KOLEJ UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2019/2020

APRIL/MAY E-ASSESSMENT

COMPUTER SCIENCE BACS1053
DATABASE MANAGEMENT

THURSDAY, 30 APRIL 2020 **TIME: 9.00 AM – 1.00 PM (4 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 in the requested format or the template provided.
- Include your **FULL NAME**, **STUDENT ID** and **PROGRAMME OF STUDY** in your submission of answer.
- This is an open book e-assessment but you **MUST NOT** receive any help whatsoever from any other person.
- Read all the questions carefully and understand what you are being asked to answer.
- You must submit your answer within the time frame allotted for the e-assessment.
- Marks are awarded for your own (original) analysis. Therefore, use the time and information to build well-constructed answers.
- Students who have submitted late beyond the allocated time for e-assessment, you are required to email to focs@tarc.edu.my to explain the reason(s) they submitted their answers late with strong justification. Students' answers may not be accepted and assessed for those who submitted late unless with extenuating circumstances
- Any late submission after the stipulated time frame or no submission, it is deemed to fail the e-assessment. [Note: For candidates who have problems completing the e-assessment (ie did not submit or attempt the e-assessment at all), please email to examination@tarc.edu.my with supporting documents to apply for "I" indicator under Extenuating Mitigating Circumstances (EMC) situation by 12 May 2020]

Declaration by candidates:

By submitting this e-assessment, I declare that this submitted work is free from all forms of plagiarism and for all intents and purposes is my own properly derived work. I understand that I have to bear the consequences if I fail to do so.

BACS1053 DATABASE MANAGEMENT

Question 1

a) GrabOrder (GO) Shop uses a database system to keep track of the food ordering and delivery transactions of its customers which are located in Selangor and Kuala Lumpur. You as a database consultant of GO shop, are required to recommend any **FOUR (4)** components needed in the database system environment. Justify your explanation for the recommended components. (8 marks)

b) Consider the following records in **Student** and **SubjectGrade** tables:

Student

StudentID	Name
S1001	Wilson
S1002	Peter
S1003	Clare
S1004	Amy

SubjectGrade

SubjectID	Title	Grade	StudentID
D001	Database	A	S1001
C002	Computer	B	S1002
P004	Programming	A	S1003
M005	Mathematic	C	S1011

(i) Produce a resulting table with data after each of the following **relational join** operations has been performed:

- Student *Left Outer Join* SubjectGrade (4 marks)
- Student *Right Outer Join* SubjectGrade (4 marks)

(ii) Consider the 2 Structured Query Language (SQL) statements shown below:

SQL statement 1:

```
CREATE VIEW GradeView AS
    SELECT SubjectID,Title,Grade
    FROM SubjectGrade
    WHERE StudentID = 'S1002';
```

SQL statement 2:

```
CREATE VIEW GradeView AS
    SELECT SubjectID,Title,Grade
    FROM SubjectGrade
    WHERE StudentID = 'S1002'
    WITH CHECK OPTION;
```

Evaluate the efficiency of the 2 SQL statements above using Data Manipulation Language (DML) operations. Specify which one is more efficient. Justify your answer with an example. (9 marks)

[Total: 25 marks]

BACS1053 DATABASE MANAGEMENT

Question 2

Central Bank has decided to store information about the applicants and loan applications in a database. Each bank provides one or many personal loan packages to their existing customers. The bank entity consists of attributes bankCode, name and hotlineNo. Each bank may have one or many branches at different location. The attributes of branch are branchCode, address and country. A customer may or may not apply for any personal loan package. The customer entity consists of attributes ICNo, customerName, and contactNo. Some personal loan packages may or may not have any application from customers. The loan application will be recorded with the dateApplied and status. The personal loan package entity consists of attributes loanPackageNo, bankCode, interestRate and loanAmount.

a) Draw an Entity-Relationship Diagram (ERD) for the above scenario using the *Crow's Foot notation* (*exclude all attributes*). Resolve many-to-many relationships, if any. (14 marks)

b) For each of the entities in the ERD drawn in Question 2 a), list all relevant attributes using Database Design Language (DBDL) format. In your listing, show all the primary keys, composite keys and foreign keys (if any) clearly. Underline all the primary keys or composite keys and identify the foreign keys with an *. (11 marks)

[Total: 25 marks]

Question 3

a) Normalize table 1 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 Database Design Language format (underline all primary keys, composite keys and use an * to indicate the foreign keys). State the component(s) that is/are removed from each Normal Form. Besides that, 1NF must be divided into repeating and non-repeating group relations.

Table 1 shows the details of HealthcareCentre

CustNo	CustName	CustContact	CustTypeID	TypeDesc	TreatID	TreatDesc	TreatDate	TreatTime
C1003	Yee Si Go	012-22552255	CT01	VIP	T001	Electronic Chair	08/01/2020	35
C1004	Ai Li Lim	012-33882288	CT02	Normal	T001	Electronic Chair	08/01/2020	30
C1004	Ai Li Lim	012-33882288	CT02	Normal	T002	Foot Massage	08/01/2020	65
C1005	Ellen Tan	012-55335533	CT01	VIP	T002	Foot Massage	08/01/2020	75
C1003	Yee Si Go	012-22552255	CT01	VIP	T001	Electronic Chair	09/01/2020	40
C1004	Ai Li Lim	012-33882288	CT02	Normal	T002	Foot Massage	09/01/2020	70
C1007	Alice Lee	012-77337733	CT01	VIP	T003	Body Slimming	09/01/2020	55

Table 1: HealthcareCentre

Note: Healthcare Center provides two free treatments daily for each customer. Each treatment time (in minutes) is recorded.

(16 marks)

Question 3 (Continued)

b) Based on the sample data shown in the HealthcareCenter 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)

[Total: 25 marks]

Question 4

The Sunflower Pet Clinic records all pets' treatments.
Given the Database Design Language (DBDL) as follow:

Owner (OwnerID, OwnerName, OwnerAddress, OwnerContact)
Pet (PetID, PetName, PetCategory, OwnerID*)
Visitation (VisitID, VisitDate, PetID*)
ChargeTreatment (VisitID*, TreatID*, Charge)
Treatment (TreatID, TreatDesc)

Note: Date format is 'DD/MM/YYYY'
You are required to use the aliases for the given tables as follow (where appropriate)

- O for owner, P for pet, V for visitation, T for treatment, C for chargeTreatment

Write a Structured Query Language (SQL) statement for each of the following questions:

a) Create the **ChargeTreatment** table with the following constraints: (7 marks)
- Appropriate data types
- Enforce entity and referential integrities

b) Refer to the following details and insert a *new pet record*:
Pet ID – 'P1355552'
Pet Name – 'Wong Choi'
Pet Category – 'Dog'
Owner ID – 'OW223311' (2 marks)

c) Update owner with ownerID 'OW778833', his contact number to '012-4488222'. (3 marks)

d) List out all dog details that visit within the month of January 2020. (4 marks)

e) For each owner (include owner name and contact), calculate the total amount of treatment charges they have paid for their pets within the year 2019 which is more than RM2500.00. Arrange the total amount of treatment charge in descending order. (9 marks)

[Total: 25 marks]