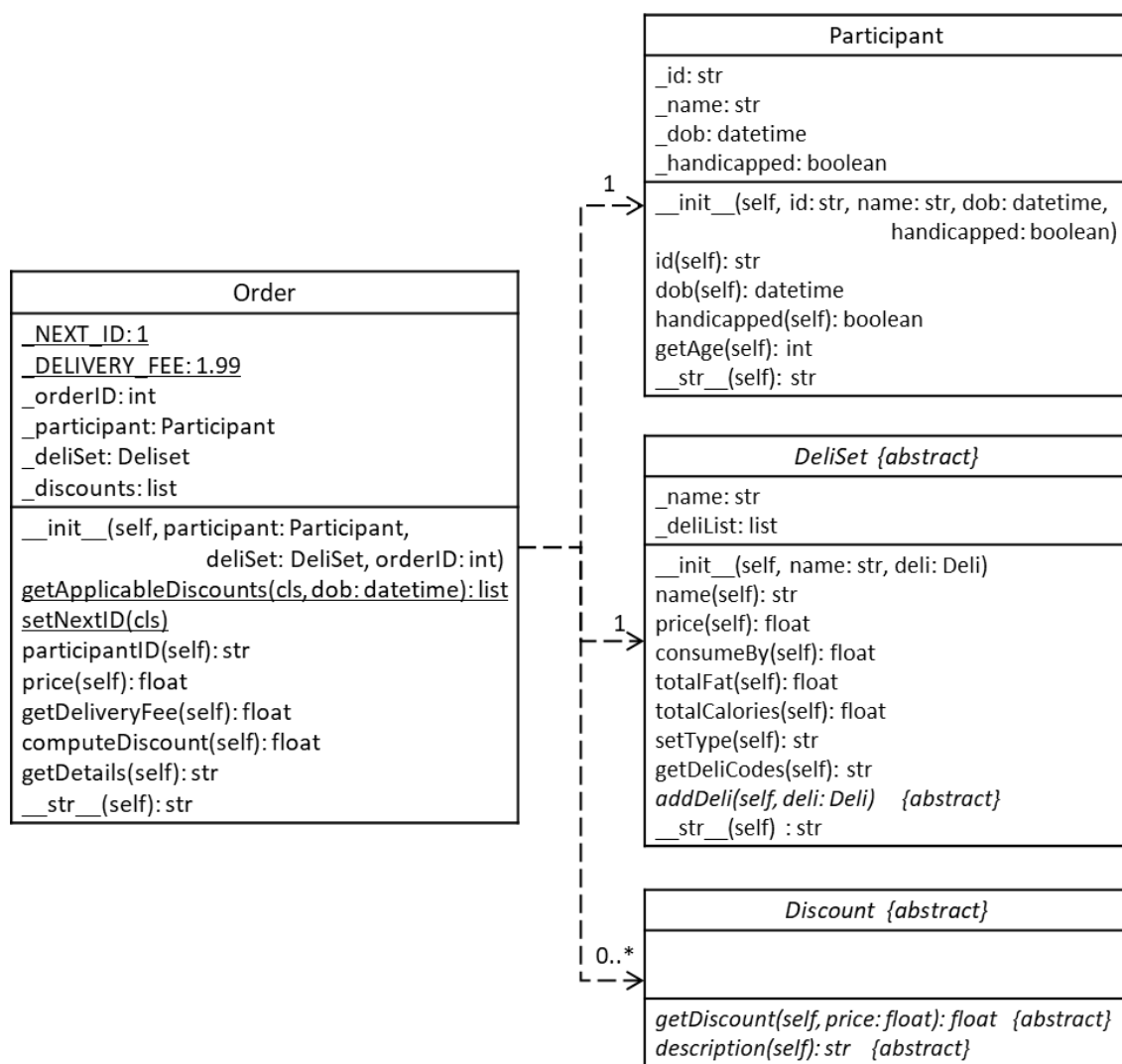Refer to Figure Q4b for the specifications of Order class.

Figure Q4b

Implement the Order class.

- It has TWO class variables:
  - _NEXT_ID, starting from 1, used for generating running numbers to uniquely identify the orders.
  - _DELIVERY_FEE, that is set at $1.99, during this pilot period.
- There are TWO class methods:
  - getApplicableDiscounts, that returns a list containing all the applicable Discount objects, based on the given parameter dob (participant's date of birth):
    - PioneerDiscount is applicable if the participant is 16 and above, on year 1965.
    - MerdekaDiscount is applicable if the participant is 64 years and above, provided participant has not qualified for PioneerDiscount.
    - If participant did not qualify for PioneerDiscount and MerdekaDiscount, then the PriceDiscount is applicable.
    - NationalDayDiscount is applicable if participant's date of birth has day or month or year matching 9, August, 1965 respectively.
    - For example,
      - participant with date of birth (9-Oct-1938) will have TWO Discount objects: PioneerDiscount, NationalDayDiscount.
      - participant with date of birth (1-Jul-1958) will have ONE Discount objects: MerdekaDiscount.
      - participant with date of birth (13-Aug-1978) will have TWO Discount objects: PriceDiscount, NationalDayDiscount.
  - setNextID: this class will determine the _NEXT_ID from the last order ID in the order file.
    - If today is 10-Sep-2023, the order file to check is "Order_20230911.txt".
    - If the file does not exist, no action needed.
    - If the file exists, get the last order ID, which are the first 11 chars from the last line of the file. E.g., 20230911002
    - Add 1 to the highlighted portion (last 3 digits) and assign to _NEXT_ID.
- There are FOUR instance variables:
  - _orderID (int): an ID to uniquely identify this order
  - _participant (Participant): represents the participant who is making this order.
  - _deliSet (DeliSet): the DeliSet object created by the participant.
  - _discounts (list): collection of Discount objects that are applicable, based on participant's date of birth.
- Constructor performs the following:
  - Initialises these 2 instance variables: _participant and _deliSet, using the given parameters.
  - The default for parameter orderID is None.
  - Initialises instance variable _orderID with the given parameter orderID if it is provided.
  - If parameter orderID is not provided, the constructor generates the _orderID using tomorrow date in format of "YYYYMMDD" and 3 digits format of the class variable _NEXT_ID, which starts from 001, and increment by 1 for every new order. E.g., 20230911001

- o Obtain the list of applicable Discount objects by invoking the class method, getApplicableDiscounts and assign to _discounts.
- Method getDeliveryFee will first check if the participant is handicapped:
  - o If yes, then the delivery fee is waived. I.e., return $0.
  - o Otherwise, return the delivery fee as specified in the class variable _DELIVERY_FEE.
- Method computeDiscount returns the sum of discounts, obtained by providing the price of the DeliSet to the method getDiscount of all applicable Discount objects.
- Getter methods for the followings: (use the property decorator)
  - o participantID: this returns the id of the participant object.
  - o price: (of this order) which is the sum of the DeliSet and delivery fee, deducting all the applicable discounts. If the computed price is below 0 after all the discounts, then returns 0.
- getDetails method returns a summary detail of an Order object, in the following order: orderID, participant's id, deliset type (E/F/C), deliset name and all the deliCodes, separated by commas. Some examples:

```
20230826001,S4096807E,F,My Breakfast,H001,C001,H008

20230826002,S5572364H,F,Mok Meal,C001,H013,H009

20230826003,S4096807E,C,Heng Heng Snack,C003,C007
```

- The __str__ method returns a string representation of an Order object, which consists of order ID, participant's information, deliSet details, discount, delivery fee and finally the order price. Below are 2 samples:

```
Order ID: 20230809001
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: Brunch              Price: $7.20      Consume in 0.5 hrs
      with Chicken with Brown Rice, Carrot & Coriander Soup, Berry Yoghurt
Discounts:   $1.00
Delivery Fee: $0.00
Final Price:  $6.20

Order ID: 20230809002
ID: S6539436G    Name: Raymond Low       Age: 58
DeliSet: NDay Lunch          Price: $6.50      Consume in 2.0 hrs
      with Roast Beef, Fish & Potato Pie
Discounts:   $3.25
Delivery Fee: $1.99
Final Price:  $5.24
```

(14 marks)

Question 5 (30 marks)

In this question, you will implement the EatRightAdmin class and the prototype application focusing on the creation of "Order". You need to make use of the classes created in the previous questions.

As ERP is a pilot programme, the EatRightAdmin class is to ensure that a participant can only submit up to 2 orders per day. This EatRightAdmin class will also contain the collections of participants, available Delis and information of orders submitted.

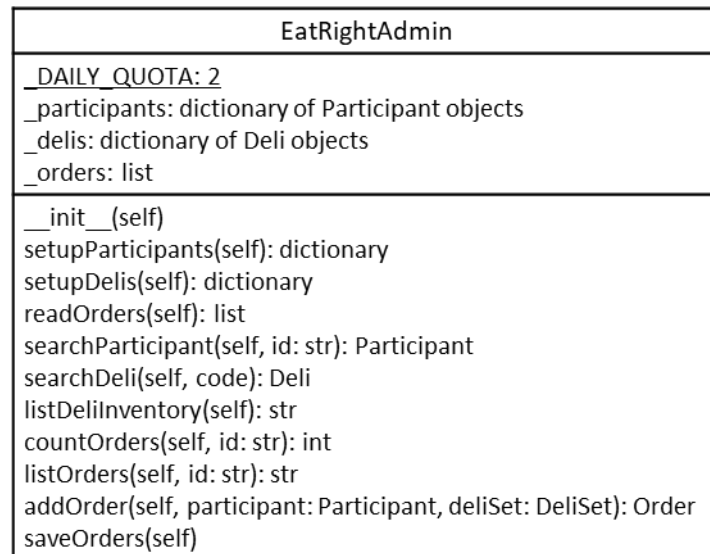Figure Q5 highlight the class diagram for EatRightAdmin.

EatRightAdmin
_DAILY_QUOTA: 2 _participants: dictionary of Participant objects _delis: dictionary of Deli objects _orders: list
__init__(self) setupParticipants(self): dictionary setupDelis(self): dictionary readOrders(self): list searchParticipant(self, id: str): Participant searchDeli(self, code): Deli listDeliInventory(self): str countOrders(self, id: str): int listOrders(self, id: str): str addOrder(self, participant: Participant, deliSet: DeliSet): Order saveOrders(self)

<u>Figure Q5</u>

(a)   Implement the EatRightAdmin class.

- There is ONE class variable: _DAILY_QUOTA which is 2, representing the number of orders a participant can submit per day.
- There are THREE instance variables:
  - _participants (dictionary): collection of ERP participants. The key for this dictionary is the participant's ID, and the value is the Participant object.
  - _delis (dictionary): collection of delis that ERP is offering. The key for this dictionary is the Deli code, and the value is the Deli object.
  - _orders (list): this is a list of Order objects, whereby the initial Order objects are created by reading the order information as shown in Appendix C.
- Constructor performs the following:
  - Invoke the setupParticipants method – to setup Participant objects into the dictionary by reading the information from "Participants.txt".
  - Invoke the setupDelis method – to setup the Deli objects into the dictionary using the information provided in "Delis.txt".
  - Invoke the readOrders method – to load the Order objects created (for next day) into a list.
  - Invoke the class method of Order: setNextID, so that the next order ID will continue from the last order created (if exists).

- Method setupParticipants reads the information from "Participants.txt" to setup the ERP participants into the dictionary _participants. See Appendix A for file content and format.
- Method setupDelis reads the information from "Delis.txt" to setup all the Delis currently offered by ERP into the dictionary _Delis. See Appendix B for file content and format.
- Method readOrders will attempt to find the order file for the next day (filename format "Order_YYYYMMDD.txt") and create an Order object before adding into the list _orders. File content is described in Appendix C.
  - If the order file is not found, manage this exception, and initialise _orders to an empty list.
  - Search for the correct Participant and Deli objects to create the Order object.
- Given an id as parameter, the method searchParticipant searches and returns the Participant object matching this id. If not found, the method returns None.
- Given a code as parameter, the searchDeli method searches and returns the Deli object that matches the parameter. If there is no such Deli, the method returns None.
- listDeliInventory method formats and returns the string representation of all Deli objects, concatenated and one Deli object per line. Example:

```
Available Deli:
===============
C001 - Smoked Duck Salad                     Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding                    Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                        Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                         Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie               Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                         Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                        Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                             Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                           Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                            Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg               Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart                     Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup          Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie                     Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                       Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut     Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes                    Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice               Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup               Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce              Price: $2.50   Fat:  3.3   Calories:  97.7
```

- countOrders method has 1 parameter: id. This method searches and returns the number of orders that has participant's id matching the parameter id. If there is no match, the method returns 0.
- The listOrders method has 1 parameter: id. This method will perform the following:
  - Search for the participant using the given id.
  - If no such participant, then method should raise ERPException with proper message "You did not sign-up for this programme..."
  - If participant is found, invoke the countOrders method.
  - If there is no order, raise ERPException with message "You did not order any DeliSet…"

o   If there are orders, the method formats and returns the order information, one per line:

```
Your order(s) for 2023-08-26:
=============================
Order ID: 20230826001
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: My Breakfast        Price: $7.00      Consume in 1.5 hrs
        with Croissant, Smoked Duck Salad, Banana Pancakes
Discounts: $1.00
Delivery Fee: $0.00
Final Price: $6.00


Order ID: 20230826003
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: Heng Heng Snack     Price: $3.50      Consume in 0.5 hrs
        with Chocolate Cake, Beetroot Raita
Discounts: $1.00
Delivery Fee: $0.00
Final Price: $2.50
```

- The addOrder method has a Participant object and a DeliSet object as parameters. This method is invoked when the participant is ready to create Order with the DeliSet. The following tasks need to be performed:
  o   Check that the participant will not break the _DAILY_QUOTA, with this new order.
  o   If yes, this method should raise ERPExcpetion with message "You cannot exceed the daily quota..."
  If there is no exception, then proceed to:
  o   Create the new Order object, with the given parameters.
  o   Append this new Order object to the instance variable _orders.
  o   Return the Order object.
- The saveOrders method will write the return value of the getDetails method of the Order objects in the list _orders into the order file for next day. The file format is defined in Appendix C.
  o   There is no need to create the order file if there is no order.

(18 marks)

(b)   Write an application that allow ERP participants to submit and enquire their orders. As this is a pilot programme, the deduction of CDC vouchers/digital wallet will be out-of-scope. Instead, your application must provide the orders' information (Appendix C), so that ERP's partners and CDC can process manually.

Before presenting the below menu, your application should create the EatRightAdmin object, so that the participants, delis, and any existing orders can be loaded.

```
Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
```

```
      Enter choice:
```

The next few paragraphs will explain the 3 options in detail.

Option 1: Order DeliSet

To order a DeliSet, the following steps and data elements should be collected:
- Prompt for participant id to help locate the Participant object.
  - If participant has enrolled in ERP, print his/her eligible discounts.
  - If there is no such participant, display appropriate message and return to menu.

```
Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S4096807E
You are entitled to the following discount(s):
        Pioneer citizen: $1 discount

... ...
... ...
... ...


Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S5572364H
You are entitled to the following discount(s):
        Merdeka citizen: $0.50 discount, or $1 discount when order is more than $7
        National Day Bonus: enjoy 50% off

... ...
... ...
... ...


Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S4096808e
You did not sign up for this program
```

- Once the participant is located and entitled discounts shown, prompt the participant to enter the customised DeliSet name. This name will help participants to recognise when they enquire about their submitted orders.
- Next, display the available Delis to the participant to start assembling a DeliSet.

```
Available Deli:
===============
C001 - Smoked Duck Salad                Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding               Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                   Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                    Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie          Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                    Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                   Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                        Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                      Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                       Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg          Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart                Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup     Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie                Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                  Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes               Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice          Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup          Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce         Price: $2.50   Fat:  3.3   Calories:  97.7
```

- Prompt participant to enter the first deli code.
  - At this point if the participant press <Enter>, the order creation is aborted.
  - If this deli code cannot locate a Deli object, prompt the participant to re-enter.
- Once the first Deli object is located, the participant needs to decide which diet plan they are following: Low Carb, Low Fat or Econ.
  - With the diet plan selection, proceed to create the appropriate DeliSet object using the first Deli object.
- Continue to prompt participant to select more Deli. Repeat until <Enter> is pressed to indicate completion of Deli selection.
  - For each deli code entered, locate the Deli object.
  - If deli code cannot locate a Deli object, prompt the participant to re-enter.
  - Add the Deli object into the DeliSet. Manage any exceptions raised.
- Once the participant has assembled the DeliSet, invoke the addOrder method of the EatRightAdmin class, using the Participant and DeliSet objects from above.
  - Manage any exceptions raised.
  - If there are no exceptions, the addOrder method will return the new Order object.
  - Display this new Order details as confirmation that the order is submitted successfully.
- Below are illustrations of successfully submitted orders:

```
Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
```

```
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S4096807E
You are entitled to the following discount(s):
        Pioneer citizen: $1 discount

Enter your customised set name: Heng Heng Snack
Available Deli:
===============
C001 - Smoked Duck Salad                 Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding                Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                    Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                     Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie           Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                     Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                    Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                         Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                       Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                        Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg           Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart                 Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup      Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie                 Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                   Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes                Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice           Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup           Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce          Price: $2.50   Fat:  3.3   Calories:  97.7

Select Deli by entering the code. <Enter> to stop
Deli <1>: C003
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet? : C
Deli <2>: H003
Add Deli failed. LowCarbSet should not have more than 500 calories
Deli <2>: C007
Deli <3>: <Enter>

Order ID: 20230826003
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: Heng Heng Snack     Price: $3.50      Consume in 0.5 hrs
        with Chocolate Cake, Beetroot Raita
Discounts:   $1.00
Delivery Fee: $0.00
Final Price: $2.50


Healthier SG: Eat-Right Programme
==================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S5572364H
You are entitled to the following discount(s):
        Merdeka citizen: $0.50 discount, or $1 discount when order is more than $7
        National Day Bonus: enjoy 50% off

Enter your customised set name: Mok Meal
Available Deli:
===============
C001 - Smoked Duck Salad                 Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding                Price: $2.00   Fat:  0.3   Calories:  45.5
```

```
C003 - Chocolate Cake                    Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                     Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie           Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                     Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                    Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                         Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                       Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                        Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg           Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart                 Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup      Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie                 Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                   Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes                Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice           Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup           Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce          Price: $2.50   Fat:  3.3   Calories:  97.7


Select Deli by entering the code. <Enter> to stop
Deli <1>: C001
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet ?? F
Deli <2>: H013
Deli <3>: H009
Deli <4>: <Enter>


Order ID: 20230826004
ID: S5572364H    Name: Sharon Mok        Age: 68
DeliSet: Mok Meal            Price: $7.50      Consume in 1.0 hrs
        with Smoked Duck Salad, Beancurd With Bean Sauce, Boiled Banana with Grated Coconut
Discounts:    $4.75
Delivery Fee: $1.99
Final Price:  $4.74



Healthier SG: Eat-Right Programme
==================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1
Enter NRIC to start your order(s): S4428006z
You are entitled to the following discount(s):
        Pioneer citizen: $1 discount

Enter your customised set name: soft meal
Available Deli:
===============
C001 - Smoked Duck Salad                 Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding                Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                    Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                     Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie           Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                     Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                    Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                         Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                       Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                        Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg           Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart                 Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup      Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie                 Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                   Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes                Price: $2.40   Fat:  6.0   Calories: 238.0
```

```
H011 - Chicken with Brown Rice          Price: $3.00  Fat:  5.8  Calories: 253.4
H012 - Carrot & Coriander Soup          Price: $2.00  Fat:  2.6  Calories:  85.0
H013 - Beancurd With Bean Sauce         Price: $2.50  Fat:  3.3  Calories:  97.7


Select Deli by entering the code. <Enter> to stop
Deli <1>: C004
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet ?? E
Deli <2>: H008
Deli <3>: H012
Add Deli failed. EconSet should not have more than 2 Delis
Deli <3>: <Enter>


Order ID: 20230826005
ID: S4428006Z    Name: Tan Yan Meng      Age: 75
DeliSet: Soft Meal           Price: $4.40      Consume in 0.5 hrs
        with Smoked Salmon, Banana Pancakes
Discounts:    $1.00
Delivery Fee: $1.99
Final Price:  $5.39


Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1
Enter NRIC to start your order(s): s5904462a
You are entitled to the following discount(s):
        Merdeka citizen: $0.50 discount, or $1 discount when order is more than $7

Enter your customised set name: WRX
Available Deli:
===============
C001 - Smoked Duck Salad                Price: $3.00  Fat: 12.5  Calories: 264.5
C002 - Strawberry Pudding               Price: $2.00  Fat:  0.3  Calories:  45.5
C003 - Chocolate Cake                   Price: $1.50  Fat: 14.3  Calories: 351.5
C004 - Smoked Salmon                    Price: $2.40  Fat:  3.7  Calories:  97.3
C005 - Chilled Papaya Smoothie          Price: $2.20  Fat:  2.1  Calories: 132.1
C006 - Berry Yoghurt                    Price: $2.20  Fat:  1.0  Calories:  57.8
C007 - Beetroot Raita                   Price: $2.00  Fat:  1.0  Calories:  72.6
H001 - Croissant                        Price: $2.00  Fat:  7.5  Calories: 130.3
H002 - Chicken Pie                      Price: $2.80  Fat: 10.7  Calories: 180.3
H003 - Roast Beef                       Price: $3.50  Fat: 21.8  Calories: 274.6
H004 - Asparagus & Poached Egg          Price: $3.00  Fat:  4.9  Calories:  88.1
H005 - Apple Sesame Tart                Price: $1.80  Fat:  7.5  Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup     Price: $3.20  Fat:  6.3  Calories: 199.9
H007 - Fish & Potato Pie                Price: $3.00  Fat:  5.5  Calories: 175.5
H008 - Banana Pancakes                  Price: $2.00  Fat:  7.0  Calories: 157.4
H009 - Boiled Banana with Grated Coconut Price: $2.00 Fat:  2.2  Calories: 150.6
H010 - Buckwheat Pancakes               Price: $2.40  Fat:  6.0  Calories: 238.0
H011 - Chicken with Brown Rice          Price: $3.00  Fat:  5.8  Calories: 253.4
H012 - Carrot & Coriander Soup          Price: $2.00  Fat:  2.6  Calories:  85.0
H013 - Beancurd With Bean Sauce         Price: $2.50  Fat:  3.3  Calories:  97.7


Select Deli by entering the code. <Enter> to stop
Deli <1>: H003
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet ?? C
Deli <2>: H005
Add Deli failed. LowCarbSet should not have more than 500 calories
Deli <2>: H004
Deli <3>: C002
Deli <4>: C004
Add Deli failed. LowCarbSet should not have more than 500 calories
Deli <4>: C007
```

```
Deli <5>: <Enter>

Order ID: 20238726006
ID: S5904462A     Name: Cheng Wei Ren      Age: 64
DeliSet: Wrx                Price: $10.50      Consume in 0.5 hrs
        with Roast Beef, Asparagus & Poached Egg, Strawberry Pudding, Beetroot Raita
Discounts:    $1.00
Delivery Fee: $1.99
Final Price:  $11.49
```

- Below are examples of unsuccessful order creation:

```
Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S4096807E

Enter your customised set name: Heng Heng Lunch
You are entitled to the following discount(s):
        Pioneer citizen: $1 discount

Available Deli:
===============
C001 - Smoked Duck Salad              Price: $3.00   Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding             Price: $2.00   Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                 Price: $1.50   Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                  Price: $2.40   Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie        Price: $2.20   Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                  Price: $2.20   Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                 Price: $2.00   Fat:  1.0   Calories:  72.6
H001 - Croissant                      Price: $2.00   Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                    Price: $2.80   Fat: 10.7   Calories: 180.3
H003 - Roast Beef                     Price: $3.50   Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg        Price: $3.00   Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart              Price: $1.80   Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup   Price: $3.20   Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie              Price: $3.00   Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                Price: $2.00   Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut  Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes             Price: $2.40   Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice        Price: $3.00   Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup        Price: $2.00   Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce       Price: $2.50   Fat:  3.3   Calories:  97.7

Select Deli by entering the code. <Enter> to stop
Deli <1>: H002
Ordering <E>conSet, Low<F>atSet, Low<C>arbSet ?? E
Deli <2>: H013
Deli <3>: <Enter>
You cannot exceed the daily quota...


Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 1

Enter NRIC to start your order(s): S5572364H
```

```
You are entitled to the following discount(s):
        Merdeka citizen: $0.50 discount, or $1 discount when order is more than $7
        National Day Bonus: enjoy 50% off

Enter your customised set name: Mok Dinner
Available Deli:
===============
C001 - Smoked Duck Salad                Price: $3.00    Fat: 12.5   Calories: 264.5
C002 - Strawberry Pudding               Price: $2.00    Fat:  0.3   Calories:  45.5
C003 - Chocolate Cake                   Price: $1.50    Fat: 14.3   Calories: 351.5
C004 - Smoked Salmon                    Price: $2.40    Fat:  3.7   Calories:  97.3
C005 - Chilled Papaya Smoothie          Price: $2.20    Fat:  2.1   Calories: 132.1
C006 - Berry Yoghurt                    Price: $2.20    Fat:  1.0   Calories:  57.8
C007 - Beetroot Raita                   Price: $2.00    Fat:  1.0   Calories:  72.6
H001 - Croissant                        Price: $2.00    Fat:  7.5   Calories: 130.3
H002 - Chicken Pie                      Price: $2.80    Fat: 10.7   Calories: 180.3
H003 - Roast Beef                       Price: $3.50    Fat: 21.8   Calories: 274.6
H004 - Asparagus & Poached Egg          Price: $3.00    Fat:  4.9   Calories:  88.1
H005 - Apple Sesame Tart                Price: $1.80    Fat:  7.5   Calories: 283.5
H006 - Beef & Brown Rice Spicy Soup     Price: $3.20    Fat:  6.3   Calories: 199.9
H007 - Fish & Potato Pie                Price: $3.00    Fat:  5.5   Calories: 175.5
H008 - Banana Pancakes                  Price: $2.00    Fat:  7.0   Calories: 157.4
H009 - Boiled Banana with Grated Coconut Price: $2.00   Fat:  2.2   Calories: 150.6
H010 - Buckwheat Pancakes               Price: $2.40    Fat:  6.0   Calories: 238.0
H011 - Chicken with Brown Rice          Price: $3.00    Fat:  5.8   Calories: 253.4
H012 - Carrot & Coriander Soup          Price: $2.00    Fat:  2.6   Calories:  85.0
H013 - Beancurd With Bean Sauce         Price: $2.50    Fat:  3.3   Calories:  97.7

Select Deli by entering the code. <Enter> to stop
Deli <1>: C009
No such Deli. Select again.
Deli <1>: <Enter>
Aborting DeliSet creation.
```

Option 2: List Orders

This option allows the participant to enquire submitted order(s), if any. Below are illustrations of list orders:

```
Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 2
Enter NRIC to list your order(s): S4096807E

Your order(s) for 2023-08-26:
=============================
Order ID: 20230826001
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: My Breakfast       Price: $7.00      Consume in 1.5 hrs
        with Croissant, Smoked Duck Salad, Banana Pancakes
Discounts: $1.00
Delivery Fee: $0.00
Final Price: $6.00


Order ID: 20230826003
ID: S4096807E    Name: Wong Yong Heng    Age: 83
DeliSet: Heng Heng Snack     Price: $3.50      Consume in 0.5 hrs
        with Chocolate Cake, Beetroot Raita
```

```
Discounts: $1.00
Delivery Fee: $0.00
Final Price: $2.50


Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 2
Enter NRIC to list your order(s): S4096808E
You did not sign-up for this programme...


Healthier SG: Eat-Right Programme
=================================
1. Order DeliSet
2. List Orders
3. Quit
Enter choice: 2
Enter NRIC to list your order(s): S4428006Z
You did not order any DeliSet....
```

Option 3: Quit

You application should ensure that the latest orders' information is saved into the "Order_YYYYMMDD.txt" before the application exits.

Errors and exceptions handling

Your application must manage all exceptions including input error.
- Type/Value error should be handled by allowing the user to re-enter.
- For all menu options, handle any raised exceptions by printing the error messages.

(12 marks)

Appendix A – Participants.txt

Format of the file:

Each line of the file contains information in this order:

```
<NRIC/FIN>,<name>,<dob-YYYYMMDD>,<handicapped>

S4428006Z,Tan Yan Meng,19480708,False
S4096807E,Wong Yong Heng,19401011,True
S4501021Z,Lee Beng Beng,19450401,True
S5385050B,Liu Gu Feng,19530505,False
S5572364H,Sharon Mok,19550809,False
S6539436G,Raymond Low,19650809,True
S7004670I,Soh Yuan Tai,19700903,True
S9672820D,Gan Siao Buang,19961029,False
S5904462A,Cheng Wei Ren,19591231,False
S9511525Z,Jessica Ong,19950808,False
T0770957E,Alvin Chin,20070801,False
S9914489J,Charles Wong,19990809,False
```

Appendix B – Delis.txt

Format of the file:

Each line of the file contains information in this order:

```
<deliCode>,<name>,<price>,<fat>,<carbohydrates>,<protein>,<styleOrTemp>
```

First char of the deliCode indicate the Deli type: Cxxx for Cold Deli, Hxxx for Hot Deli

```
C001,Smoked Duck Salad,3.0,12.5,23,15,16
C002,Strawberry Pudding,2.0,0.3,10,0.7,3
C003,Chocolate Cake,1.5,14.3,50.7,5,12
C004,Smoked Salmon,2.4,3.7,0,16,3
C005,Chilled Papaya Smoothie,2.2,2.1,21.3,7,8
C006,Berry Yoghurt Surprise,2.2,1,9.2,3,3
C007,Beetroot Raita,2.0,1,12.4,3.5,8
H001,Croissant,2.0,15,26.7,4.6,Baking
H002,Chicken Pie,2.8,21.3,32,10,Baking
H003,Roast Beef,3.5,21.8,0,19.6,Roasting
H004,Asparagus & PoachedEgg,3,4.9,3.1,7.9,Boiled
H005,Apple Sesame Tart,1.8,7.5,49.1,4.9,Baking
H006,Beef & Brown Rice Spicy Soup,3.2,6.35,17.7,18,Boiled
H007,Fish & Potato Pie,3,5.5,15,16.5,Baking
H008,Banana Pancakes,2,7,20,3.6,Pan-Fried
H009,Boiled Banana with Grated Coconut,2,2.2,30.7,2,Boiled
H010,Buckwheat Pancakes,2.4,6,39,7,Pan-Fried
H011,Chicken with Brown Rice,3,5.8,48.3,15,Steaming
H012,Carrot & Coriander Soup,2,2.6,13.8,1.6,Boiled
H013,Beancurd With Bean Sauce,2.5,3.3,6.8,10.2,Steaming
```

Appendix C – Order_YYYYMMDD.txt

This file will be created by your application, containing orders for the next day.

Format of the file:

`<orderID>,<NRIC/FIN>,<DSetType>,<DeliSetName>,<DeliCode1>,<DeliCode2>, ... ,<DeliCodeN>`

Example: "Order_20230826.txt"

```
20230826001,S4096807E,F,My Breakfast,H001,C001,H008
20230826002,S5572364H,F,Mok Lunch,C001,H013,H009
20230826003,S4096807E,C,Heng Heng Snack,C003,C007
20230826004,S5572364H,F,Mok Meal,C001,H013,H009
20230826005,S4428006Z,E,Soft Meal,C004,H008
20230826006,S5904462A,C,LCM,H003,H004,C002,C007
```

---- END OF ASSIGNMENT ----