



الجامعة العربية المفتوحة  
Arab Open University

**Arab Open University  
Faculty of Computer Studies**

**Examination Paper  
and  
Marking Guide**

**Name/Section No.:** ..... / .....

**Student's ID:** .....

<b>Academic Year</b>	<b>2007/2008</b>
<b>Semester</b>	<b>Second</b>
<b>Course No.-Part</b>	<b>CS490</b>
<b>Course Name</b>	<b>Special Topics in Computer Science: Database Management Systems</b>
<b>Examination Type</b>	<b>Final</b>
<b>Form</b>	<b>B</b>
<b>Examination Date</b>	<b>11 June 2008</b>
<b>Examination Period</b>	<b>First</b>
<b>Allotted Time</b>	<b>120 Minutes</b>
<b>Number of Pages including this page</b>	<b>13</b>

## IMPORTANT INSTRUCTIONS

1) This Exam consists of 3 Parts

- Part I (25 marks) contains 25 True/False Questions.
- Part II (50 marks) contains 25 Multiple Choice Questions (MCQ).
- Part III (25 marks) contains 6 questions of which you choose any 5.

### معلومات هامة

(1) هذا الامتحان مكون من ثلاثة اجزاء:

- الجزء الاول (25 درجة) و يحتوى على 25 سؤال صواب/خطأ
- الجزء الثانى (50 درجة) و يحتوى على 25 سؤال متعدد الاختيارات
- الجزء الثالث (25 درجة) و يحتوى على 6 اسئلة تختار منها أى 5

Part No.	Part's Marks	Student's Mark	Tutor's Name and Signature
1	25		
2	50		
3	25		
<b>Total</b>	<b>100</b>		

**PART-I. Answer ALL the following 25 True/False Questions. Each question is worth 1 mark.**

1. The Object oriented database model is the most common database model in use today.
2. The purpose of class diagrams is to model the interrelationships between the different classes in the database.
3. Procedural code is often placed within forms and reports.
4. The inner query in a correlated nested query is evaluated only once.
5. It is possible to use a WHERE if the query contains a GROUP BY.
6. To include a title at the top of each page in a report, the required text would be placed in the page header.
7. A columnar Form presents a single record at a time.
8. All database forms should be bound to either a table or a query.
9. The developer can follow a specific set of procedures and rules to ensure that a table is in 1NF, 2NF and 3NF.
10. The relational database model is a navigational model requiring navigational commands to move from one table to another.
11. A table with non-atomic values can be in 1NF.
12. A limitation of the UPDATE operation is that it can only change one column at the same time.
13. Data triggers only activate after a value in a row is changed.

14. A limitation of database systems is that no application outside of the DBMS can gain access to the data.
15. Specifying a one (1) for the lower bound for the association multiplicity on a class diagram indicates that the item is required.
16. Using an IN operator is an alternative to using a group of OR clauses in a WHERE statement.
17. SQL provides visually oriented tools for developing applications.
18. To get subtotals for different grouped data, use the SQL GROUP BY and SUBTOTAL commands.
19. It is always possible to properly design a database and avoid using composite keys.
20. In a university database, the normal multiplicity for a relationship between courses and students would be many to many.
21. In procedural languages the developer specifies what is to be done and the system figures out how to do it.
22. Including the DISTINCT operator in a query will always result it less than or equal to the number of records returned when the DISTINCT operator is not used.
23. Database cursor is used to indicate your current position in a database.
24. Many to Many associations solve many problems in database designs.
25. There is no specific set of procedures and rules to ensure that a table is in DKNF.

**PART II. Answer ALL of the following 25 multiple choice questions. Each question is worth 2 marks.**

26. You would use this SQL command to remove a table and all its contents from the database schema?
- A) INDEX BY
  - B) DROP TABLE
  - C) SEQUENCE BY
  - D) GROUP BY
27. The Table T (A, B, C), where  $A \rightarrow B, C$  and  $B \rightarrow C$  is in
- A) 2NF
  - B) 3NF
  - C) 4NF
  - D) BCNF
28. A SQL keyword that is commonly used to answer questions involving some reference to 'every' item in a certain field (i.e., such a students that have taken every MIS class offered, or who has had every Accounting faculty for at least one class)?
- A) EXISTS
  - B) ALL
  - C) IN
  - D) EVERY
29. The process of defining and bundling all of the properties and functions into a class is called \_\_\_\_\_.
- A) encapsulation
  - B) inheritance
  - C) polymorphism
  - D) database design
30. The term for information that describes what type of data is available in a database is \_\_\_\_\_.
- A) index data
  - B) data dictionary
  - C) metadata
  - D) data repository

31. Which of the following is the most appropriate approach to automatically generate a purchase order when the inventory level drops to a predetermined level?
- A) Input mask
  - B) Data Trigger
  - C) Referential Integrity constraint
  - D) Database Cursor
32. Which SQL command is used to indicate how tables are to be linked together in a query?
- A) TABLES
  - B) GROUP
  - C) LINK
  - D) INNER JOIN
33. What is the SQL command to change the structural design of a table?
- A) CHANGE STRUCTURE
  - B) STRUCTURE
  - C) ALTER TABLE
  - D) MODIFY DATABASE
34. Which component of the database management system (DBMS) most affects the performance (speed)?
- A) Query Processor
  - B) Security Subsystem
  - C) Database Engine
  - D) Data Storage Subsystem
35. The ability to modify the data structure and not have to change the programs using that data is called \_\_\_\_\_.
- A) data independence
  - B) referential integrity
  - C) data dictionary
  - D) data integrity
36. A hidden dependency exists if \_\_\_\_\_.
- A) the defining and dependent columns are in different tables
  - B) there is no composite key defined
  - C) there is no foreign key defined
  - D) the dependency is not explicitly captured in a table

37. The modern database report writer \_\_\_\_\_.
- A) provides the tools for database designer to display information in the desired format
  - B) is a career path that focuses on creating, managing and supporting the reports generated from databases
  - C) provides the tools for the database administrator to monitor and report on database use and activity
  - D) provide limited control over how information is displayed and reported.
38. Which SQL clause is used to specify the tables used in the query?
- A) WHERE
  - B) TABLES
  - C) FROM
  - D) SOURCE
39. Why is it a good idea to use special associations when drawing class diagrams?
- A) Specialized tools are available to create these special associations.
  - B) They hide the detail concerning the database structure, making them easier to understand
  - C) It is necessary. It is impossible to draw some diagrams without using these special structures.
  - D) They convey more information about the underlying structure of the database, making them easier to understand.
40. What negative effect can triggers have on a database?
- A) Makes it more complicated for the end user
  - B) Since the execution order is only defined at run time, results can be unpredictable
  - C) They can create security holes if not done properly
  - D) Cascading triggers can slow down the database
41. Tables in second normal form (2NF) \_\_\_\_\_.
- A) have a composite key
  - B) have all non-key fields depend on the whole primary key
  - C) eliminate the possibility of a insertion anomalies
  - D) eliminate all hidden dependencies
42. A reflexive association is drawn using which symbol \_\_\_\_\_.
- A) small triangle at the end of a line connecting the aggregated item and multiple component items
  - B) small open diamond at the end of a line connecting two tables
  - C) small closed diamond at the end of a line connecting two tables
  - D) a line which loops back onto the same table

43. Which type of join would you use to join two tables based on one value in one table falling within a range of values from the second table rather than exact matches between the two tables?
- A) Outer Join
  - B) Reflexive Join
  - C) Range Join
  - D) Inequality Join
44. A table is in Boyce-Codd Normal Form (BCNF) if the table is in 3NF and \_\_\_\_\_.
- A) referential integrity is enforced
  - B) the table is indexed
  - C) no hidden dependencies exist between non-key fields and key fields
  - D) data integrity is enforced
45. Which of the following best illustrates the principle of consistency as related to transactions.
- A) The process by which Ann transfers money from her checking to saving account is the same as the process Bob uses to transfers money from his checking to saving account (where each use their own account numbers)
  - B) Access to the account balances using an ATM is always done in the same way
  - C) If no money is deposited or withdrawn from a no interest account, the balance today will be the same as the balance tomorrow.
  - D) The amount of money withdrawn from a checking account equal the amount transferred to the saving account
46. One approach used by databases to handle the differences in fonts used by different languages (i.e., English, Russian, Chinese, etc.) is the support of \_\_\_\_\_?
- A) UNIX
  - B) Unicode
  - C) ASCII
  - D) Perl
47. What role does the isolation level play in serialization?
- A) Deals with the connectivity of transaction to transaction
  - B) Deals with the referential integrity constraints imposed in the database
  - C) Determines which data elements must be protected to insure the integrity of the process
  - D) None of the above
48. Which SQL clause is used to specify the criteria for selecting records in the query?
- A) WHEN
  - B) WHERE
  - C) RULE
  - D) CONDITION

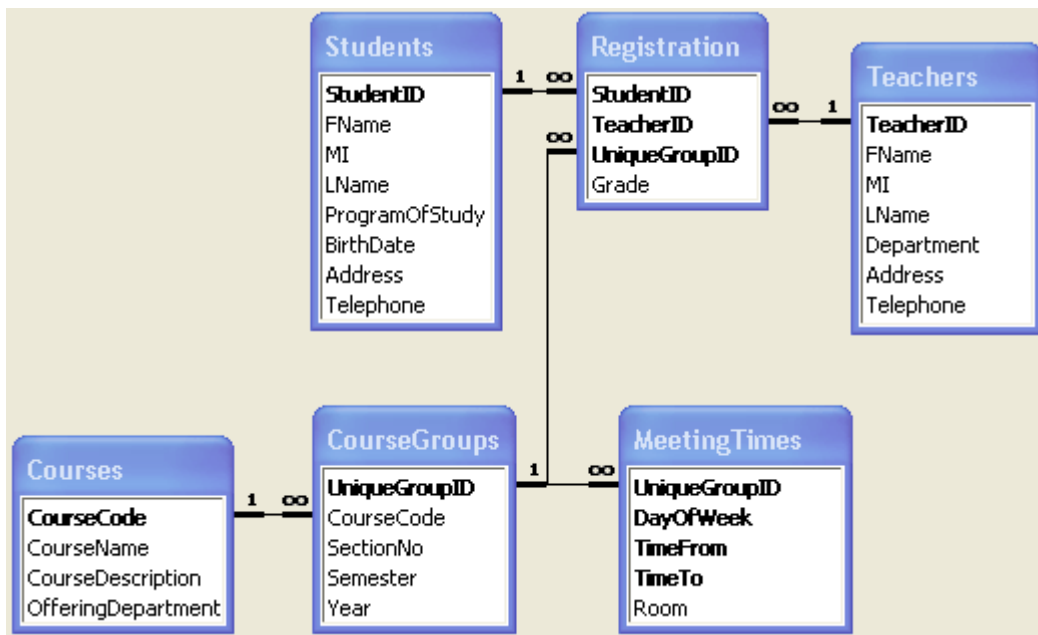
49. Assume you are creating a database to handle the data associated with instruction at a university. What is the most appropriate special association to model degree requirements (for example, required number of credit hours in general university requirements, specialty requirements, and electives)?
- A) reflexive association
  - B) composition association
  - C) generalization association
  - D) n-ary association
50. A key distinction between abstract data types and subtables is that \_\_\_\_\_.
- A) abstract data types aggregate multiple fields from the base table into a single column, while subtables will keep the fields in separate columns
  - B) abstract data types support the use of methods while subtables do not
  - C) subtables support inheritance and abstract data types do not
  - D) abstract data types support inheritance and subtables do not

**PART III. Answer ANY 5 of the following 6 questions. Each question is worth 5 marks.**

51. A restaurant owner wishes to computerize his operations. Currently, a paper-based form similar to the one below is being used. He also wishes to keep additional details about each of his employees, including ID, Name, Address, Phone, and Job start date. Show a Class diagram for this case, including an identification of all keys and all multiplicities.

<b>Meal Check</b>		
Order ID:		
Cashier	Server:	Number of Guests
Room:	Table No.:	
Date:	Start Time:	End Time:
Item	Quantity	Cost of Quantity Ordered
Subtotal		
Service Charge (10%)		
Order Total		

Use the following University registration database to answer questions 52-53:



In this database,

- \* Each **Course** is identified by a unique course code and has a course name, a course description and is offered by a single department.
- \* Each course may have multiple **Course Groups**. A course group has a unique ID across all courses, all semesters, and all years. Each a group of a course is also assigned a section number that is unique only within that single course offering.
- \* Each course group meets in certain rooms during certain times and days of the week. The **Meeting Times** table, therefore, includes the unique group id, along with the day of the week, the start time (TimeFrom), end time (TimeTo), and the room in which each meeting is scheduled to be held.
- \* **Students** are identified by a unique student ID, and have a first name, middle initial, last name, a single program of study, a birth date, an address and a telephone number.
- \* **Teachers**, are identified by a unique TeacherID, their department, and the other normal personal identifying information.
- \* Finally, the **Registration** information includes all the three ids of the associated student, teacher, and group, along with the grade obtained by the student in that course group.

52. Write a SQL query to find the the Ids and names of all students in the IT program who are over 25.

53. Write a SQL query to find the number of students in each program of study

Use the following to answer questions 54-56:

Consider the following suppliers-parts-projects database:

**Suppliers**(SID, SNAME, CITY, RATING)

**Parts**(PID, PNAME, COLOR, WEIGHT, CITY)

**Projects**(PROJID, JNAME, CITY)

**Shipments**(SID, PID, PROJID, QTY)

The **Supplier** relation contains a unique supplier ID, the supplier name, the city where the supplier is located, and a Rating from 1-10 indicating the quality of services provided by the supplier. The **Parts** relation contains a unique part number, the part name, its color, weight and the city in which the part is stored. The **Projects** relation contains a unique project number, a project name, and the city in which this project is located. The **Shipments** relation contains a unique combination of supplier number, part number, project number, together with the quantity of the shipment of the indicated part from the indicated supplier to the indicated project.

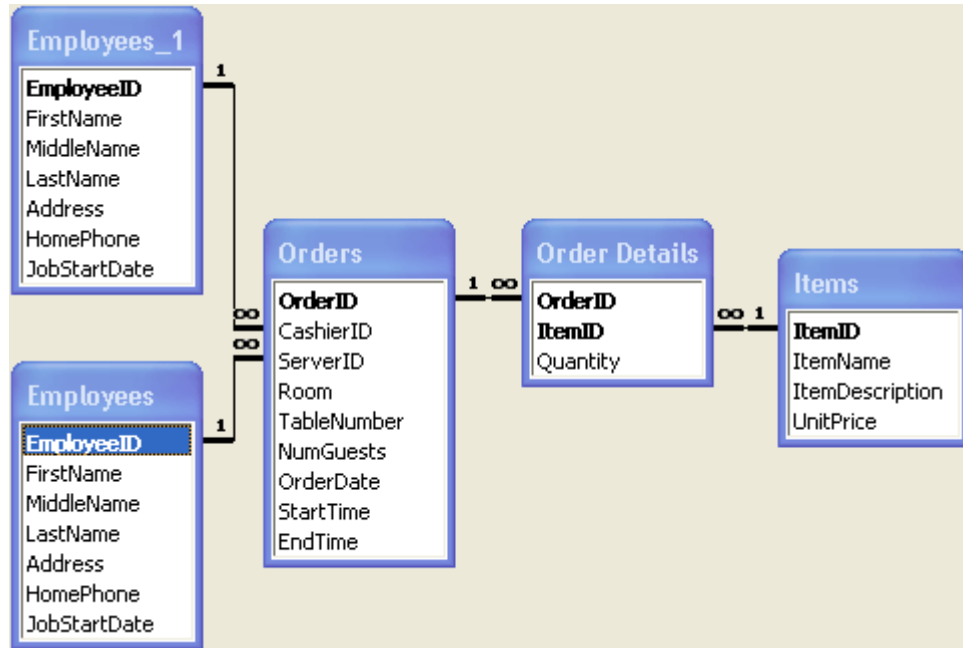
54. Write a SQL query to get all part numbers for all parts supplied (shipped) by more than one supplier
  
55. Write a SQL query to retrieve all parts not in the city of Beirut with weight greater than 10
  
56. Write an SQL query to get the total number of suppliers

**Answer Sheets**  
**CS490-Spring 2008 – Form B**

1.	False
2.	True
3.	True
4.	False
5.	True
6.	True
7.	True
8.	False
9.	True
10.	False
11.	False
12.	False
13.	False
14.	False
15.	True
16.	True
17.	False
18.	False
19.	False
20.	True
21.	False
22.	True
23.	False
24.	False
25.	True

26.	B
27.	A
28.	A
29.	A
30.	C
31.	B
32.	D
33.	C
34.	C
35.	A
36.	D
37.	A
38.	C
39.	D
40.	D
41.	B
42.	D
43.	D
44.	C
45.	D
46.	B
47.	C
48.	B
49.	B
50.	A

51.



52. SELECT Students.StudentID, Students.FName, Students.MI, Students.LName  
FROM Students  
WHERE (((Students.ProgramOfStudy)="IT") AND ((Year(Now())-  
Year([Students].[BirthDate]))>25));
53. SELECT Students.ProgramOfStudy, Count(Students.StudentID) AS  
CountOfStudentID  
FROM Students  
GROUP BY Students.ProgramOfStudy;
54. SELECT Shipments.PID  
FROM Shipments  
GROUP BY Shipments.PID  
HAVING COUNT(Shipments.SID) > 1;
55. SELECT \*  
FROM Parts  
WHERE Parts.CITY <> Beirut  
AND Parts.WEIGHT > 10;
56. SELECT COUNT(\*) AS NO\_OF\_SUPPLIERS  
FROM Suppliers;