

**Assignment (35%)**

**(Total = 100 marks)**

**INSTRUCTIONS:**

1. This assignment will be due in week 15, Sunday 11:59pm.
2. Code review will be done in week 16 during practical session.
3. Create a Python Project using your **admin no**.
4. Include the following comments at the top of all the source files  
    # Author: <enter your name>  
    # Admin No: <enter your admin number>

You are implementing a drink vending machine simulation program. This program consists of 2 parts. The first part allows the user to purchase drinks and the second part allows the vendor to manage the inventory in the vending machine.

**Part 1( 50 marks )**

- a) The vending machine asks for option to display drink menu or vendor menu. Write the python program, named as **VMPart1.py**.

**Drink Menu**

```
Are you a vendor (Y/N)? N
Welcome to ABC Vending Machine.
Select from following choices to continue:
IM. Iced Milo (S$1.5)
HM. Hot Milo (S$1.2)
IC. Iced Coffee (S$1.5)
HC. Hot Coffee (S$1.2)
1P. 100 Plus (S$1.1)
CC. Coca Cola (S$1.3)
0. Exit / Payment
```

**Vendor Menu**

```
Are you a vendor (Y/N)? Y
Welcome to ABC Vending Machine.
Select from following choices to continue:
1. Add Drink Type
2. Replenish Drink
0. Exit
Enter choice:
```

**( 5 marks )**

- b) In the drink menu, user must enter valid choice to make purchase and he can also choose multiple drinks. The vending machine will count the drinks selected and sum the purchases.

```
Welcome to ABC Vending Machine.  
Select from following choice to continue:  
IM. Iced Milo (S$1.5)  
HM. Hot Milo (S$1.20)  
IC. Iced Coffee (S$1.50)  
HC. Hot Coffee (S$1.20)  
1P. 100 Plus (S$1.10)  
CC. Coca Cola (S$1.30)  
0. Exit / Payment  
Enter choice: im  
No. of drinks selected = 1  
Enter choice: JT  
Invalid option  
Enter choice: CC  
No. of drinks selected = 2  
Enter choice: 0  
Please pay: $2.80
```

( 20 marks )

- c) When the user chooses to exit the program with at least 1 purchase, the program will ask user to input cash in the order of denomination of \$10, \$5 and \$2 until sufficient cash has been entered. The machine will return the change before exit. If user enter insufficient cash, program should allow user to cancel the purchase. Refer to the sample output below.

( 25 marks )

Sample output:

Payment amount is \$3.

- No. of 10-dollar note input is 1 which is sufficient for payment, machine will not ask for next denomination.

```
Welcome to ABC Vending Machine.  
Select from following choices to continue:  
IM. Iced Milo ($1.5)  
HM. Hot Milo ($1.2)  
IC. Iced Coffee ($1.5)  
HC. Hot Coffee ($1.2)  
1P. 100 Plus ($1.1)  
CC. Coca Cola ($1.3)  
0. Exit / Payment  
Enter choice: IM  
No. of drinks selected = 1  
Enter choice: ic  
No. of drinks selected = 2  
Enter choice: 0  
Please pay: $3.00  
Indicate your payment:  
Enter no. of $10 notes: 1  
Please collect your change: $7.00  
Drinks paid. Thank you.
```

Payment amount of \$6.

- Number of 10-dollar note input is 0,
- Machine proceeds to ask for 5-dollar note. User enters one 5-dollar note (which is still insufficient for payment),
- Machine proceeds to ask for \$2-dollar note. User enters one 2-dollar note (which is now sufficient for payment)

```
Welcome to ABC Vending Machine.
Select from following choices to continue:
IM. Iced Milo (S$1.5)
HM. Hot Milo (S$1.2)
IC. Iced Coffee (S$1.5)
HC. Hot Coffee (S$1.2)
1P. 100 Plus (S$1.1)
CC. Coca Cola (S$1.3)
0. Exit / Payment
Enter choice: IM
No. of drinks selected = 1
Enter choice: ic
No. of drinks selected = 2
Enter choice: ic
No. of drinks selected = 3
Enter choice: im
No. of drinks selected = 4
Enter choice: 0
Please pay: $6.00
Indicate your payment:
Enter no. of $10 notes: 0
Enter no. of $5 notes: 1
Enter no. of $2 notes: 1
Please collect your change: $1.00
Drinks paid. Thank you.
```

### User input insufficient cash and choose to cancel purchase

```
Welcome to ABC Vending Machine.  
Select from following choices to continue:  
IM. Iced Milo (S$1.5)  
HM. Hot Milo (S$1.2)  
IC. Iced Coffee (S$1.5)  
HC. Hot Coffee (S$1.2)  
1P. 100 Plus (S$1.1)  
CC. Coca Cola (S$1.3)  
0. Exit / Payment  
Enter choice: IM  
No. of drinks selected = 1  
Enter choice: ic  
No. of drinks selected = 2  
Enter choice: 0  
Please pay: $3.00  
Indicate your payment:  
Enter no. of $10 notes: 0  
Enter no. of $5 notes: 0  
Enter no. of $2 notes: 1  
Not enough to pay for the drinks  
Take back your cash!  
Do you want to cancel the purchase? Y/N: Y  
Purchase is cancelled. Thank you.
```

## Part 2 (50 marks)

Create a new Python File `VMPart2.py`. Copy the codes from `VMPart1` to `VMPart2`. Modify `VMPart2` to finish the rest of the code in part 2.

- a. You must meet the following technical requirements strictly:

Ensure that all necessary validation and checks are in place so that the program will not terminate abnormally.

Create a nested dictionary as below to store the inventory of vending machine. The dictionary describes the drink id, drink description, selling price and stock quantity in the vending machine.

```
{'IM': {'description': 'Iced Milo', 'price': 1.5, 'quantity': 30},
 'IC': {'description': 'Iced Coffee', 'price': 1.5, 'quantity': 40},
 'CC': {'description': 'Coca cola', 'price': 1.3, 'quantity': 50}}
```

Implement code using the function headers given to improve the readability and maintainability of code.

(18 marks)

- b. Manage inventory in vendor menu

From part 1, vendor menu is created to update the inventory.

```
Are you a vendor (Y/N)? Y
Welcome to ABC Vending Machine.
Select from following choices to continue:
1. Add Drink Type
2. Replenish Drink
0. Exit
Enter choice:
```

Implement a function to add new drink type in the inventory with following function header. This function adds the new drink detail to the inventory dictionary.

```
def add_drink_type(drink_id, description, price, quantity):
    .....
    .....
    .....
```

Implement “Add Drink Type” feature to capture drink id, description, price and quantity. The program should not allow an existing drink type to be added.

```

Are you a vendor (Y/N)? Y
Welcome to ABC Vending Machine.
Select from following choices to continue:
1.  Add Drink Type
2.  Replenish Drink
0.  Exit
Enter choice: 1
Enter drink id: im
Drink id exists!
Enter drink id: JT
Enter description of drink: Jasmine Tea
Enter price: $2.3
Enter quantity: 50
  
```

Implement a function to replenish drink in the inventory with following function header. The function will add the quantity of a particular drink in the inventory dictionary.

```

def replenish_drink(drink_id, quantity):
    .....
    .....
    .....
  
```

Implement “Replenish Drink” process of a particular drink when the quantity is below 5. The drink selected must be exist before replenishment.

```

Are you a vendor (Y/N)? Y
Welcome to ABC Vending Machine.
Select from following choices to continue:
1.  Add Drink Type
2.  Replenish Drink
0.  Exit
Enter choice: 2
IM. Iced Milo (S$1.5)   Qty : 2
HM. Hot Milo (S$1.2)   Qty : 20
IC. Iced Coffee (S$1.5) Qty : 2
HC. Hot Coffee (S$1.2) ***out of stock***
1P. 100 Plus (S$1.1)   Qty : 50
CC. Coca Cola (S$1.3)  Qty : 50
  
```

```
JT. Jasmine Tea (S$2.3) Qty : 50
Enter drink id: XP
No drink with this drink id. Try again.
Enter drink id: CC
No need to replenish. Quantity is greater than 5.
Enter choice: 2
Enter drink id: IM
Enter quantity: 18
Iced Milo has been top up!
Enter choice:
```

( 17 marks )

- c. Enhance the code of purchase drink to ensure that the updated inventory is displayed in menu. Handle all scenarios of selecting drinks where drink could be out of stock and user could not select the item. Upon the successful purchase, you must update the inventory.

( 15 marks )

```
Are you a vendor (Y/N)? N
Welcome to ABC Vending Machine.
Select from following choices to continue:
IM. Iced Milo (S$1.5) Qty: 20
HM. Hot Milo (S$1.2) Qty: 20
IC. Iced Coffee (S$1.5) Qty: 2
HC. Hot Coffee (S$1.2) ***out of stock***
1P. 100 Plus (S$1.1) Qty: 50
CC. Coca Cola (S$1.3) Qty: 50
JT. Jasmine Tea (S$1.2) Qty: 50
0. Exit / Payment
Enter choice: HC
Hot Coffee is out of stock
Enter choice:
```

~ End ~