CITY UNIVERSITY OF HONG KONG

Course code & title :   CS 3342 Software Design

Session   :   Semester A 2010/11

Time allowed   :   Two hours

This paper has 4 pages (including this cover page).

1.   This paper consists of 5 questions.

2.   Answer ALL questions.

3.   This question paper should NOT be taken away.

1   [CILO 1: Software Process] (20%)

(a) In a software development project, your boss instructs you to choose either the Waterfall model or the Spiral model to be applied in the project. What should be considered in order to make the decision? Please explain the pros and cons of each model. [12%]

(b) Describe four characteristics of the Unified Process (UP) [8%]

2. [CILO 5: Professional Ethics] (10%)

(a) The next project will be implemented in JSP, but you do not know this technology. Thus, you read books and write some JSP programs to gain some practical experience.

Which is the most important code of ethics you have followed? Explain your answer. [5%]

(b) You are the project manager of a development team. You find that your team is unlikely to produce a software system with the expected functionality. In a meeting, the president of your company requests you to report the progress of the project. You reply, "Everything is under control."

Which is the most important code of ethics you have NOT followed? Explain your answer. [5%]

3. [CILO 3: Object-Oriented Analysis] (20%)

Perform object modeling for the following software system and draw a class diagram (that shows classes, attributes, and relationships between classes).

The *mPhone System* has the following features:
   i) **Voice call**
      * The system allows user to receive incoming phone calls and make outgoing phone calls. The system records the call history, which is a list of call records that have been dialed from, received by, or missed on the phone. Each recorded call will expire automatically after 60 days or can be removed manually by the user.

   ii) **Short Message Service (SMS)**
      * The system records a list of incoming SMS messages and also a list of outgoing ones. Each incoming message has a text message, sender's phone number and the receiving time. Each outgoing message has a text message, receiver's phone number and the sending time.

   iii) **Phone book**
      * The system supports phone book, with which you can customize the contact information for your family, friends, and business associates. A contact includes first name, last name, address, and at least one phone number.

   iv) **Blacklisting**
      * The system allows a user to block a list of mobile phone numbers. Incoming calls from any blacklisted number will be ignored.

4. [CILO 2: Capturing Requirements] (20%)

You are a summer intern of *CityU Bank* and you are assigned to review and refine the following use case specification for *Credit Card Management System*.

Use Case UC1: Report Credit Card Lost
Primary Actor: *Customer*
Participatory Actor: *Police Lost Property System*
Stakeholders and Interests:

Stakeholders and Interests:
  a) *Customer*: wish no unauthorized transaction after credit card lost, and credit card be re-issued
  b) *Bank*: maintain customer relationship
  c) *Police Force*: detect potential criminals

Success Guarantees (Post-conditions):
  • Old credit card is de-activated as lost.
  • A new card is issued.
  • Card re-issuing fee is charged to the customer.
  • An email notification is sent to bank staff for customer relationship maintenance.

Main Success Scenario	
Actor Action (or Intention)	*System Responsibility*
1. *Customer* signs on with username and selects the "report card lost" function.	
	2. Verify the customer's identity.
	3. Deactivate lost credit card as lost.
	4. Validate that old credit card has no unauthorized transactions after card lost.
	5. Issue a new card.
	6. Pass the previous transactions of the old card to the new card.
	7. Notify Bank Staff of the re-issue of the lost card.
	8. Send email to Customer for double confirmation.
9. *Customer* records the case number and logs off from the system.	

(a) The manager suspects that there may be something missing in the use case specification. Review the use case specification. Identify and justify what should be added to it. [10%]

(b) Suppose that the cost of developing this software is too expensive (and will be approved by the CEO) and the manager has decided to cut out some features from the software to be implemented. The manager however is informed that "Report Credit Card Lost" is too important to be cut out. To address this problem, the manager asks you to identify **exactly one** success guarantee of the use case that can be left to be manual operations. What is your choice? Briefly justify your choice. [5%]

(c) If the manager requests you to validate the correctness of the user requirements captured in a use case specification in the project, what will you do? [5%]

5. [CILO 4: Design Principles] (30%)

(a) Draw a communication diagram to model the following scenario, and write down the design decisions you have made in the model. [15%]
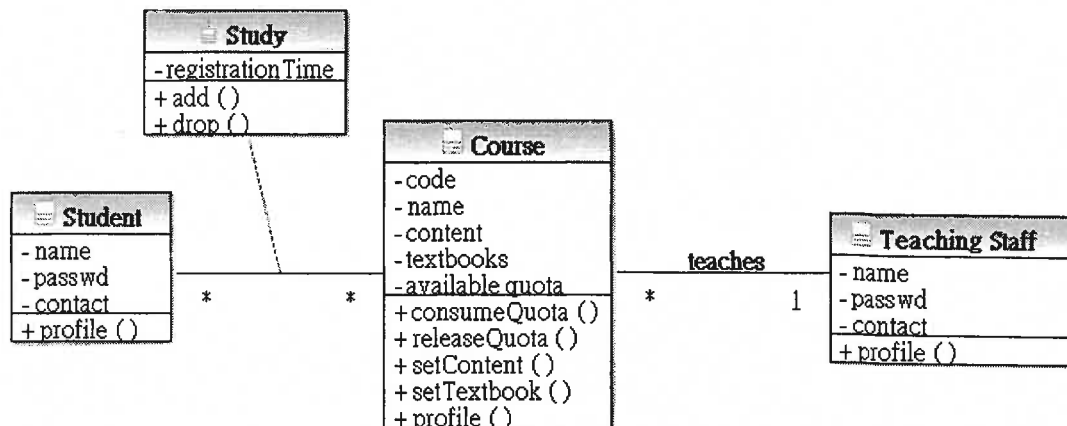
Note: You must clearly describe the messages and the flow of messages in your communication diagram. State clearly the assumption if appropriate.

Scenario: Buy Movie Tickets
1. Customer browses the movies now showing.
2. Customer selects a movie from the movie list.
3. The system shows the seating plan of the selected movie to the customer.
4. Customer picks two seats from the available seats of the seating plan.
5. Customer submits the selected seats with membership number and password to the system.
6. The system verifies the membership number and password, reserves the selected seats, charges the member's account, and generates a confirmation for the customer.
7. Customer presses the [OK] button and the system shows the movie list again.

(b) The following diagram depicts the current class design of a course administration system. However, we realize that the consumeQuota( ) and releaseQuota( ) methods will only be used in the *Study* class for add/drop. The setContent( ) and setTextbook( ) methods will only be used in the *Teaching Staff* class. The profile( ) method of the *Course* class will only be used in the *Student* and *Teaching Staff* classes.

Which design principle is violated in the current class design? Improve the design by refining the class diagram. Explain how you improve the design. [15%]

- END -