

OLLSCOIL NA hÉIREANN, GAILLIMH

National University of Ireland, Galway

Semester II Examinations, 1999/2000

Third Year Commerce Examination

PROGRAMMING LANGUAGES II (MS304)

Professor R. O'Callaghan

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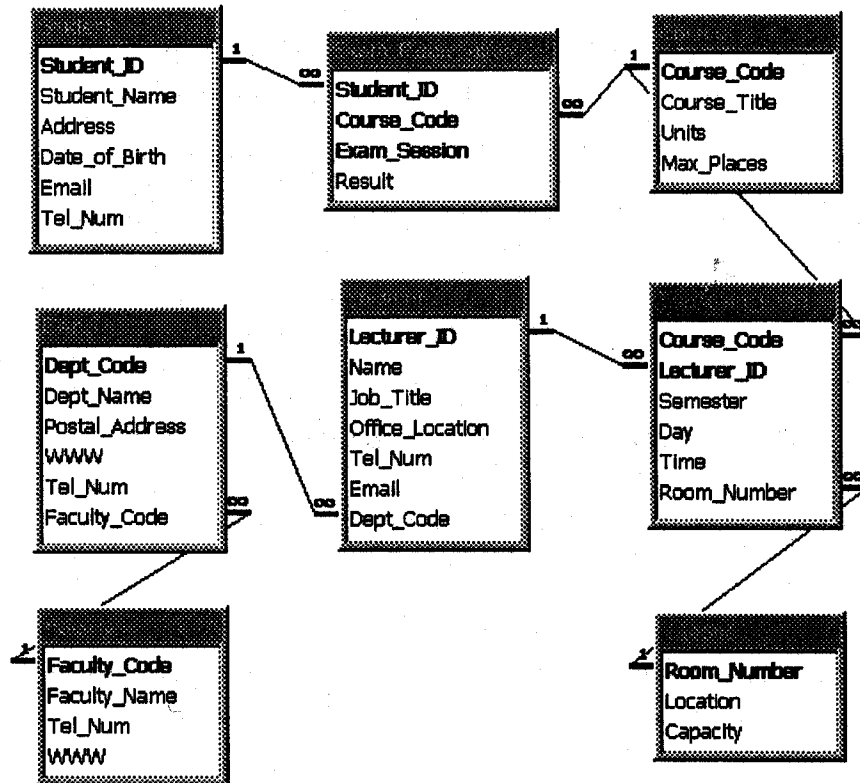
Mr. M. A. Lang

Time Allowed: TWO Hours

Answer **QUESTION THREE** and any other **TWO** questions

1. (a) An essential requirement of a database management system (DBMS) is that it should assure data integrity. Discuss this statement.
(18 marks)
- (b) Briefly describe how *entity integrity* and *referential integrity* may be implemented within Microsoft Access.
(8 marks)
2. (a) Describe the fundamental characteristics of the relational database model and the principal issues to be considered when designing a relational database.
(18 marks)
- (b) Briefly compare and contrast the relational database model with other database models.
(8 marks)

- /3. Given the following tables and relationships, you are required to provide the SQL commands necessary to execute the transactions (a) to (p) below. You may use ANSI SQL or Microsoft Access SQL where there are dialect variations. It is recommended that you clearly state any assumptions that you make.



- List the codes and titles of all courses where there is a restriction on places available; that is, the Max_Places field contains a value.
- List all details of all students who were born in 1980.
- List the full examination results (course code, course title, and result) of Stephen Hawkins, born March 20, 1978; from Corraun, Achill, County Mayo, for the Semester 2 1998/1999 examination session, ordered from best result to worst result.
- List the names of all Associate Professors in the Faculty of Arts.
- How many lectures does Isaac Newton from the Department of Mathematics give each week in Semester 1 ?
- What theatre has the largest capacity ?
- Produce a list, showing the department name and Web address for all departments that have Web sites, and the department name and postal address for those departments that do not have Web sites. [Hint: use a UNION operator]
- A scholarship is awarded to the student who attains the highest **combined** mark in Systems Analysis 1 (MS301) and Database Technologies (MS310). Who was awarded the scholarship on the basis of the Semester 1 1997/1998 examination session ? [Hint: base a query on a view]

- i) How many course **units** is Mary Kilroy (Student ID 96340012) taking in the Semester 1 1999/2000 examination session ?
- j) What was the average result for Multimedia & New Technologies (MS875) in Semester 1 1997/1998 ?
- k) Brian O'Callaghan, a lecturer in the Department of Electronic Engineering, suspects that some of his mail is being misdirected. Create a query which shows all pairs of staff with the same name. [Hint: use a self-join]
- l) Because of high levels of demand, it has been decided to restrict the number of places available in future on course MS905 to 80 students. Implement this policy.
- m) Helena Reilly (Lecturer ID 18031) has been promoted to College Lecturer. Update her record
- n) A new lecture theatre, AC206, has been built on the Arts Concourse with capacity of 120. Insert the new record.
- o) Tom Smyth from the Department of Geography has retired. Update the database accordingly.
- p) Reverse the effects of queries (m) to (o) above. Assume you are using an ANSI-SQL compliant multi-user database.

(48 marks)

4. (a) Describe the ANSI / ISO Transaction Processing Model and its popular variants.

(18 marks)

- (b) Outline the Two-Phase Commit (2PC) protocol and its implications for transaction processing in a distributed environment.

(8 marks)

5. (a) "The prolific expansion of information networks has amplified the need to implement data security provisions". Outline the primary concerns relating to data security, and illustrate how SQL commands may be used to enforce security.

(20 marks)

- (b) How may views be used to restrict unauthorised access to confidential data ?

(6 marks)