** Noted that Access Modifier Notations can be listed below*

+ (public)
(protected)
- (private)
Underline (static)
Italic (abstract)

Set-Up Instruction

- Don't forget to set your Eclipse workspace and working set.
- You must submit the JAR file, exported (with source code), from your Eclipse project.
- You must check your JAR file to make sure all the source files (.java files) are present. It can be opened with file compression programs such as 7-zip or Winrar.
- Failure to export properly will result in your work not getting marked.

Question 2

Objective

1) Be able to implement Objects and Classes.

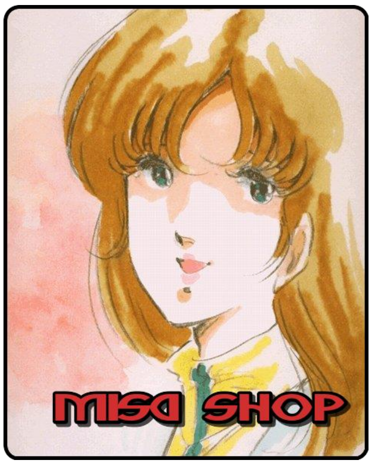
Instruction

1) Create Java Project in Eclipse.
2) Copy all folders in "**Q2_toStudent**" to your project directory src folder.
3) You are to implement the following classes (detail for each class is given in section 3 and 4)

a)	**MisaShop**	(package application)
b)	**Item**	(package logic)
c)	**OrderItem**	(package logic)
d)	**Order**	(package logic)

4) **JUnit for testing is in package test.grader**

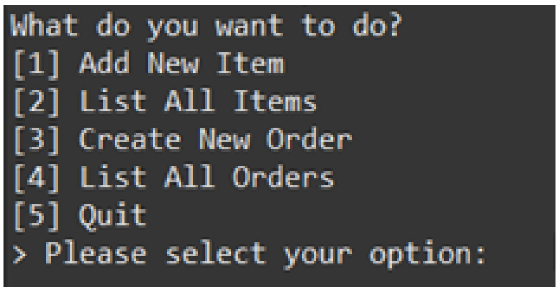
Problem Statement: Misa Shop



Misa Shop is a JAVA application for the shop manager to add items and create orders. The order contains item orders that tell which item the order has and how much the amount is. However, the current system's implementation is still incomplete. You are tasked to implement the remaining Item, Order and OrderItem classes.

Here's is how the Shop should work, part of this is already provided.

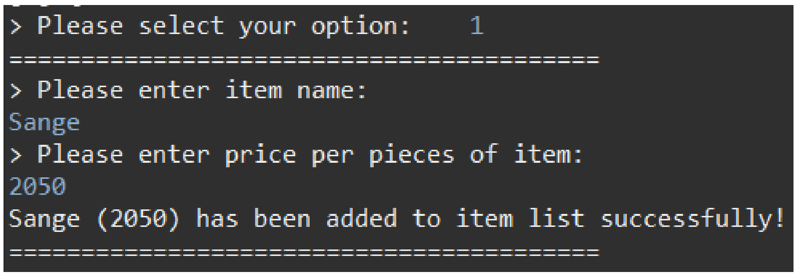
When the application is open, there will be a welcome message with all the available commands for the user.



```
What do you want to do?
[1] Add New Item
[2] List All Items
[3] Create New Order
[4] List All Orders
[5] Quit
> Please select your option:
```

Figure 1. Welcome screen when the application starts

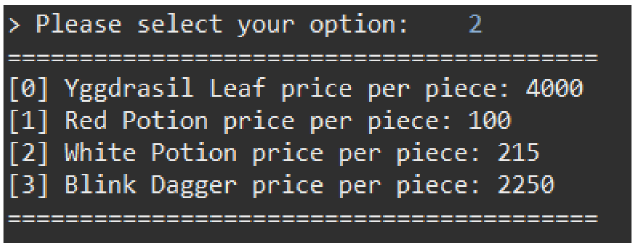
1) The first option is adding a new item to the system. Please note that the new item name has to be different from existing items and not blank. Otherwise, the system will raise an error. If price per piece entered is less than 1, the system will set the item price to 1.



```
> Please select your option:    1
=========================================
> Please enter item name:
Sange
> Please enter price per pieces of item:
2050
Sange (2050) has been added to item list successfully!
=========================================
```

Figure 2. Successfully adding a new item

2) The user can choose to list all current items in the system. Each item information displays the item name and its price per piece. When the program starts, there will already have 4 initial items in the system.



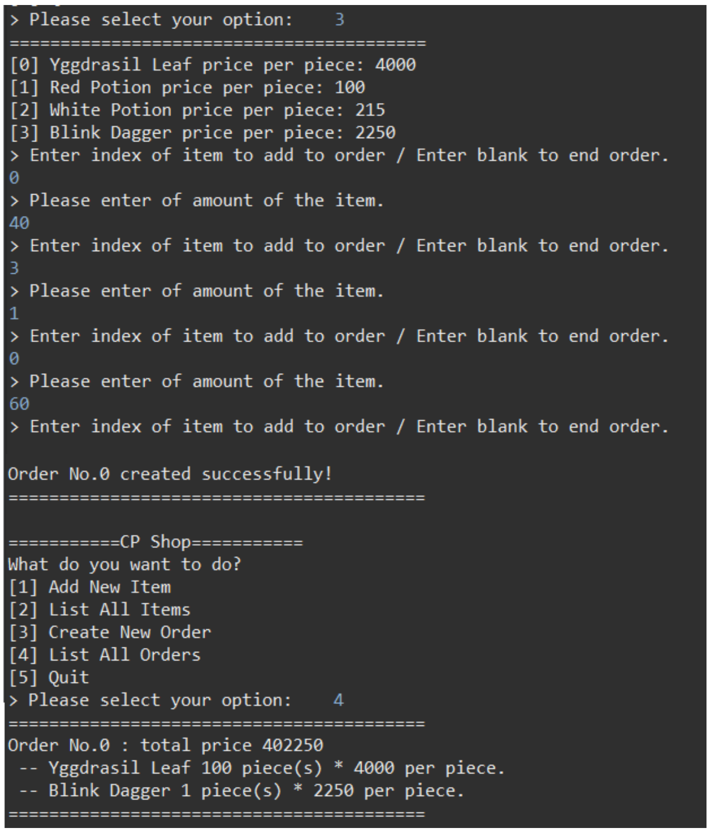
```
> Please select your option:    2
=========================================
[0] Yggdrasil Leaf price per piece: 4000
[1] Red Potion price per piece: 100
[2] White Potion price per piece: 215
[3] Blink Dagger price per piece: 2250
=========================================
```

Figure 3. Initial Item Listing

3) Third option is creating a new order. The user will then be asked to select item by entering its index and then enter the amount to add to the order. The user can finish

creating order by pressing Enter key.

If the user select to add an item that is already in the order, the amount of that item in the order will increase.



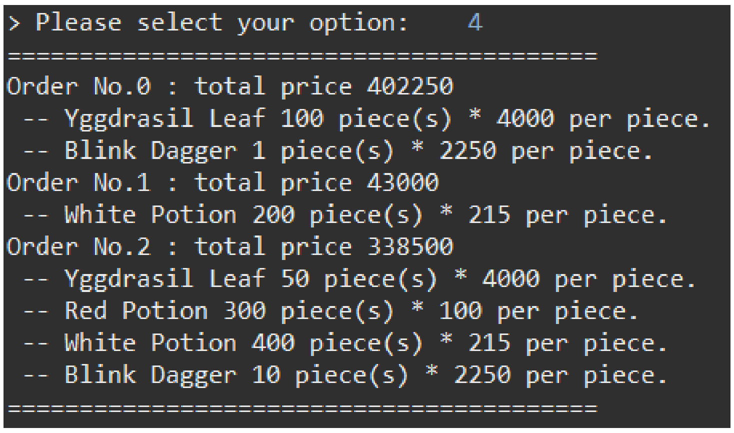
```
> Please select your option:    3
========================================
[0] Yggdrasil Leaf price per piece: 4000
[1] Red Potion price per piece: 100
[2] White Potion price per piece: 215
[3] Blink Dagger price per piece: 2250
> Enter index of item to add to order / Enter blank to end order.
0
> Please enter of amount of the item.
40
> Enter index of item to add to order / Enter blank to end order.
3
> Please enter of amount of the item.
1
> Enter index of item to add to order / Enter blank to end order.
0
> Please enter of amount of the item.
60
> Enter index of item to add to order / Enter blank to end order.

Order No.0 created successfully!
========================================

==========CP Shop==========
What do you want to do?
[1] Add New Item
[2] List All Items
[3] Create New Order
[4] List All Orders
[5] Quit
> Please select your option:    4
========================================
Order No.0 : total price 402250
 -- Yggdrasil Leaf 100 piece(s) * 4000 per piece.
 -- Blink Dagger 1 piece(s) * 2250 per piece.
========================================
```

Figure 4. Creating a new order.

4) The user can list out all order in the system.



```
> Please select your option:    4
========================================
Order No.0 : total price 402250
 -- Yggdrasil Leaf 100 piece(s) * 4000 per piece.
 -- Blink Dagger 1 piece(s) * 2250 per piece.
Order No.1 : total price 43000
 -- White Potion 200 piece(s) * 215 per piece.
Order No.2 : total price 338500
 -- Yggdrasil Leaf 50 piece(s) * 4000 per piece.
 -- Red Potion 300 piece(s) * 100 per piece.
 -- White Potion 400 piece(s) * 215 per piece.
 -- Blink Dagger 10 piece(s) * 2250 per piece.
========================================
```

Figure 5. Listing all orders.

Implementation Detail

The class package is summarized below.

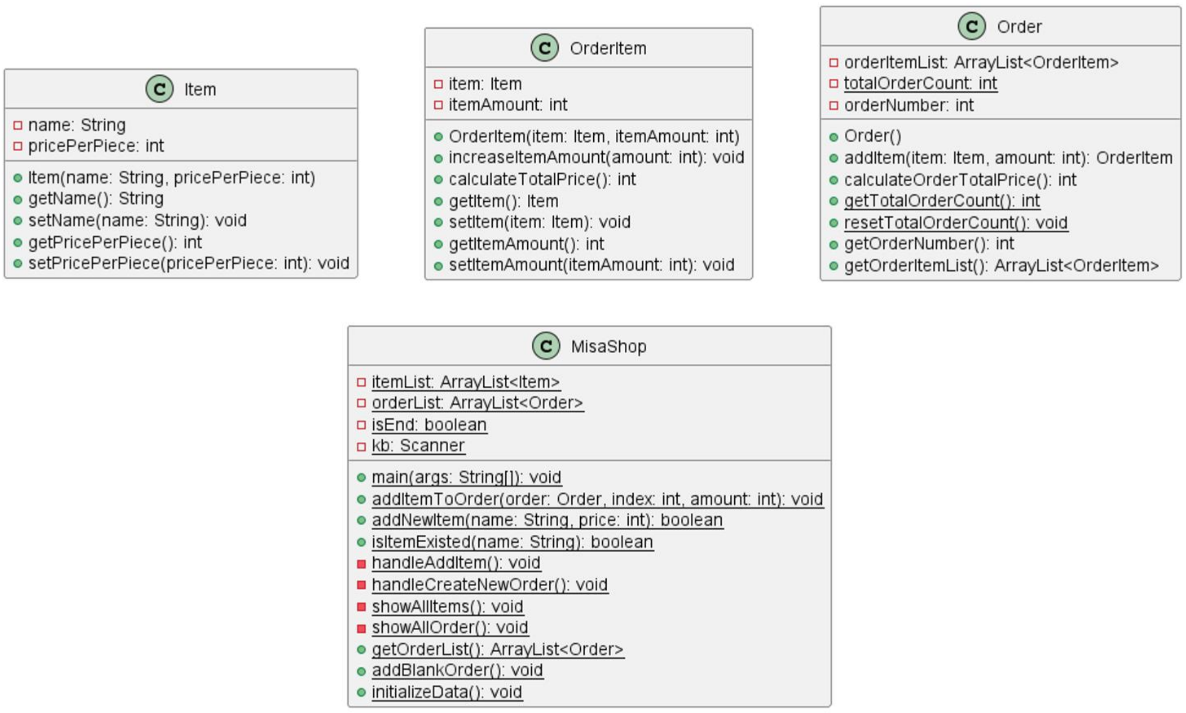

Item
name: String
pricePerPiece: int
Item(name: String, pricePerPiece: int)
getName(): String
setName(name: String): void
getPricePerPiece(): int
setPricePerPiece(pricePerPiece: int): void
OrderItem
item: Item
itemAmount: int
OrderItem(item: Item, itemAmount: int)
increaseItemAmount(amount: int): void
calculateTotalPrice(): int
getItem(): Item
setItem(item: Item): void
getItemAmount(): int
setItemAmount(itemAmount: int): void
Order
orderItemList: ArrayList<OrderItem>
totalOrderCount: int
orderNumber: int
Order()
addItem(item: Item, amount: int): OrderItem
calculateOrderTotalPrice(): int
getTotalOrderCount(): int
resetTotalOrderCount(): void
getOrderNumber(): int
getOrderItemList(): ArrayList<OrderItem>
MisaShop
itemList: ArrayList<Item>
orderList: ArrayList<Order>
isEnd: boolean
kb: Scanner
main(args: String[]): void
addItemToOrder(order: Order, index: int, amount: int): void
addNewItem(name: String, price: int): boolean
isItemExisted(name: String): boolean
handleAddItem(): void
handleCreateNewOrder(): void
showAllItems(): void
showAllOrder(): void
getOrderList(): ArrayList<Order>
addBlankOrder(): void
initializeData(): void

Figure 6. Class Diagram

You must write java classes using UML diagram specified above.

* In the following class description, only details of IMPORTANT fields and methods are given. *

4.1 Package logic

4.1.1 **Class Item**: This class represents an item.

You must implement this class from scratch.

Field

Name	Description
- String name	The name of the item.
- int pricePerPiece	Price per piece of the item.

Constructor

Name	Description
+ Item(String name, int pricePerPiece)	Create a new Item object with specified name and price per piece. Set related fields with the given parameters; Price per piece must be equals or more than 1.

Method

Name	Description
+ void setPricePerPiece(int pricePerPiece)	Set price per piece of the item. If given price per piece is less than 1, set price per piece to 1. (This is one of the setters).
+ getter/setter for other variables	

4.1.2 **Class OrderItem**: This class is used for storing an ordered Item and amount of the ordered item in the Order made through the application menu.

You must implement this class from scratch.

Field

Name	Description
- Item item	Ordered item of this OrderItem.
- int itemAmount	Amount of ordered item

Constructor

Name	Description
+ OrderItem(Item item, int itemAmount)	Create a new OrderItem object with specified item and itemAmount. Set related fields with the given parameters.

Method

Name	Description
+ void increaseItemAmount(int amount)	Increase the itemAmount by given amount. If given amount is negative values, the itemAmount should not be changed.
+ int calculateTotalPrice()	Calculate the total price of this OrderItem and return it.
+ void setItemAmount(int itemAmount)	Set itemAmount of the OrderItem by given itemAmount. If given itemAmount is negative values, set itemAmount to 0. This is one of the setters.
+ getter for each variable	

4.1.3 **Class Order**: This class represents a single order that is made from the application menu. An order can contain more than one OrderItem (an item with the amount). It is partially provided. Please fill necessary code.

/* PARTIALLY PROVIDED */

Field

Name	Description
- ArrayList<OrderItem> orderItemList	ArrayList of OrderItem.
<u>- int totalOrderCount</u>	Total number of orders created in the application so far. This will be used to assign order number to a new Order.
- int orderNumber	Number of this order.

Constructor

Name	Description
+ Order()	/* FILL CODE */ Create a new order object. Assign the orderNumber to totalOrderCount and then increase the totalOrderCount by 1. Do not forget to initialize orderItemList.

Method

Name	Description
+ OrderItem addItem(Item item, int amount)	/* FILL CODE */ Adding item to this order by creating new OrderItem with given amount. If an OrderItem with the same item name already existed, <u>increase the ItemAmount in the OrderItem</u> by the given amount instead. Return the orderItem that was changed or added.
+ int calculateOrderTotalPrice()	/* FILL CODE */ Calculate total price of the order by summing total price of each orderItem in orderItemList

+ <u>void resetTotalOrderCount()</u>	Reset totalOrderCount to 0.
+ <u>int getTotalOrderCount()</u>	Return totalOrderCount
+ other remaining getters	

4.2 Package application

4.2.1 **Class MisaShop**: This class represents the shop. It also contains main method. This class is partially provided. You only need to fill the code where necessary.

/* PARTIALLY PROVIDED */

Field

Name	Description
- ArrayList<Item> itemList	ArrayList of item containing all items
- ArrayList<Order> orderList	ArrayList of order containing all orders

Method

Name	Description
+ void main()	Handle MisaShop process.
+ addItemToOrder(Order order, int itemIndex, int amount)	/* FILL CODE */ Add item at given itemIndex from itemList to the order with given amount.

Score (22, will be scaled equal to other assignments):

ItemTest

● testConstructor()	1 mark
● testConstructorIllegalPrice()	1 mark
● testGetPricePerPiece()	1 mark
● testSetPricePerPiece()	1 mark
● testSetPricePerPieceIllegal()	1 mark

● testGetName()	1 mark

OrderItemTest

● testConstructor()	1 mark
● testConstructorNegativeAmount()	1 mark
● testGetItem()	1 mark
● testGetItemAmount()	1 mark
● testSetItemAmount()	1 mark
● testSetItemAmountNegative()	1 mark
● testCalculateTotalPrice()	1 mark
● testIncreaseItemAmount()	1 mark
● testIncreaseItemAmountNegative()	1 mark

OrderTest

● testConstructor()	1 mark
● testAddItemNormal()	1 mark
● testAddItemExisted()	1 mark
● testAddItemNegativeAmount()	1 mark
● testAddItemExistedNegativeAmount()	1 mark
● testCalculateOrderTotalPrice()	1 mark

MisaShopTest

● testAddItemToOrder()	1 mark