COIT20247 - Database Design & Development
Tutorial – Logical design (Relational model)

Theory questions

Answer each of the questions below. You should be able to answer most of these questions within about 3 to 5 sentences. Refer to the lecture slides to find the important points about each of these questions. Keep to the point and be sure to *answer the question that has been asked*. For example, if you are asked "What is the definition of a database?" then explain the important concepts in the definition a database; **don't** say how wonderful databases are.

1. Describe what is meant by **logical design**.

2. Define what is meant by a **relation.** Is a table the same thing as a relation?

3. What **properties** must a table satisfy in order for it to be considered a relation? (Hint: what are the six properties of a relation?)

4. Does the following table satisfy the requirements of a relation? Why or why not?

StudentID	Name	DateOfBirth	Course	Grade
S0000001	Rakesh Singh	5/5/1985	COIS20026	C
			COIS20025	D
S0000002	Bruce Li	4/9/1978	COIS20026	HD
S0000003	Eric Jones	21/11/1990	COIS20007	P
			COIS20026	D

5. Does the following table satisfy the requirements of a relation? Why or why not?

CustomerID	CustomerName	OrderDetails
C001	Fred Smith	Order #1, 11/2/09, $250 Order #3, 12/2/09, $195
C002	Bruce Li	Order #2, 12/2/09, $120 Order #4 ,13/2/09, $55 Order #5, 15/2/09, $400

6. What are the **three components** of the relational model? Briefly describe (1 or 2 sentences) each component.

7. What is the difference between a relation and a relationship?

8. Define what is meant by **attribute** and **tuple**. What are the informal names for attribute and tuple?

9. What is the difference between a null, a zero, a space, and an empty string?

10. Define what is meant by **candidate key**, **primary key** and **alternate key**. What is the difference between a primary key and an alternate key?

11. The table below lists students at a university. The primary key is StudentID. What is wrong?

StudentID	Name	DateOfBirth
S0000001	Rakesh Singh	5/5/1985
S0000002	Bruce Li	4/9/1978
S0000003	Eric Jones	21/11/1990
S0000003	Fred Smith	8/12/1980

12. Define what is meant by **foreign key**. What is the *purpose* of a foreign key?

13. Define what is meant by a **composite key**.

14. Name three major types of integrity constraints specified by the Relational Model.

15. Describe what is meant by a **domain constraint** and give an example.

16. What is the **entity integrity rule**? (Note: sometimes called "entity integrity *constraint*".)

17. What is the **referential integrity rule**? (Note: sometimes called "referential integrity constraint".)

18. Using the tables given below, describe what is meant by referential integrity. That is, values are allowed/forbidden in what columns and why? Assuming that referential integrity is enforced, are there any illegal values in these tables?

COURSE

CourseID	CourseName
COIS20026	Database development & management
COIS20025	Systems Management Overview

STUDENT

StudentID	Name	DateOfBirth
S0000001	Rakesh Singh	5/5/1985
S0000002	Bruce Li	4/9/1978
S0000003	Eric Jones	21/11/1990

ENROLMENT

StudentID	*CourseID*
S0000001	COIS20026
S0000001	COIS20025
S0000002	COIS20026
S0000003	COIS20007
S0000003	COIS20026

Note:
Foreign Key (Enrolment.StudentID) references Student
Foreign Key (Enrolment.CourseID) references Course