

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

GX 0088

Semester I Examinations, 2005/2006

Exam Code(s)	1IT1
	1MF1
Exam(s)	Masters in Information Technology
	M.Sc. in Software Design and Development
Module Code(s)	CT511
	CT521
Module(s)	Database Development
Paper No.	
Repeat Paper	Special Paper
External Examiner(s)	Prof. S McClean
Internal Examiner(s)	Ms. P. Byrne
	Dr. M. Madden

Instructions: Answer ALL questions

Duration	2 hrs
No. of Answerbooks	1

Requirements:

Handout	
MCQ	
Statistical Tables	
Graph Paper	
Log Graph Paper	
Other Material	

No. of Pages	3
Department(s)	Information Technology

1. (a) The Better Books book store wishes to set up a database to hold information which can be used to maintain an inventory of their stock. This should be available for customers to search by title, author(s), or ISBN. It is planned that a program be written which will be run weekly to advise staff when there is a minimal number of copies of a book remaining so that they might reorder. The publisher details must also be kept in order facilitate the reordering process.

Draw up the appropriate normalised tables to hold the data for this system, indicating the primary and foreign keys in each case.

[20]

- (b) A college database contains the following tables (keys are in bold type), containing details about departments, their locations, lecturers, students, courses and who teaches each subject.:

DEPARTMENT	Dept_Num	Dept_Name	Dept_Prof	
DEPT_LOCATION	Dept_Num	Dept_Locn		
LECTURER	Lect_ID	Lect_Dept	Lect_Name	Salary
STUDENT	Stud_ID	Stud_Fname	Stud_Lname	
TAKES	Student_ID	C_Code	Mark	
COURSE	Course_Code	Course_Name	hours	
TEACHES	Lect_ID	Cor_Code		

Note: The information held on departments includes name, number, name of the professor and the location of that department. The LECTURER relation holds details of a lecturers name, department and salary, while the TEACHES relation has details of the courses they teach. The STUDENT relation holds student names, and the TAKES relation has entries for the courses which they have taken and the grade they obtained in that course. The COURSE relation has the name of each course and the number of hours for which it is taught.

Create SQL queries to satisfy the following information requests:

- List by name all departments that are in the "Greenway building"
- List the names of all lecturers and their departments who teach subjects to a student named "Cormac Anderson"
- List all subject codes with the average mark attained in that subject
- List the lowest mark attained in any subject that is taken by more than 15 students
- List the subject name and number of students taking that subject for any subject taught by a lecturer who earns more than €50,000

[20]

2. (a) Explain how the problems of lost updates, uncommitted data and inconsistent retrieval can occur in a database transaction. How might these problems be overcome? [10]
- (b) Why employ fragmentation in a distributed database? Explain some of the techniques by which this might be carried out successfully. [10]
- (c) Define the rules of normalisation to Bryce-Codd normal form, in each case explaining how the rules are used to prevent anomalies in the data. [10]
3. (a) List the advantages and disadvantages to a company in using databases and internet communications to link with their customers. [10]
- (b) Explain the rules of referential integrity and entity integrity and how the validity of a database may be compromised if these are not adhered to. Use examples to illustrate your answer. [10]
- (c) Distinguish between the types of data held in a data warehouse and a conventional transactional database, and describe the steps which should be taken in setting up a data warehouse. [10]