UNIVERSITI SAINS MALAYSIA

UNIVERSITY COLLEGE SEDAYA INTERNATIONAL

First Semester Examination
Academic Session 2004/2005
October 2004

External Degree Programme
Bachelor of Pharmacy (Hons.)

CMM212 – Database Organisation and Design

Duration : 2 hours

INSTRUCTIONS TO CANDIDATES:

- Please ensure that this examination paper contains **THREE** questions in **FOUR** printed pages before you start the examination.

- Answer **ALL** questions.

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1. (a) Given the following relation:

STAFF (staffNo, IDNo, name, address, telephoneNo)

StaffNo and IDNo are unique and all other attributes carry the normal meanings.

Explain and give **one (1)** example for each of the following terms based on the given relation:

(i) Alternate key

(ii) Composite key

(iii) Multi-valued attribute

(iv) Super key

(40 marks)

(b) A study carried out in a departmental store for its database design yielded the following information.

There are various departments in the store. Each department has a departmental_code, name, room_no and person_incharge. One department sells many items. The details about the items like brand_name, cost_price, sale_price, batch_no and internal_item_number are to be stored in the database.

A unique number called internal_item_no is assigned to every item by the store. A supplier may supply up to ten items. Every item is supplied by only one supplier at a time. Database should have the supplier details like s_name, s_address, and s_telno.

A department has many employees. An employee can belong to at most one department. Employee's particulars like name, employee_no, tel_no, age, designation and address are to be stored. A Manager is an employee who may look after more than one department but a department may be looked after by only one manager. The number of employees working under each manager is stored. Sale representative and cashier are two other categories of employee working in the departmental store. Sale representatives are eligible for bonus payment based on the volume of sale that he/she has made in a year. A cashier is responsible for the amount collected from the cash register that he/she is appointed to. A cash register is identified by its number.

(i) Draw an ER diagram for the above scenario.

(40 marks)

(ii) Map the diagram obtained in 1(b)(i) to a relational schema. Underline the primary key and identify the foreign key (if any).

(20 marks)

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2. (a) The table below is a sample instance of a relation which shows the attributes that are involved in the grade report issued by USM.

StudentNo	Name	Major	Advisor	CourseCode	Title	LecturerName	LecturerOffice	Grade
P101	Ganesh	Computer Science	Kamarudin	CS111	Computer System	Sathy	K01	B
P101	Ganesh	Management	Fatimah	CS111	Computer System	Sathy	K01	A
P101	Ganesh	Management	Fatimah	M231	Finance	John	M30	B
L232	Rina	Art	Tan	S242	Oil Painting	Omar	S10	A

Assume that a student can take many courses and the same course can be taken under different majors. A student may have many advisors but can have only one advisor under a particular major. An advisor may advise in one major only. An instructor may teach many courses and has only one office but no team teaching (more than one instructor sharing a course) is allowed.

(Note: you may assume that *LecturerName* is unique.)

(i) Identify **two (2)** types of anomalies that occur in the above relation. Explain and give an example for each.

(20 marks)

(ii) List all functional dependencies that exist.

(10 marks)

(iii) Normalize the relation to BCNF. Explain every step that you have taken.

(40 marks)

(b) Why would we want to dynamically generate web pages from data held in the operational database? List **five (5)** general requirements for web-database integration.

(30 marks)

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3. (a) Pantai General Hospital has the following database scheme:

PATIENT (patientID, name, age, address, telephoneNo, dateAdmitted, dateDischarged)
PHYSICIAN (physicianID, physicianName, physicianPhone)
MEDICINE (medicineID, description)
ATTENDS (physicianId, patientID, treatment)
BILL (patientID, medicineID, charge)

Write the following queries in SQL.

(i) List all names of Malay male Physicians who have treated PatientID 1234. (Assume that all Malay male names contain the middle name "bin".)

(10 marks)

(ii) Display the medicine description which has the largest **charge** value.

(10 marks)

(iii) List the names of all patients who are treated by Dr. Roger or Dr. Kennedy in alphabetical order.

(15 marks)

(iv) List down the particulars of the patients who have stayed more than 10 days.
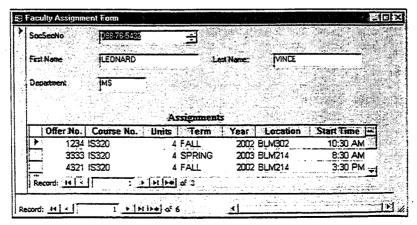
(10 marks)

(v) PatientID 5678 passed away a year ago and all his bills have been settled. Delete all records of this patient from the database.

(15 marks)

(b) Repeat 3(a)(i) and 3(a)(iii) above in QBE.

(20 marks)

(c) Given the Faculty Assignment Form in Access below, write the main form query and subform query:

	Offer No.	Course No.	Units	Term	Year	Location	Start Time
▶	1234	IS320	4	FALL	2002	BLM302	10:30 AM
	3333	IS320	4	SPRING	2003	BLM214	8:30 AM
	4321	IS320	4	FALL	2002	BLM214	3:30 PM

Example Faculty Assignment Form.

(20 marks)