

OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER 1 EXAMINATIONS 2003

SECOND YEAR-BA EXAMINATION
THIRD BIOMEDICAL SCIENCE EXAMINATION

INFORMATION SYSTEMS 1 (CT241) (CT219)

Prof. D. Bell
Prof. G. Lyons
S. Hughes

Time allowed: **Two hours**

Candidates are required to answer Question One in SECTION A and two other questions from SECTION B

SECTION A

- Q1.** The following is a relational schema (keys bolded) representing a Orders system store. The database has four entities (Customer, Order, Ordline and Parts).

CUSTOMER: (Cid, Name, ctype, city, email, creditcardtype, creditcardno, ccexpirydate, contact, email)
ORDER: (Oid, Odate, Cid)
ORDLINE: (Oid, Pid, Qty, Unit_Price)
PARTS: (Pid, Name, Colour, Weight)

Required:

To provide the SQL commands to execute the transactions (A) to (Q) below.

- A) At the end of each year, data from the orders table from the previous year is transferred to an orders-archive table which has identical structure. Specify the SQL statements to perform the clearance of obsolete data from last year.
- B) All users must be able to retrieve customer's name, type of business and email details. Specify the SQL statements to facilitate this request.
After this privilege has been granted, it has been noticed that user Barns has been abusing her powers. Make the appropriate changes.
- C) Write the SQL commands to create the Parts and Ordline table, assuming that the create table statement supports both Entity and Referential Integrity.
- D) How many cities do we have business customers in that have placed orders in May 03.
- E) List the name of the parts that are either ordered by customer 100 or are green.
- F) List the names of cities where we have exactly one customer.
- G) List the customer name and part name for customer's with orders totalling more than 100 for that part.
- H) List all customers who have "Hotmail.com" email addresses.
- I) For each date and part: list the date, part ID, name, the no of orders on that date which contained that part and the total quantity of the part that was ordered on that date.
- J) List the names of customers who have never made an order.
- K) Part "Whatsit" has changed its colour to pink. Write the SQL commands to reflect this.
- L) The contact column is no longer needed in the customers table. Make the changes.
Add a new mobile phone column to the customers table.

- M) Generate a popularity list of parts that have been ordered this year from the most to least popular.
- N) List the name and address of all customers whose credit card has not expired.
- O) The name of all the customers who have ordered at least all of the parts that customer no 2 has ordered.

[30 Marks]

SECTION B

- Q2.** (i) With respect to the design of relational databases, discuss the following issues (giving examples where appropriate):
- Selection of Primary Keys
 - Entities, attributes and domains
- (ii) Given the following requirements of an insurance company's database system, create an ER model to represent the entities (and their attributes) and the relationships between them.

An insurance company's policy-holders may have a number of policies with the company. Each policy is given a policy number and relates to a single holder. The company has a range of products and may put together a number of products to form a policy sold to a holder. Examples of motor products are third party, fire, theft, accident damage, and windscreen cover.

Brokers sell policies for commission. Any one policy may have commission payable to more than one broker. Claims are made against policies. A claim relates to only one policy and each claim is classified according to one of six claim types. The company's products are grouped by business area, such as: life, motor, marine. Any particular product belongs to only one business area. In order to limit risk, the company may place all or part of a policy with re-insurers. All or part of a single policy may be placed with a number of different re-insurers.

(State any assumptions made)

[35 Marks]

- Q3.** [i] Explain what is meant by a DDBMS, describe the major features, what is the advantages and disadvantages of such approach.
- [ii] Describe the main ways in which data integrity may be violated, and the checks that a DBMS can apply to safeguard against them.
- [iii] Explain the purpose and the main entries in a systems log.

[35 Marks]

- Q4. [i] Explain the limitations of the file system approach to data management.
Explain how a DBMS overcomes these limitations.
- [ii] Indicate how the following document would be represented in a normalised relational database, outlining and describing the steps involved clearly:

Customer ID: 501
Name: Dunnes Stores
Address: 898 BallyFoe, Galway

COMPUTER REPAIR JOB CARD

Job Details

DATE	JOB	TECHNICAN NO	TECHNICAN NAME	HOURS	RATE	PART NO	PARTS	QTY	COSTS
5/5/00	Repair	100	Mick	3	€20	PSU01	Power Supply	1	€60
						MB032	Mother Board	1	€85
Total Labour: €60					Parts €145				
8/6/00	Upgrade	103	John	2	€15	R512	RAM	2	€60
						FE19	Monitor	1	€300
						HD	Hard Disk	1	€70
Total Labour: €30					Parts €490				
5/7/00	Repair	102	Eileen	1	€40	CPU1	Processor	1	€320
						M100	Modem	1	€120
Total Labour: €40					Parts €440				

[35 Marks]