HONG KONG INSTITUTE OF VOCATIONAL EDUCATION (TY/LWL)
DEPARTMENT OF INFORMATION TECHNOLOGY

HIGHER DIPLOMA IN SOFTWARE ENGINEERING (IT114105)
HIGHER DIPLOMA IN COMPUTER SYSTEMS ADMINISTRATION (IT124106)

Module Name:	Contemporary Topics in CSA/ Contemporary Topics in Software Engineering
Module Code:	ITP4605/ITP4507
Assignment Number:	One
Hand-in:	22 November, 2015 (Submit your work to Moodle on or before 11:55 PM)
Weighting of This Assignment:	50% of the End of Module Assessment

This assignment is a group assignment (group size: max. two students) and must be done by group members only. Plagiarism will be treated seriously. Any assignments that are found involved wholly or partly in plagiarism (no matter the assignments are from the original authors or from the plagiarists) will score Zero mark. **Late submission will NOT be accepted**.

Task Specification

X Membership handling Corporation is a large membership management company. The company manages different subsidy companies' membership programs that let the user to create, search, renew, and close accounts in different membership programs. There are two subsidy companies, which are Africa Java Coffee Series shop (AJCS), and Wo-long Tea Series shop (WLTS).

AJCS uses a system call "AdvancedMem" to manage the membership records, Primary Membership, and Company Membership.

The system has couple basic methods to support the daily operations.

1. createMem( ) to create membership with one year valid period
2. searchMem( ) to search membership
3. updateAddress( ) to update the member address.
4. extendGoodTill( ) to extend the Good Till Date for one year
5. isStillGood ( ) to check the Good Till Date is not expired

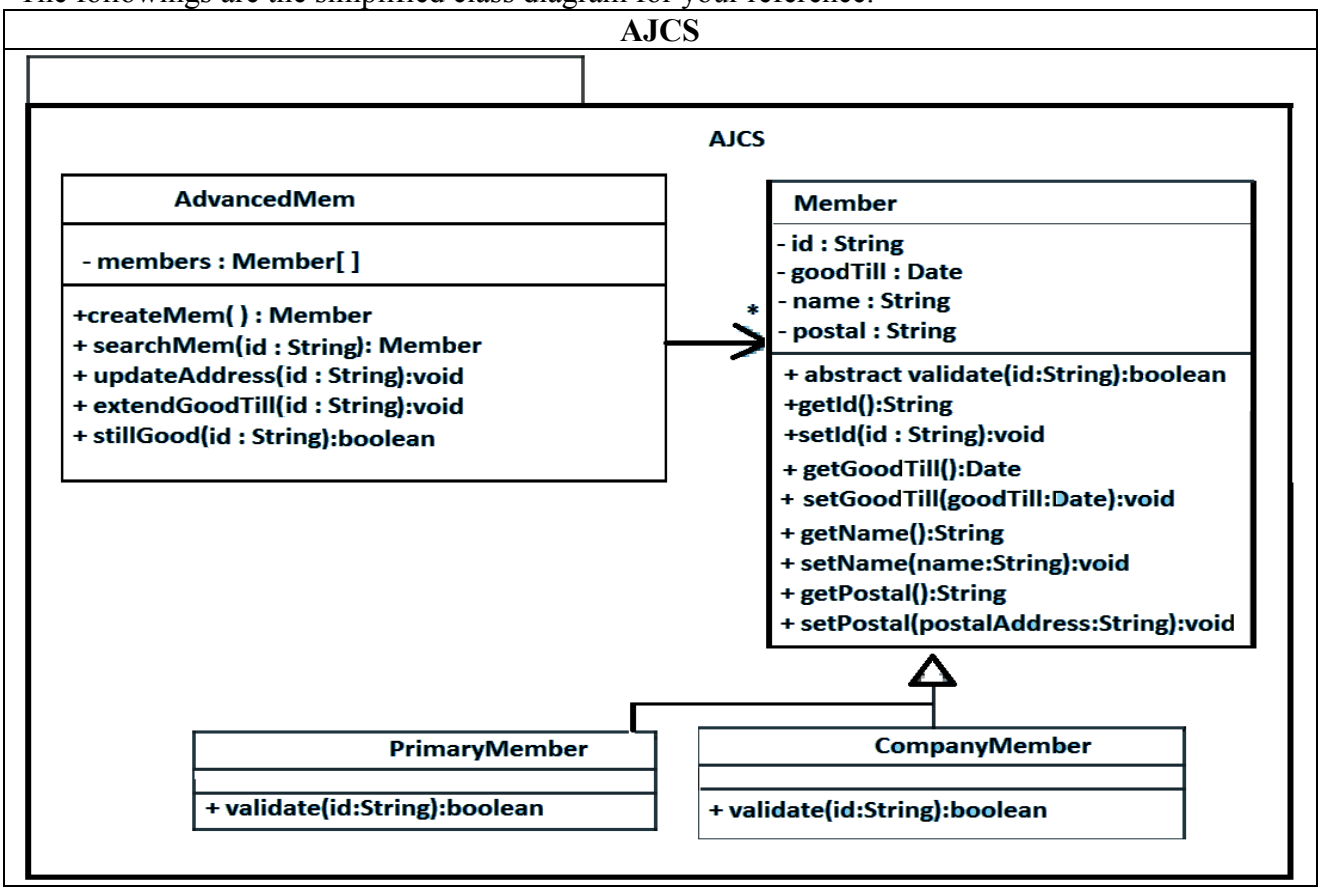
All member numbers contain 7 digits plus 1 check digit. Sample "Primary" membership number is 31201221; "Company" membership number is 31111225; as the last digit is check digit. The sum of all digits (include check digit) of primary membership number modulo 3 is zero. The sum of all digits (include check digit) of company membership number modulo 8 is zero. The validate( ) method of PrimaryMember and the Company classes will check the id is valid or not.

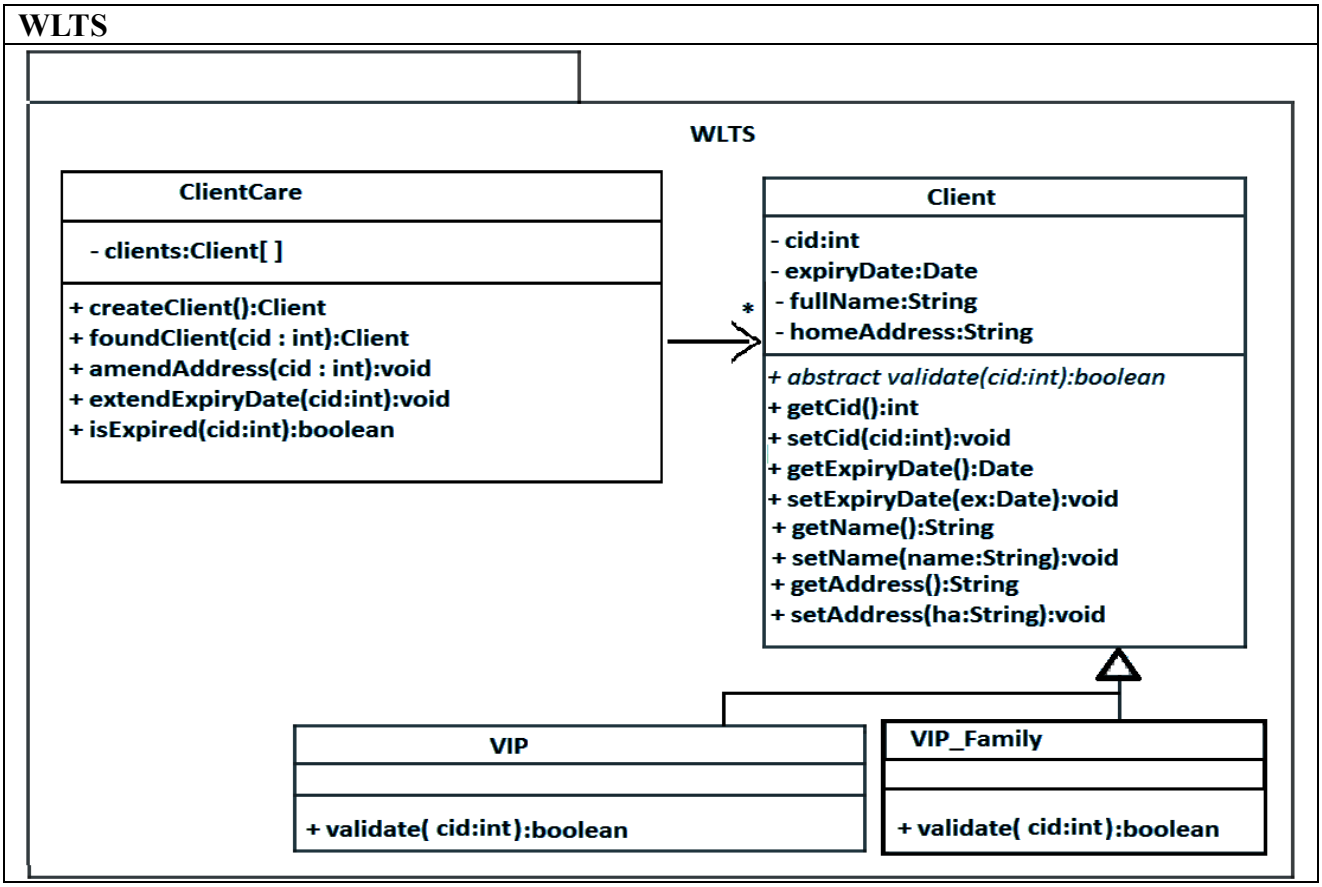
WLTS uses a system call “ClientCare” to manage the membership records, VIP Membership, and VIP_Family Membership.
The system has couple basic methods to support the daily operations.

1. createClient ( ) to create membership with one year valid period
2. foundClient ( ) to search membership
3. amendAddress( ) to update the member address
4. extendExpiryDate ( ) to extend the Expiry Date for one year
5. isExpired( ) to check the Expiry Date is not expired

The VIP number is started with digit ‘3’ and the VIP_Family number is started with 3 fix digits “303”. Both number types contain 8 digits plus 1 check digit. All membership numbers contain exact 9 digits. The sum of all digits modulo 6 is zero. Sample “VIP” number is 312312114; “VIP_Family” number is 303123213.
The validate( ) method of the ClientCare and Client classes will check the cid is valid or not.

The followings are the simplified class diagram for your reference.





As a system analyst of the Company, you are required to support the system integration. You are asked to design and develop the X_MEM Membership management System for integrating the classes in the existing two systems. You are reminded that the design of the existing classes: AdvancedMem, Member, PrimaryMember, CompanyMember, ClientCare, Client, VIP, VIP_Family must be kept unchanged.

You should **minimize** the impact of future change on data structures and operations in both existing systems; however, your new system should integrate the operations with one common user interface. Moreover, there may be newly subscripted company for future integration.

The new system module should provide the following functions:

1. Create a membership in a company (Africa Java Coffee Series shop (AJCS), or Wo-long Tea Series shop (WLTS), or any new company in the coming future).
2. Show membership details, by given id. (input id = *999 to show all records)
3. Update the address of the membership, if membership is valid.
4. Extend membership expiry date
5. Undo last command
6. Redo the last undone command
7. Show undo/redo list

Your system design should confront to the Open Closed Principle so that your design should easily support new types of operations, for example, creation of different types of membership.

You **MUST** apply the following design patterns for your new system

- **Adapter pattern** to support the operations between the two exist companies, and consider the future change for any new company.
- **Command pattern** to provide the "create membership", "show member detail", "update the address of the membership", "extend membership expiry date", "undo", "redo" and "show undo/redo list" functions
- **Factory pattern *or* Abstract Factory Pattern** to create different Command objects and membership objects
- **Memento pattern** to provide "Undo" and "Redo" functions

Assignment Report

In addition to the system development, you are required to write up a **Short Report** covers the following sections:

1. **Assumptions regarding the problem context**
2. **Application design with class diagram**
3. **Discussion and explanation on each of the design patterns applied to the application**
4. **User Guide**
5. **Test Plan and Test Cases**
6. **Well documented Source Code**

Mark Allocation

Your assignment work will be marked according to the following criteria.

Work	Mark Allocated
System Coding and Implementation	
a) Implementation of the system and coding style **(Hard-coded output will result in zero mark.)**	30%
b) Demonstration * (Hard-coded output will result in zero mark.)	15%
c) User Guide	5%
d) Test Plan and Test Cases (Will be used in testing your own application.)	5%
System Analysis and Design, and Discussion	
e) Design of your system and correct use of design patterns	20%
f) Application design with class diagram	10%
g) Discussion and explanation on each of the design patterns applied to the application	15%
Total	**100%**

Note: * Please note that you will be asked to recompile all you Java classes during demonstration, and to answer questions regarding your implementation.

Submission of Assignment Work

1. The front page of your submission should include the course title, module title, student identity number, student name, and group number.

2. Submit **a zipped soft copy to Moodle** of all your work including
   - Well documented Source Code of your program
   - User Guide and Test Plan with Test Cases (describe how your program works and develop different test cases for testing each functionality of your program – please include all the required screen dumps).
   - Report for analysis and discussion on system
     A. The assumption made during analysis and design of the application
     B. System design on your application with class diagram
     C. Discussion on the design patterns that applied on your application

3. Submit according to the guideline on the top part of cover page. **Late submission will NOT be accepted**.

Extra Reference

This sample run is served for reference only. You are free to design your own user interface.

Sample Run of assignment

You may follow the design of user interface shown in this sample run in DOS command prompt.

User's inputs are in bold face.

1. Create Member Information (c)

```
X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u
= undo, r = redo, l = list undo/redo,      X = eXit system

c
Enter Company Code (ajcs/wlts):
wlts
Enter id;type;name;address:
312345675;VIP;Chan Tai;Flat 1, Tower A, 1 Tai Rd.
New member record created.
```

Create family member

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

c
Enter Company Code (ajcs/wlts):
wlts
Enter id;type;name;address:
303345675;VIPF;TANG Chi;Room B;Tower 2, 3 Mansion Rd.
New member record created.

2. Show one member information (s)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
303345675

Member information
ID: 303345675
Type: VIP Family
Name: TANG Chi
Address: Room B, Tower 2, 3 Mansion Rd.
Expire date (DD-MM-YYYY): 12-10-2016

Show all records

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
***999**

Member information

Expire Date ID	Type	Name	Address
12-10-2016, 303345675,	VIPF,	TANG Chi,	Room B, Tower 2, 3 Mansion Rd.
12-10-2016, 312345675,	VIP,	Chan Tai,	Flat 1, Tower A, 1 Tai Rd.

Create 2 members (1 primary member, and 1company member)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

c
Enter Company Code (ajcs/wlts): **ajcs**
Enter id;type;name;address:
21234561;Pri;Chan Siu;Flat 3, Tower C, 21 Tai Rd.
New member record created.

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

c
Enter Company Code (ajcs/wlts): **ajcs**
Enter id;type;name;address:
22345673;Com;SW Dve;Flat 1101, Tower X, 38 Busy Rd.
New member record created.

Show all records

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
***999**

Member information

Expire Date	ID	Type	Name	Address
12-10-2016,	303345675,	VIPF,	TANG Chi,	Room B, Tower 2, 3 Mansion Rd.
12-10-2016,	312345675,	VIP,	Chan Tai,	Flat 1, Tower A, 1 Tai Rd.
12-10-2016,	21234561,	Pri,	Chan Siu,	Flat 3, Tower C, 21 Tai Rd.
12-10-2016,	22345673,	Com,	SW Dve,	Flat 1101, Tower X, 38 Busy Rd.

3. Update address (a)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

a
Enter id (*999 to show all):
303345675
Enter address:
Room D, Tower 2, 3 Mansion Rd.
Member address updated.

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
303345675

Member information
ID: 303345675
Type: VIP Family
Name: TANG Chi
Address: Room D, Tower 2, 3 Mansion Rd, Wanchai.
Expire date (DD-MM-YYYY): 12-10-2016

4. Extend membership (e)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

e
Enter id:
22345673

Membership extended:
12-10-2017, 22345673, Com, SW Dve, Flat 1101, Tower X, 38 Busy Rd.

Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
***999**

Member information

Expiry Date ID	Type	Name	Address
12-10-2016, 303345675,	VIPF,	TANG Chi,	Room D, Tower 2, 3 Mansion Rd.
12-10-2016, 312345675,	VIP,	Chan Tai,	Flat 1, Tower A, 1 Tai Rd.
12-10-2016, 21234561,	Pri,	Chan Siu,	Flat 3, Tower C, 21 Tai Rd.
12-10-2017, 22345673,	Com,	SW Dve,	Flat 1101, Tower X, 38 Busy Rd.

5. Display the Undo/Redo List (l)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

l

Undo List:
Create 312345675
Create 303345675
Create 21234561
Create 22345673
Update address 303345675
Extend Membership 22345673

Redo List:
Empty

6. Undo Last Command in the Undo List (u)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

u

Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

l

Undo List:
Create 312345675
Create 303345675
Create 21234561
Create 22345673
Update address 303345675

Redo List:
Extend Membership 22345673

Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

u

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

l

Undo List:
Create 312345675
Create 303345675
Create 21234561
Create 22345673

Redo List:
Extend Membership 22345673
Update address 303345675

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
***999**

Member information

Expire Date	ID	Type	Name	Address
12-10-2016,	303345675,	VIPF,	TANG Chi,	Room B, Tower 2, 3 Mansion Rd.
12-10-2016,	312345675,	VIP,	Chan Tai,	Flat 1, Tower A, 1 Tai Rd.
12-10-2016,	21234561,	Pri,	Chan Siu,	Flat 3, Tower C, 21 Tai Rd.
12-10-2016,	22345673,	Com,	SW Dve,	Flat 1101, Tower X, 38 Busy Rd.

7. Redo the last undo command (r)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

l

Undo List:
Create 312345675
Create 303345675
Create 21234561
Create 22345673

Redo List:
Extend Membership 22345673
Update address 303345675

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

r

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

s
Enter id (*999 to show all):
***999**

Member information

Expire Date	ID	Type	Name	Address
12-10-2016,	303345675,	VIPF,	TANG Chi,	Room D, Tower 2, 3 Mansion Rd.
12-10-2016,	312345675,	VIP,	Chan Tai,	Flat 1, Tower A, 1 Tai Rd.
12-10-2016,	21234561,	Pri,	Chan Siu,	Flat 3, Tower C, 21 Tai Rd.
12-10-2016,	22345673,	Com,	SW Dve,	Flat 1101, Tower X, 38 Busy Rd.

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

l

Undo List:
Create 312345675
Create 303345675
Create 21234561
Create 22345673
Update address 303345675

Redo List:
Extend Membership 22345673

8. Exit the System (X)

X Mem Management System
Please Enter Command: [c | s | a | e | u | r | l | X]
c = create membership, s = show membership details, a = update address, e = extend membership, u = undo, r = redo, l = list undo/redo, X = eXit system

X

Leaving System...

End of Sample Run
***** END *****