

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

**SUMMER EXAMINATIONS 2000**  
**SECOND YEAR BA EXAMINATION**  
**INFORMATION SYSTEMS (CT219)**

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Ms. S. Hughes

Time allowed: Three hours

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

**SECTION A**

**Q1.** The following is a relational schema (keys bolded) representing a section of a movie database. The database has two entities (movie and actors) in a many-to-many relation. A third table casting is used to link them.

MOVIE:	( <b>Movie_ID</b> , Title, Year, Score, Votes, Country)
ACTOR:	( <b>Actor_ID</b> , Name)
CASTING:	( <b>Movie_ID</b> , <b>Actor_ID</b> , Ordinal_Position)

**Notes:**

- [1] Score refers to the average of all votes cast for the film (Internet users can votes for films on a scale of 1-10).
- [2] Votes refer to the number of votes cast for that film.
- [3] The ordinal position of an actor refers to the position of that actor in the cast list. The star of the movie will have an ordinal value of 1, the co-star will have a value of 2 and so on.

**Required:**

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

- (a) List all movies, which have at least 5000 votes.
- (b) List the titles and scores of the movies containing the word "Dog".
- (c) Obtain the cast list for the movie "Aliens".
- (d) How many films were made in Scandinavia?
- (e) What is the total and average number of votes cast for all movies?
- (f) What movies have the smallest and largest votes?

- (g) Generate popularity listing of all movies, ordered by the most to least popular, grouping by year.
- (h) Obtain a list of actors in descending order of number of starring roles.
- (i) List the actors who have worked with Sean Connery.
- (j) The score for "Pulp Fiction" has been amended from "5" to "8". Perform the relevant update.
- (k) A new movie "RiverRock", made in Ireland, with a Movie\_ID number 104, score 4, with no votes is shortly going to be released. Insert this new data.
- (l) Provide the SQL statement to create the Casting table.

**(25 Marks)**

## SECTION B

- Q2.**
- (i) What is meant by the term normalisation? State the rules for the different forms of normalisation.
  - (ii) Normalisation is often used to guarantee correctness in relational databases. Explain and illustrate how anomalies may arise in relations that are not normalised.
  - (iii) Indicate how the following document would be represented in a normalised relational database, outlining the steps involved clearly:

<b>INVOICE</b>					
<b><i>Outdoor Express Ltd.</i></b>					
<b><i>Galway.</i></b>					
<b><i>Telephone: 01- 456456</i></b>					
<b>Invoice No:</b>		987878		<b>Customer Number:</b> 3000	
<b>Invoice Date:</b>		9/1/99		<b>Customer Name:</b> Grand Hotel	
<b>Order No:</b>		50000012125		<b>Customer Address:</b> 3 Hunters Run, Dublin 4	
				<b>Telephone No.:</b> 01-4565456	
Quantity	Product Code	Product Description	Unit Cost	Discount	Net Cost
10	CH454	Garden Chairs	200	10%	180
11	TAB456	Garden Tables	400	15%	340
15	FLPT456	Flower Pots	500	10%	450
					970
VAT @ 21%					204
Total Cost:					1174

**(25 Marks)**

- Q3.** With respect to the design of relational databases, discuss the following issues (giving examples where appropriate):

- (a) One-to-One relationships
- (b) One-to-Many relationships
- (c) Many-to-Many relationships
- (d) Selection of Primary Keys
- (e) Selection of Data types
- (f) Entities, attributes and domains

**(25 Marks)**

- Q4.** (i) Write a short note describing the relational model, paying particular attention to the data structure and integrity constraints used.
- (ii) Discuss why Data Independence is a desirable property of a relational database.
- (iii) 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.

**(25 Marks)**

- Q5.** (i) Given the following requirements of a bank database system, create an ER model to represent the entities (and their attributes) and the relationships between them.

Investors in the ITC bank may hold several investment accounts where each account is associated with one of the society's high street branches. The investor may make withdrawals from an investment account or make payments into it at any of the society's branches. Details of the transaction, such as the date, amount, and so on are recorded. As well as investment accounts for investors, there are mortgage accounts. Likewise, each mortgage account is associated with one of the branches. Payments into a mortgage account may be made at any branch office. It is also possible to transfer funds directly from an investment account into a mortgage account.

(State any assumptions made)

- (ii) Write notes on each of the following:
- Concurrency Controls
  - Desirable properties of transactions

**(25 Marks)**

- Q6.** (i) In relation to the Internet, discuss the problems associated with

- Search engines
- DNS Names
- Information Overload

- (ii) What is meant by CGI? Explain your answer with appropriate examples.
- (iii) What is TCP/IP? Explain your answer with appropriate examples.
- (iv) Write the code for a HTML form that accepts order details from the user. These details should include: Name, Address, Telephone number, Quantity and Price.

Using the script of your choice ensure that the price field only accepts numeric data and gives a message box warning if the user has entered invalid data.

**(25 Marks)**