UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 1999/2000

February 2000

CSI512 - Database Management Systems

Duration : [3 hours]

INSTRUCTION TO CANDIDATES:

- Please ensure that this examination paper contains **FIVE** questions in **FIVE** printed pages before you start the examination.
- Answer **ALL** questions.
- You can choose to answer either in Bahasa Malaysia or English.

ENGLISH VERSION OF THE QUESTION PAPER

1. (a) Database Management System (DBMS) was introduced to overcome some problems encountered in the file-based systems. How successful do you think is this effort today?

(5/100)

(b) Two important concepts on data were introduced with DBMS. They are data independence and data abstraction. How do these concepts influence the design of database system?

(10/100)

(c) It is important to understand the development life cycle of a system before you start a project on designing a database application program. How does your understanding of the database application life cycle helps you in your project?

(10/100)

(d) You have just been appointed as a database administrator to an organisation which is planning to purchase a DBMS software to manage its staff information system. What kind of challenges are you going to prepare for yourself?

(5/100)

2. (a) Represent each of the following scenario by an ER or EER model.

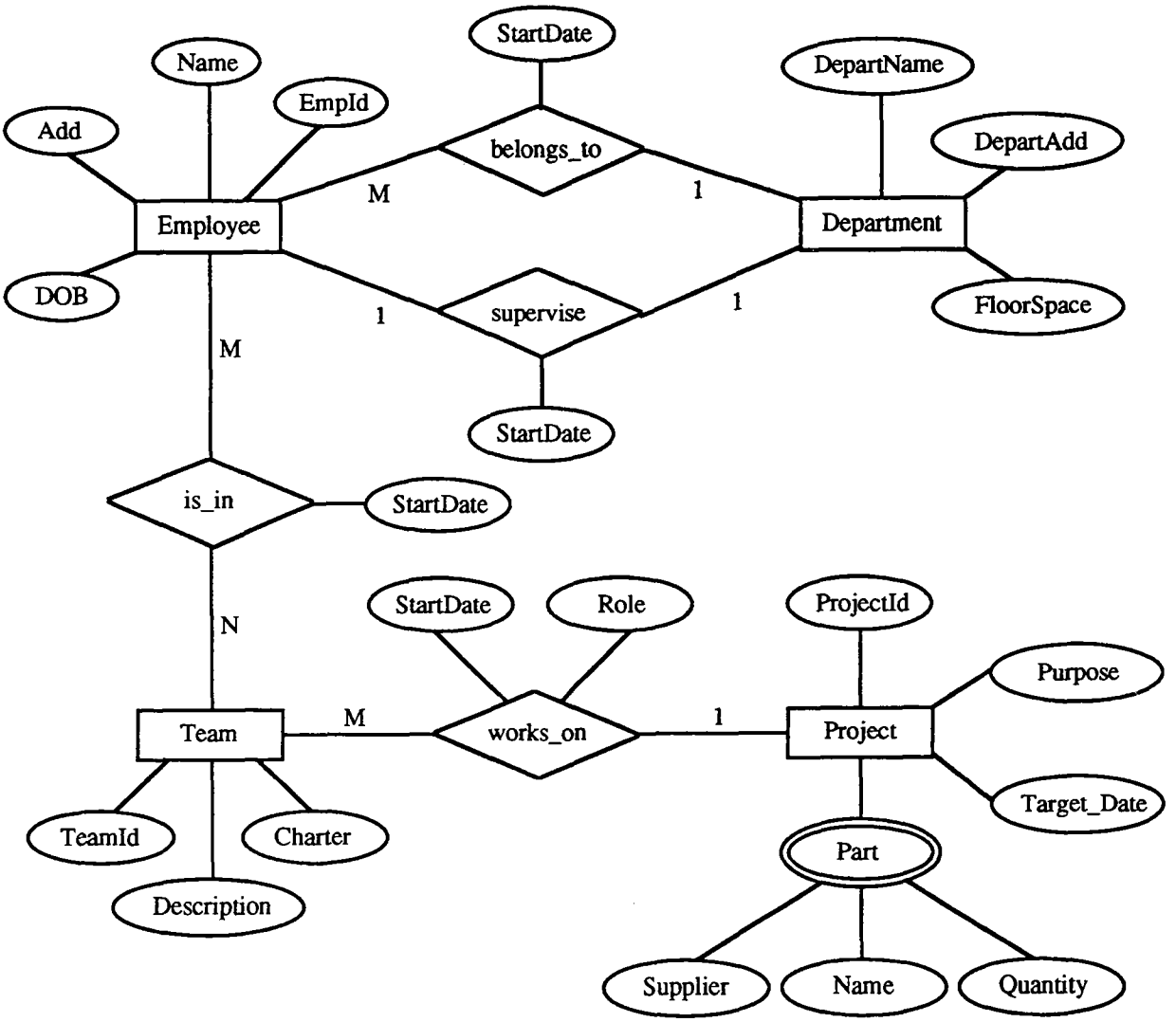
(i) An employee must open either a saving account or a checking account. A saving account pays a fixed interest rate while a checking account has an overdraft facility. A checking account holder can choose to apply or not to apply for a better service by having a gold account or a silver account or both. Each has different additional advantages.

(7/100)

(ii) A training centre has 5 instructors and offers several courses. Each instructor can teach a maximum of two courses but a course must be taught by only one instructor and can accommodate up to fifty trainees. Each trainee may take two to four courses per session. Each course should have at least five trainees in order to be offered.

(7/100)

(b) Given the following ER diagram, map it onto a relational model.



(6/100)

3. (a) Explain the importance of normalization in database design.

(5/100)

(b) A sales report of a company consists of the following particulars.

InvNo	-	invoice number
SaleDate	-	the date the sale is made
ProdCode	-	product code
ProdName	-	product name
VendCode	-	vendor code
VendName	-	vendor name
NoSold	-	number of product sold
Price	-	unit price of a product

Assuming that all particulars carry their normal meaning, design a good relational database scheme for the company's sales department. (It is important to show the dependency diagram and the resulting schema in each step of the normalization processes. You may assume BCNF as the target normal form).

(15/100)

4. Given a relational database schema for a banking enterprise as follows:

BRANCH (branch_name, branch_city, assets)
CUSTOMER (customer_name, customer_street, customer_city)
LOAN (branch_name, loan_no, amount)
BORROWER (customer_name, loan_no)
ACCOUNT (branch_name, account_no, balance)

(a) Write the following query in

(i) Relational Algebra

(ii) Tuple Relational Calculus

(iii) SQL

(iv) QBE

"List the names and addresses of customers who has some loans from a branch called 'Branch One'".

(6/100)

(b) Write the following query in SQL

(i) using the tupple variable

(ii) using subquery

"Find the names of all branches that have assets greater than at least one branch located in Kuala Lumpur"

(4/100)

(c) Write the following queries in SQL.

(i) List the name of all branches which has released some loans totalling more than its asset.

(3/100)

(ii) Create a view called BORROWER_DETAILS consisting of the names of the customers who took some loans, the loan amount and the name of the branch which released the loan.

(3/100)

(iii) Update the database scheme to reflect that a customer, Rafiq, has settled his loan recently. His loan number is L001. Since Rafiq settled his loan earlier than scheduled, he was given a bonus of RM500.00 deposited into his account.

(4/100)

5. (a) List three different types of threat that could affect a database system, and for each, describe the controls that you could use to counteract each of them.

(5/100)

(b) Discuss, with examples, the types of problem that can occur in a multiuser environment when concurrent access to the database is allowed.

(5/100)

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