KOLEJ UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2018/2019

APRIL/MAY EXAMINATION

COMPUTER SCIENCE BACS1053
DATABASE MANAGEMENT

WEDNESDAY, 24 APRIL 2019 TIME: 9.00 AM – 11.00 AM (2 HOURS)

BACHELOR OF INFORMATION SYSTEMS (HONOURS) IN ENTERPRISE INFORMATION SYSTEMS

BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN INTERNET TECHNOLOGY
BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN SOFTWARE SYSTEMS DEVELOPMENT

Instructions to Candidates:

Answer **ALL** questions. All questions carry equal marks.

BACS1053 DATABASE MANAGEMENT

Question 1

a) Explain any **THREE (3)** Database Management System (DBMS) functions that can ensure the integrity and security of the data stored in the database. (9 marks)

b) Recommend any **THREE (3)** features of database software security for online banking services. (9 marks)

c) Consider the following records in ItemA and ItemB tables:

ItemA

ItemCode	Name	SupplierNo
A011	Sharpener	S01
D002	Duster	S03
G003	Glue	S04

ItemB

ItemCode	Name	SupplierNo
B001	Battery	S02
D002	Duster	S03
G003	Glue	S04
R010	Ruler	S05

Produce a resulting data in table after each of the following relational **set** operations statement has been performed:

(i) Select * from ItemA *Union* Select * from ItemB (4 marks)

(ii) Select * from ItemA *Intersect* Select * from ItemB (3 marks)

[Total: 25 marks]

Question 2

a) Describe any **TWO (2)** importance of data dictionary in a database management system. (6 marks)

b) Unit4Rent.com site allows a property owner (landlord) to rent out their unit of apartment easily. A landlord may rent out zero or many units of apartment. The units can be rented by one or many landlords. The attributes of landlord are landlordIC, name, contactNo and address. The attributes of unit are UnitNo, BlockName, FloorNo and SquareFeet. The landlord decides a monthly rental and deposit as rental fee for each rented unit. An e-contract of the rented unit will be generated and signed by at least one tenant, the attributes of e-contract includes contractNo, duration and signedDate, whereas the attributes for tenant are TenantIC, TenantName, Nationality and ContactNo.

(i) Draw an Entity-Relationship Diagram (ERD) for the above scenario using the *Crow's Foot notation*. Resolve many-to-many relationships, if any. (11 marks)

(ii) For each of the entities in the ERD drawn in Question 2 b) (i), list all relevant attributes using Database Design Language (DBDL) format. In your listing, show all the primary keys and foreign keys (if any) clearly. Underline all the primary keys or composite keys and identify the foreign keys with an *. (8 marks)

[Total: 25 marks]

Question 3

Castrol Service Centre located at 3 different branches to provide car services to its customers. A sample of service details is shown as below:

Service table:

NRIC	Owner	Contact No	Vehicle No	Vehicle Model	Mileage (KM)	Charge (RM)	Service Date	Code	Centre Name	Worker Name
760321145310	Eric	0122850668	WDH 6318	Honda City	90,000	399.00	02/02/18	SP	Setapak	Ahmad
760321145310	Eric	0122850668	WHD 6818	Toyota Vios	88,000	466.00	08/10/18	SP	Setapak	Zamal
800311145322	Betty	0136684321	WNA 9599	Perduo Myvi	55,000	250.00	05/06/18	WM	Wangsa Maju	Rahim
701208135210	Anne	0123850011	WSS 9269	Nissan Sentra	160,000	455.00	11/02/18	SL	Sentul	Zahir
701208135210	Anne	0123850011	WSS 9269	Nissan Sentra	100,000	333.00	18/11/18	SL	Sentul	Adin
660518145177	Jenny	0119898765	WTT 8814	Proton Waja	150,000	210.00	28/04/18	SL	Sentul	Zahir
730818145288	David	0165431567	WZA 5674	Honda BRV	70,000	388.00	16/12/18	SP	Setapak	Ahmad

a) Based on the sample data shown in the Service table above, provide each of the following data anomalies with a specific example:

(i) Insertion anomaly (3 marks)

(ii) Modification anomaly (3 marks)

(iii) Deletion anomaly (3 marks)

b) Normalize the Service table above to a set of Third Normal Form (3NF) relations. Your answer should show all the three stages of normalization (1NF, 2NF and 3NF) by using the DBDL format (underline all the primary keys and use an * to indicate the foreign keys). State the components which have been removed from each Normal Form, and indicate all partial dependencies and transitive dependencies, if any. (12 marks)

c) Explain the following functional dependencies in the normalization:

(i) Partial dependency (2 marks)

(ii) Transitive dependency (2 marks)

[Total: 25 marks]

BACS1053 DATABASE MANAGEMENT

Question 4

The Subject Registration System allows students to register for an elective subject prior to the commencement of a semester.

Given the Database Design Language (DBDL) as follow:

Student (studentID, studName, NRIC, address, contact, status)
Registration (studentID*, subjectCode*, registerDate)
Subject (subjectCode, subjName, prerequisite, creditHour, tutorID*)
Tutor (tutorID, tutorName, salary, qualification, yearExperience, departmentName)

Note: Date format *is* 'DD-MMM-YYYY'
You are required to use the aliases for the given tables as follow (where appropriate):
S for Student, J for Subject, R for Registration, T for Tutor

a) Create the **Registration** table with the following constraints: (6 marks)
- Appropriate data types
- Enforce entity and referential integrities
- Register date should be before '31-Oct-2018'

b) For each department, calculate the number of tutors who have a 'Phd' qualification. Label the column as 'Total Phd'. (4 marks)

c) Display the subject code, subject name and tutor name who are teaching the subject code BACS1053, BACS2053 and BACS2063. (5 marks)

d) A salary increment of 5% for tutors who have at least 2 years of working experience with 'Master' qualification. (4 marks)

e) For each subject, display number of students who have registered for the same subjects in the month of October 2018, sorted by subject code. Label the column as 'Total Students'. (6 marks)

[Total: 25 marks]