Databases

December 2015

Sample Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 3 hours

The maximum mark for this paper is 100.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

Marks

Question 1

a) Identify FIVE (5) ways in which a large educational institution such as a university might use data. **5**

b) Explain what *metadata* means **and** provide THREE (3) examples of metadata from the systems you identified in part (a). **5**

Total: 10 Marks

Question 2

An online restaurant booking system allows customers to make a reservation for a table. A table might be reserved by many customers over a period of time.

a) Draw an entity-relationship (ER) diagram for this scenario. **5**

b) Identify attributes, including primary and foreign keys, for this ER model. **5**

Total: 10 Marks

Question continue on next page

Question 3

Consider the following relational model. In a property management company a branch has many staff members who manage properties, but not every property must be managed by someone.
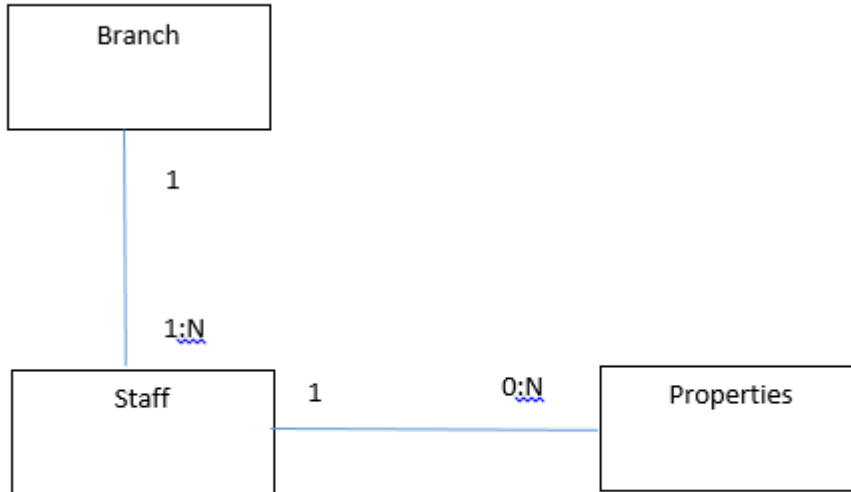
a) This model is an example of a *chasm trap*. Explain what a chasm trap is.	**3**
b) How might this problem be resolved in the scenario shown?	**2**
c) Define the term *tuple*.	**1**
d) Explain what is meant by *cardinality* in the relational model **and** give THREE (3) examples.	**4**

Total: 10 Marks

Question 4

a) Explain the term *relation*.	**5**
b) What is meant by the term *data independence* in the context of relational databases?	**5**

Total: 10 Marks

Question continue on next page

Question 5

a) List FOUR (4) data manipulation commands in SQL. **4**

b) In what ways can SQL be used to enforce domains? **2**

c) What issue with the CHAR data type does the use of the VARCHAR data type overcome? **2**

d) Explain how SQL does not support the full relational model. **2**

Total: 10 Marks

Question 6

The table below is associated with customers and the products they have purchased. **10**

Customer ID	Customer Name	Products Purchased	Product Type Code	Product Type Description
C1	Danny Whybrow	Lawnmower	G	Gardening
		Rake	G	Gardening
		Microwave Oven	K	Kitchen
C2	Anderson Smith	Saucepan Set	K	Kitchen
C3	Tommy West	Chrome Book	T	Technology
C6	Charun Singh	Lawnmower	G	Gardening

Split the table into FOUR (4) third normal form (3NF) relations. You do not have to show data or the steps that you took to normalise the table.

Total: 10 Marks

Question 7

a) Explain the role that prototyping can play in systems development. **4**

b) Identify SIX (6) activities that could be involved in physical database design. **6**

Total: 10 Marks

Question continue on next page

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Question 8

a) What activities need to be carried out during database design to understand how transactions will interact with the database? **6**

b) What is meant by the term *performance* with regard to data manipulation statements? **2**

c) Suggest TWO (2) ways in which a database developer might increase the performance of database transactions. **2**

Total: 10 Marks

Question 9

Consider the following tables for a vehicle hire company that operates largely online and needs to keep a record of its customers and rentals.

Customer ID	Customer Name	Address
232	Donald Smith	55 Treetop Avenue, London, N1
345	Mandy Jackson	101 Tops Road, London, SE15
123	Tamara O'Toole	99 Ustinov Road, London, N1

CUSTOMERS

Vehicle ID	Name
1	Ford Transit Van
2	VW Utility Van
3	VW Camper

VEHICLES

| Customer ID	Vehicle ID	Rental Start Date	Rental End Date
232	1	01/01/2015	06/01/2015
232	1	09/06/2015	10/06/2015
123	3	01/01/2015	30/01/2015

RENTALS

a) Write the SQL statements to create the above tables. **5**

b) Write an SQL statement to change the name of the vehicle 'VW Camper' to 'VW Luxury Camper'. **3**

c) Write an SQL statement to delete Donald Smith as a customer. **2**

Total: 10 Marks

Question continue on next page

Question 10

Consider the entity-relationship (ER) diagram shown below for an events management company.
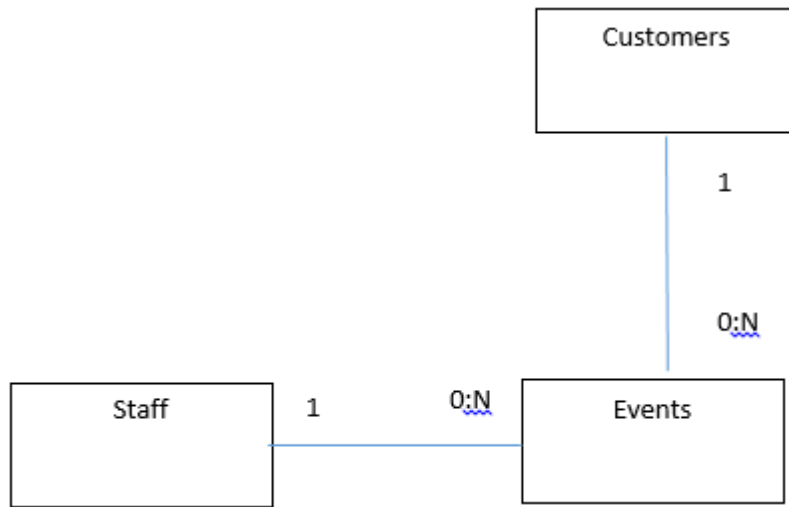
a) Create a CRUD matrix to show the following transactions: **4**

Transaction 1 – add a new event
Transaction 2 – delete a customer
Transaction 3 – record an event
Transaction 4 – show a list of events and the staff and customers they are for

b) Identify and explain the FOUR (4) basic properties of a transaction. **4**

c) What are the concerns of the concept of *authorisation* with regard to transactions in a relational database? **2**

Total: 10 Marks

End of Examination Paper