Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
End Semester Examination –August/September 2011
CST222-2 Object Oriented Analysis and Design
CST122-2 Object Oriented Analysis and Design

Uva Wellassa University

INSTRUCTIONS TO CANDIDATES

1. This paper contains **4** Questions in **3** pages.
2. Each Question carries **25** marks.
3. Answer **ALL** questions
4. Time Allowed: **Two (2) Hours**

Question 1

(a) Define the **objects** and **classes** with reference to object oriented concepts? *[4 marks]*

(b) Why software systems are inherently complex? *[3 marks]*

(c) Briefly explain the following relationships.

i. Inheritance *[2 marks]*
ii. Reflexive association *[2 marks]*
iii. Aggregation *[2 marks]*
iv. Composition *[2 marks]*

(d) Briefly explain the advantages of using UML for software modeling. *[6 marks]*

(e) What is meant by Polymorphism? Briefly explain with an example. *[4 marks]*

Question 2

(a) Brifly explain the following terms used in UML.

i. Actor *[2 marks]*
ii. Including use case *[2 marks]*
iii. Swimlanes *[2 marks]*
iv. Visibility prefixes *[2 marks]*

(b) Draw a ***sequence diagram*** to the given scenario that a customer taking food and beverages from a restaurant.

Initially the customer orders the food and the waiter will take the order to the cook to make it. While the cook prepares the dish, the customer asks for a beverage and the waiter serves it. Then the waiter gets the food from the cook and serves it to the customer. Finally, the customer makes the payment to the cashier and completes the scenario.

[9 marks]

(c) Following paragraph describes the state changes of a personal computer. Draw a ***state transition diagram*** to model these state changes.

Personal Computer (PC) has three initial states. Initializing, Working and Shutting Down. When PC is turned on, boot up takes place. As a result of activities in the initializing state, PC transforms to working state. When user chooses to shut down the PC, it generates a trigger event that causes the transition to shutting down the PC. If the PC is idle for more than 10 minutes, then PC switches to screen saving state. Any keystroke or mouse movement transitions the PC from the screen saving state back to the working state.

[8 marks]

Question 3

You are asked to develop a computer based system for the library in your town. This new system is expected to make the book browsing and recording of book borrowing easy. You have found the following in the initial business meeting.

Library contains books and journals. Every book has one or more copies (Book Copy). Library members can borrow books. (Hint: that is, members borrow these book copies). Library members are divided into two groups: 'General Members' and 'Platinum Members'. General members can borrow only books. Platinum members can borrow both books and journals.

(a) Do a noun-verb analysis and list down the classes for the system. *[2 marks]*

(b) Draw **High Level Class diagram** for the system. *[10 marks]*

(c) Consider the scenario of **'a library member borrows a book'** and draw the Use-Case diagram. Clearly state the pre-condition, post-condition and any assumptions you made.

[6 marks]

When platinum members need to borrow a journal, first she/he visits the library and then searches for the required journal. If it's available then she/he borrows the journal. If not present, platinum members can reserve the journal. When the journal is available, the member is notified to collect it.

(d) Draw the activity diagram for the above scenario. *[7 marks]*

Question 4

(a) What is the 'Rational Unified Process (RUP) of software development? *[2 marks]*

(b) List and briefly explain the phases of RUP. *[8 marks]*

(c) There are six industry proven best practices defined in RUP. List them. *[4 marks]*

(d) Briefly explain one of the six best practices in RUP. *[3 marks]*

(e) What is Computer-Aided Software Engineering (CASE)? *[2 marks]*

(f) What are the advantages and disadvantages of using CASE tools? *[6 marks]*

End of the paper