



Uva Wellassa University, Sri Lanka
Faculty of Science & Technology
2nd Semester Examination – September/October 2012
IIT112-2 System Analysis and Design



Total 04 Questions

Time: two (02) hours

Answer all questions

Question 1 (25 marks)

- (a) What is an *information system*? Why are they essential in organizations?
- (b) What are the most important *technology drivers* for today's information systems?
- (c) Who are the typical *stakeholders* in an information system? What are their roles?
- (d) What are the four steps in a system development process? What happens in each step?
- (e) Explain why having a *centralized system* development process is important to an organization.

Question 2 (25 marks)

- (a) Describe the different types of *information systems* and how they interoperate to supplement one another.
- (b) Assume you are the system analyst for consulting company and have been asked to assist the chief executive officer (CEO) of a regional bank. The bank recently implemented a plan to reduce the number of the staff, including loan officers, as a strategy to maintain profitability. Subsequently the bank has experienced chronic problems with backlogged loan requests because of the limited number of loan officers who are able to review and approve or disapprove loans. The CEO of the bank is interested in solutions that would allow the approval process to move faster without increasing the number of loan officers, and has engaged your company to come up with suggestions. What is the type of system that you might recommend to the bank?
- (c) Assume you are the system analyst who will be conducting a requirement analysis for an individually owned brick-and-mortar retail store with a point-of-sale system. Identify the typical *internal* and *external users* might include.
- (d) Write a comparison of different life cycle models.
- (e) Explain why programs, which are developed using evolutionary development, are likely to be difficult to maintain.

Question 3 (25 marks)

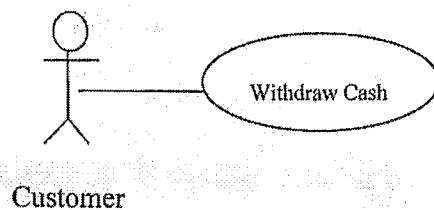
- (a) What is the role of *DFD* as a documentation aid?
- (b) What is a *Context Diagram* and what does it contains and what it should not contain?
- (c) What is meant by *functional decomposition* and *balancing DFD*.
- (d) *Tic-tac-toe Computer Game*. Tic-tac-toe is a computer game in which a human player and a computer make alternate moves on a 3 x 3 square. A move consists of marking a previously unmarked square. A player who first places three consecutive marks along a straight line (i.e. along a row, column or diagonal) on the square wins. As soon as either the human player or the computer wins, a message congratulating the winner should be displayed. If neither player manages to get three consecutive marks along a straight line, and all the squares on the board are filled up, then the game is drawn. The computer always tries to win a game.

Draw the *context diagram* and the *level 1 DFD* for the above Tic-tac-toe computer game.

- (e) What are the different types of Data Flow Diagrams?

Question 4 (25 marks)

- (a) Outline how use-cases may be used in requirements capture. Are there any particular advantages in using use-cases for requirement capture?
- (b) Explain the purpose of the <<extends>> and <<includes>> stereotyped dependencies.
- (c)



Write *description* of the above use cases under the following headings.

- | | | | |
|------|-------------------|-------|-------------------|
| i. | Use Case Name | v. | Pre-condition |
| ii. | Description | vi. | Basic Flow |
| iii. | Actor | vii. | Alternative Flows |
| iv. | Related Use Cases | viii. | Post-condition |

(d) Prepare the *use case diagrams* that capture the requirements for the following system;

A university wishes to increase security in its car park. It has been decided to issue an identity card to all employees. The cards record the employee's name, department and identity number. A barrier, a card reader and a sensor are placed at the entrance of the car park. The driver inserts the numbered card into the card reader. The card reader checks the card number. If the number is valid, the reader sends a signal to raise the barrier and the vehicle can enter the car park. The sensor sends a signal to the barrier to lower when the vehicle has entered. There is a system at the exit with a barrier which is raised when a car wishes to leave the car park.

When there are no spaces in the car park a sign at the entrance displays "Full" and is only switched off when a vehicle leaves.

Special visitors' cards, which record a number and the current date, also permit access to the car park. Visitors' cards may be sent out in advance or collected from reception. All visitors' cards must be returned to the reception when the visitor leaves the site so that they can be deleted from the list of valid cards.

(e) Using UML notation, draw a Class Diagram that supports the situation described below. You do not need to include any attributes or operations on your Class Diagram, if it is not provided to you, and you need only to show the associations between classes.

- A student can be an undergraduate or a graduate student.
- An undergraduate student can be a type of tutor.
- A tutor tutors a student.
- A lecturer and a professor are two types of instructors.
- A teaching assistant can assist a lecturer and a professor, but a lecturer can be assisted by at most one teaching assistant, while a professor can be assisted by up to five teaching assistants.
- A teaching assistant is a type of graduate student.

---End of the Question Paper---