UNIVERSITY EXAMINATIONS: 2013/2014

ORDINARY EXAMINATION FOR THE BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BIT 2104 DATABASE DESIGN AND DEVELOPMENT

DATE: AUGUST, 2014   **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other TWO

QUESTION ONE [30 MARKS]

i).   A research organization is in the process of developing an application that keeps information about studies done over a period of time. In this proposed system there are several data collection tools e.g. questionnaire, interview e.t.c. Each tool can be administered to several respondents but a respondent will only be given one tool. Each tool consists of several questions of different types but a given question belongs to one and only one tool. As a result there are several responses for the same question but only one response from the same respondent for a particular question. The study is described by studyId, sample_size and area of study. The research tool is described by toolID and tool name. The respondent is described by respondent ID, gender and age. The questions are described by question id and description. Finally, the response is described by response Id and details.

Required: Produce a logical data model for this case using chen's notation.

[9 Marks]

ii).   Differentiate between a distributed database (DDB) and a distributed database management system (DDBMS).

[4 Marks]

iii). Differentiate between horizontal and vertical fragmentation as used in a distributed database

[4 Marks]

iv).   Define object as used in object oriented database systems.

[2 Marks]

v).   State any three characteristics of objects in an object oriented database.

[3 Marks]

vi).   Define mobile database and give any applications of mobile databases.

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vii).   Data management is a discipline that focuses on proper generation, storage and retrieval of data. Outline any four data management issues.

[4 Marks]

QUESTION TWO [20 MARKS]

a) A database design and development team for a hospital patient system have identified two important entity types and during their modeling they have come up with the schema below:

PATIENT->(PatientID, PatientName, PatientGender,PatientAge)

DOCTOR->(DoctorID, DoctorName, Department)

You been tasked with the responsibility of normalizing this design to third normal form and producing a logical data model using crow's foot notation.   [10 Marks]

b) Describe any three functions of a database administrator (DBA).

[6 Marks]

c) End users are people whose jobs require access to the database for querying, updating and generating reports. The database basically exists because of the end user. Describe four types of end users highlighting main activities for each.

[4 Marks]

QUESTION THREE [20 MARKS]

a) Describe three advantages and three disadvantages of object oriented database management systems (ODBMS).   [6 Marks]

b) Discuss any four structural components of a database management system (DBMS).

[8 Marks]

c) Describe the term database replication and state its importance.

[6 Marks]

QUESTION FOUR [20 MARKS]

a) Discuss three main types of actions involving a database.   [9 Marks]
b) Outline any four applications of advanced databases.   [4 Marks]

c) Explain the difference between object oriented data model(OODM) and object oriented database (OODB).   [3 Marks]

d) When developing a database application, developers are required to develop application that can access and used the database. Consequently, coding is required. Discuss any four best practices followed when coding a database application.

[4 Marks]

QUESTION FIVE [20 MARKS]

a) Describe the difference between a database state and database schema.

[4 Marks]

b) Database tuning is the process of modifying the actual database which encompasses the allocated memory, disk usage, CPU, I/O and underlying database processes as well as modification of database architecture to optimize the use of the hardware resources available. In this regard discuss three advantages of database tuning.

[6 Marks]

c) Database security refers to the process of protecting the database against unauthorized access to or modification of the database, denial of service to authorized users and provision of service to authorized users. Any security measure must address three key characteristics. Discuss these characteristics.   [6 Marks]

d) Use the table below to answer the questions that follow.

EMPLOYEE					
EmpNo	FirstName	Gender	Age	Department	Salary
101	Jacob	Male	23	Sales	202000
102	Jesse	Male	24	Sales	120000
103	Fred	Male	25	HR	120000
104	Susan	Female	28	Sales	160000
105	Timothy	Male	27	Marketing	170000
106	Peter	Male	28	Sales	180000
107	William	Male	22	HR	122000
108	Ronald	Male	26	HR	133000
109	Jason	Male	22	Sales	125000
110	Mary	Female	23	Marketing	144000
111	Faith	Female	21	HR	111000
112	Susan	Female	20	Sales	78000
113	Rodney	Male	28	Marketing	38000
114	Peterson	Male	27	Sales	132000
115	Jeffery	Male	26	HR	104000

Write DML statements for each of the following tasks.

i). Display female employees who do not work in sales department.

[2 Marks]

ii). Compute the total salary paid to each department displayed as **PAY**.

[2 Marks]