

IMIS HIGHER DIPLOMA QUALIFICATIONS

Contemporary Issues in Systems Design (H3)

Wednesday 4th December 2013 10:00hrs – 13:00hrs

DURATION: 3 HOURS

Candidates should answer ALL the questions in Part A and THREE of the five questions in Part B. Part A carries 40% of the marks available and Part B carries 60%. Candidates should allocate their time accordingly.

No reference material of any kind may be taken into the examination.

[Turn over]

Part A: Answer all of the following 8 questions

Question A1

Identify THREE ways in which clients, users and developers might disagree about the most important objectives of a systems development project.

(5 marks)

Question A2

Identify THREE disadvantages of the waterfall model of systems development.

(5 marks)

Question A3

What is meant by “polymorphism” in the context of object oriented design?

(5 marks)

Question A4

What is the KEY difference between “structural” and “behavioural” diagrams in the Unified Modelling Language?

(5 marks)

Question A5

Outline the FIVE main steps in developing a sequence diagram from a Use Case.

(5 marks)

Question A6

Explain how object oriented design is well-suited to the design of reusable components.

(5 marks)

Question A7

Identify the TWO main purposes of an operation specification.

(5 marks)

Question A8

How can collection classes be used when implementing associations between classes? Illustrate your answer with a suitable example.

(5 marks)

Part B: Answer 3 of the following 5 questions (20 marks each)**Question B9**

- a) Explain how software reuse might benefit an organisation in each of the following areas:
- i. The cost of developing software. (2 marks)
 - ii. The quality of software. (2 marks)
 - iii. The flexibility of software. (2 marks)
- b) Explain how the developers of an object oriented software system might make use of the following to encourage software reuse:
- I. Object “wrappers”. (3 marks)
 - II. Class Libraries. (3 marks)
 - III. Commercially available componentware. (4 marks)
 - IV. Web Services. (4 marks)

Question B10

You have been asked to develop a system for a student housing service that helps students to find somewhere to live. One of the classes you have identified for the system is “house”. A house is either Vacant or Occupied. When someone vacates a house the housing service has the house thoroughly cleaned before advertising it as “vacant” again or removing it from their listings.

- a) Draw a statechart showing the various states that the “house” class might transition throughout its lifetime. You should identify at least FOUR states. Explain any assumptions you make in constructing this diagram. (10 marks)
- b) Explain why ALL the guard conditions from a state should be mutually exclusive. (4 marks)
- c) Describe the KEY ways in which a statechart should be cross-checked for consistency with other UML diagrams. (6 marks)

Question B11

- a) Give an example of a persistent and of a transient object that might be represented in a class diagram. Explain the KEY difference between the two. (5 marks)
- b) Explain THREE ways in which the classes in an inheritance hierarchy could be mapped to tables in a relational database. (6 marks)
- c) Explain TWO KEY differences between a relational DBMS and an object DBMS. (5 marks)
- d) What is meant by the acronyms OML and ODL in relation to object databases? (4 marks)

Question B12

- a) What is the KEY difference between “white box” and “black box” tests?
(4 marks)
- b) Identify THREE unit tests that could be applied during the design of an interface to an ATM (Automated Teller Machine). Describe how EACH of these tests should be documented.
(6 marks)
- c) Identify and describe FIVE aspects of system testing.
(10 marks)

Question B13

- a) Explain what is meant by the terms ‘quality problems’ and ‘productivity problems’ associated with systems development.
(4 marks)
- b) Identify FOUR quality problems that may occur in systems development. Comment on the ways in which we can minimize the risk of each problem occurring.
(8 marks)
- c) An online video streaming service allows registered customers to watch films on a pay-per-view basis. It has been suggested that the system supporting this activity should be linked to the organisation’s management information system. Identify and briefly describe FOUR ethical issues that might be involved in integrating the two systems.
(8 marks)