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SOUTH EASTERN UNIVERSITY OF SRI LANKA
FACULTY OF TECHNOLOGY
DEPARTMENT OF INFORMATION & COMMUNICATION
TECHNOLOGY
BACHELOR OF INFORMATION & COMMUNICATION TECHNOLOGY
FIRST EXAMINATION SEMESTER I - SEP/OCT 2018
CIS-11022 DATABASE DESIGN

Answer **ALL** Questions

Time allowed: **TWO (02) Hours**

- 1 a) Define the following terms:
- a. Data
 - b. Information
 - c. Data warehouse
 - d. Database
- (20 Marks)
- b) Explain followings with suitable examples:
- i. Data definition language
 - ii. Data manipulation language
- (20 Marks)
- c) What are the benefits of a database management system over a manual system? Provide five (05) examples
- (30 Marks)
- d) Explain the three tier architecture of DBMS with a clear illustration along with the mappings.
- (30 Marks)

[Total 100 Marks]

- 2 a) Define the following terms:
- a. Domain
 - b. Weak entity
 - c. Attributes
 - d. Relationship
- (20 Marks)
- b) Raki Records has decided to store information about musicians who perform on its albums (as well as other company data) in a database. The company has wisely chosen to hire you as a database designer. Each musician that records at Raki has an SSN, a name, an address, and a phone number. Poorly paid musicians often share the same address, and no address has more than one phone. Each instrument that is used in songs recorded at Raki has a name (e.g., guitar, synthesizer, flute) and a musical key (e.g., C, B-flat, E-flat). Each album that is recorded on the Raki label has a title, a copyright date, a format (e.g., CD or MC), and an album identifier. Each song recorded at Raki has a title and an author. Each musician may play several instruments, and a given instrument may be played by several musicians. Each album has a number of songs on it, but no song may appear on more than one album. Each song is performed by one or more musicians, and a musician may perform a number of songs. Each album has exactly one musician who acts as its producer. A musician may produce several albums, of course.

(80 Marks)

Design and draw an ER diagram based on above scenario that captures the information about the Raki Records by identifying entities, relationships, cardinality ratio and attributes. Be sure to indicate any key and participation constraints and state any assumption you made.

[Total 100 Marks]

3 a) Define the following terms:

- Relation schema
- Tuple
- Relation instance
- Relation cardinality

(20 Marks)

b) What is the difference between a candidate key and the primary key for a given relation? What is a super key? Briefly explain with suitable arguments.

(25 Marks)

c) What is a foreign key constraint? What is referential integrity? Briefly explain with suitable arguments.

(25 Marks)

d)

pet_id	pet_name	pet_type	pet_age	owner	visit_date	Procedure_no	Procedure_name
246	Rover	Dog	12	Sam Cook	Jan 13/2002	01	Rabies Vaccination
					Mar 27/2002	10	Examine & Treat Wound
					Apr 02/2002	05	Heart Worm Test
298	Spot	Dog	2	Terry Kim	Jan 21/2002	08	Tetanus Vaccination
					Mar 10/2002	05	Heart Worm Test
341	Morris	Cat	4	Sam Cook	Jan 23/2001	01	Rabies Vaccination
					Jan 13/2002	01	Rabies Vaccination
519	Tweedy	Bird	2	Terry Kim	Apr 30/2002	20	Annual Check Up
					Apr 30/2002	12	Eye Wash

Convert the above table in to third normal form (3NF).

(30 Marks)

[Total 100 Marks]

4 a) Consider the following schema and answer the questions given below using relational algebraic notations.

student (id , name)
 entrolledIn (id , code)
 subject (code , lecturer)

- What are the names of the students enrolled in CS3020?
- Which subjects is "Hecktor" taking?
- Who teaches CS1500 or CS3020?
- What are the names of all the students?
- What are the names of the students taking a subject taught by "Rogar"?

(50 Marks)

- b) Answer the following questions using SQL statements by referring the following relational schema. Note that the keys of the relations are underlined.

Student (Name, Student_No, Class, Major)

Course (Course_name, Course_No, Credits, Department)

Section (Section_ID, Course_number, Semester, Year, Instructor)

Grade_report (Student_Num, Section_ID, Grade)

- i. Insert a new course

{‘Discrete Mathematics’, ‘MAT4390’, 3, ‘MATH’} to the relation ‘COURSE’

- ii. Retrieve the names of all the students who are majoring in ‘CS’

- iii. Retrieve the total number of credits offered by each of the Department

- iv. Retrieve the names of all the courses with their credits taught by the instructor ‘Anderson’ in the year 2017

- v. Retrieve the Student_No and transcript of each of the student. A transcript includes course name, course number, credits, semester, year, and grade for each course completed by the student.

(50 Marks)

[Total 100 Marks]