



OXFORD BROOKES UNIVERSITY
BACHELOR OF SCIENCE (HONS) COMPUTING
AND INFORMATION SYSTEMS
DECEMBER 2004 EXAMINATION

15 DECEMBER 2004

M8748 Information Systems Analysis and Design

TIME : 2 Hours + 10 Minutes Reading

NUMBER OF PAGES : 1 Cover sheet and 4 Pages of questions

INSTRUCTIONS:

- ☐ **All Questions in SECTION A are COMPULSORY and choose any TWO questions in SECTION B.**
- ☐ Section A carries 40 marks.
- ☐ All questions in Section B carry 30 marks each.
- ☐ Please start every question on a new page.
- ☐ Answers will not be marked if they are illegible.
- ☐ Enter the question numbers (in the order you have attempted) in the boxes provided in the answer script.
- ☐ Write your **INDEX NUMBER** and **MODULE NUMBER** on the cover page of the answer script.

SECTION A
 (Answer ALL questions)

QUESTION 1

A college offers a number of degrees. Each degree is composed of a number of topic modules (or courses depending upon which part of the world you live in). Not all degrees are made up from the same number of modules. Each degree has a unique name, and each module has a unique name.

The grade for a module will be based on a weighted combination of an exam mark and a coursework mark. The weight given to each of these grade components can differ from one module to the next, and is part of the defining characteristics of a module.

When a student registers for a college degree it is necessary to store such information as the name of the student, and the name of the degree for which the student is registering. You must also be able to add the results for the student for each of the modules in the registered degree.

We want to eventually create a system that will let us define, update and report on various students' degrees of study.

- (a) Use appropriate graphical notations to depict the requirements of a system that defines, updates and reports on various students' degrees of study for the college. [Student required to draw actors and use cases with explanation to support their answers. [10 marks]
- (b) Using the noun analysis technique discover a number of suitable classes from the description of each use case drawn in part (a). [10 marks]
- (c) Use UML diagrams to document the attributes and methods of classes listed in your answers for part (b). [20 marks]

[TOTAL FOR QUESTION 1: 40 MARKS]

SECTION B

(Answer any **TWO** Questions)

QUESTION 2

During the initial analysis of an information system for a school, the following classes seemed to be appropriate - *School, Department, Student, Course* and *Instructor*.

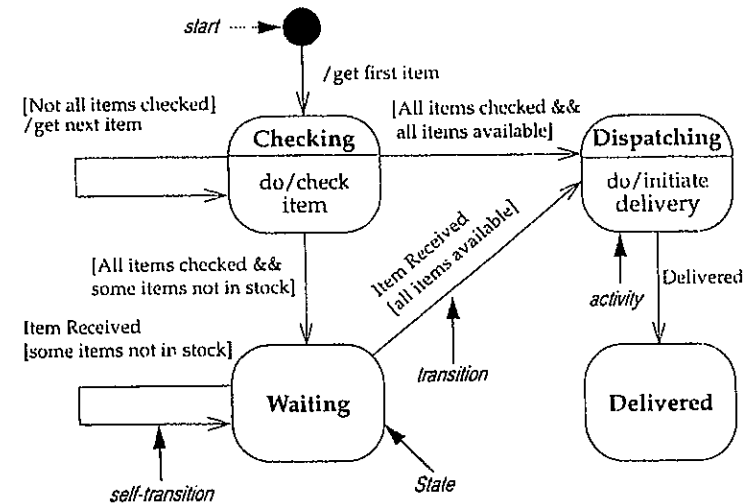
- Use CRC cards to establish the responsibilities and collaborators for these classes. [10 marks]
- Draw a UML class diagram showing the relationships between these classes. [10 marks]
- What are the purposes of drawing class diagrams? [4 marks]
- Use UML notation to show the relationship between:
 - A Polygon class and a Side class;
 - A Company and an Employee;
 - A Company and its Departments.

[6 marks]

[TOTAL FOR QUESTION 2: 30 MARKS]

QUESTION 3

- The following is the state diagram showing the various states for an order object in an order processing system. Apply walk-through technique to perform static testing of the diagram using the following scenarios as test cases.

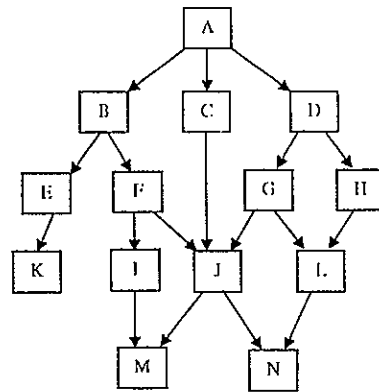


Event condition, state, new state and action . condition should be listed when creating the test cases. Below are the possible cases.

- Scenario 1: There is 1 item in the order list, and the item is available.
 Scenario 2: There is 1 item in the order list, but the item is not available.
 Scenario 3: There are 2 items in the order list; the first is available, but the second is not available.
 Scenario 4: There are 2 items in the order list, the first is not available, but the second is available.
 Scenario 5: There are 2 items in the order list; both of them are not available.
 Scenario 6: There are 0 item in the order list.
 Scenario 7: There are 3 items in the order list; none of them are available.

[10 marks]

- Given the following module interdependence relationship, describe the top-down and bottom-up integration process respectively.



[10 marks]

Briefly describe five important underlying causes of problems in information systems development?

[10 marks]

[TOTAL FOR QUESTION 3: 30 MARKS]

QUESTION 4

An automated book-loan system for a library has book borrowers, journal borrowers, librarians and browsers. A book borrower uses the automated book-loan system to borrow a book, return a book, place a reservation and extend a loan. A journal borrower may borrow or return a copy of a journal. The librarian uses the system to update the library catalog. The browser browses the library catalog online. If a borrower is a member of the library entitle to borrow up to 6 books on loan or if a borrower is a librarian can borrow up to 12 books on loan;

(a) Draw a Use Case diagram for the above automated book-loan system. [15 marks]

(b) Draw a single business activity diagram for the borrowing and returning of books in a library. [10 marks]

(c) Write the pre and post conditions for the book borrowing process. [5 marks]

[TOTAL FOR QUESTION 4: 30 MARKS]

- END OF PAPER -