GX2542

NATIONAL UNIVERSITY OF IRELAND, GALWAY
OLLSCOIL NA hÉIREANN

SEMESTER 1 EXAMINATIONS 1999/2000

HIGHER DIPLOMA IN APPLIED SCIENCE
(SOFTWARE DESIGN & DEVELOPMENT)

MASTERS OF INFORMATION TECHNOLOGY

Database Development (CT857)
Databases (CT511)

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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 section of a cinemas database.

SCREEN:	(**Screen_Name**, Capacity)
SHOW:	(**Date, Time, Screen_Name,** Film_Code, No_of_tickets_Issued)
FILM:	(**Film_Code,** Title,Censor_Rating, Duration, Distributor_Code)
DISTRIBUTOR:	(**Distributor_Code,** Distributor_Name, Address, Telephone, Fax_No, Contact_Name)

Notes:

i. All films are shown twice daily; once in the afternoon (before 6 o'clock) and once in the evening (after 6 o'clock).
ii. Time values are stored in 'HH:MM' format; for example, 6 o'clock is represented as '06:00'. There are never any shows before noon.
iii. Date values are stored in 'DD-MMM-YYYY' format; for example, March 20 1997 is represented as '20-MAR-1997'.
iv. Data in the **Show** table refers to the current week only, and is refreshed each Friday.

Required:

To provide the SQL commands to execute the transactions (a) to (t) below.

(P.T.O)

a) List the Distributor Name, Telephone, and Contact Name for all distributors, sorted in ascending order by Distributor Code.

b) Find the addresses of all distributors who do **NOT** have a fax number.

c) List the names of all films for which there are seats available for the evening show today.

d) Which screen has the largest capacity?

e) What is the total daily takings for a single day if all seats for all shows are filled, given that tickets are priced at £3.50 each?

f) At what time does the earliest show this evening commence ?

g) An enquiry has been received from a caller who wishes to bring two children to an afternoon show tomorrow. Find the names of all films rated "PG", "U" or "12".

h) How many films are being shown this week ? (Note: Films in high demand may sometimes run on two or more screens simultaneously)

i) List the titles and ratings of all films distributed by CMX Entertainment's Limited or by the Borneo Film Company.

j) Locate contact details for all distributors in the 021 telephone area. (*Hint*: use Pattern Matching with wildcards)

k) Generate a popularity listing of films showing this week, ordered from most popular to least popular. (*Hint*: use Sorting and Grouping)

l) List the number of tickets sold **each day** this week from Friday through Thursday for showings of 'Goldeneye'.

m) What film is currently showing on the screen with the largest capacity?

n) The reel for 'Cinema Paradiso' has been accidentally destroyed and a replacement needs to be urgently reordered. Find the contact name and fax number of the relevant distributor.

o) What is the name of the shortest film to have ever been shown in this cinema? (You may assume that all titles in the **Film** table have been shown at least once).

p) The censorship rating for the 'Guns of Navarone' has been amended from "15" to "PG". Perform the relevant update.

q) Two new screens, 'G' and 'H', are to be shortly opened with capacities of 150 and 180 respectively. Insert this new data.

r) Due to electrical maintenance, all shows in screen 'D' tomorrow afternoon are cancelled. Delete the appropriate records.

s) Each Friday, all data from the **Show** table is transferred to an archive table called **Show_Archive** which has an identical structure. Fresh data for the coming week is then inserted into the **Show** table. Specify the SQL statements required to perform the clearance of obsolete data. (*Hint*: use Multi-Row Insert, and Delete)

t) Make all the above changes permanent.

(40 Marks)

(P.T.O)

SECTION B

Q2. (a) Write short note describing the relational model, paying particular attention to data structure and integrity constraints used.

(b) Discuss why Data Independence is a desirable propriety of a relational database.

(c) Describe in detail what is meant by the terms "entity integrity" and "referential integrity" and discuss how associated problems encountered with these when inserting, deleting, or updating data can be properly resolved.

(30 Marks)

Q3. (a) Normalisation is often used to guarantee correctness in relational databases. Explain and illustrate how anomalies may arise in relations that are not normalised.

(b) Define second normal form, third normal form and Boyce Codd normal form.

(c) Write notes on each of the following:

- CGI
- Concurrency Controls
- Desirable proprieties of transactions

(30 Marks)

Q.4 With respect to the design of relational databases, discuss the following issues (giving examples where appropriate):

- One-to-One relationships
- One-to-Many relationships
- Many-to-Many relationships
- Selection of Primary Keys
- Selection of Data types
- Entities, attributes and domains

(30 Marks)