



Faculty of Computers & Artificial Intelligence

2st Term (2019-2020) Final Exam

class:3rd year 2020

Course Code: DBA372

Course name: Database Management Systems



Benha University

Final Date: 7 / 6 /2020

Total Marks: Pass / Fail

Examiner(s): Dr. Noha El-Attar

Research submission: From 31 May to 7 June 2020

a) Write a research project in ONE of the following topics:

Topic No. 1

From your choice, suggest an online organization that sells its products or services uses databases. This database includes several activities such as organizing their products, pricing information, orders details and user purchase history. Discuss the type of this application from the perspective of database management system, and compare it with other popular types of database applications that can be used in our real life, then draw the ERD and establish the schema for this database. Assume the tuples, the attributes and the relationships and discuss how can you apply the values and referential integrity constraints

Topic No. 2

Discuss how can you apply the four main actions for establishing a database for HEALTHCARE ORGANIZATION. This database must contain at least 5 relations or more as you need. You have to use the appropriate SQL statements in declaring and manipulating this database, with defining the appropriate constraints on attributes values to achieve referential integrity. Also, specify all the relationships among the relations of your database. Finally, decide the suitable architecture for your database and discuss why you choose this architecture.

Topic No. 3

State the difference between logical data independence and physical data independence in a real life database example from your choice, and explain how can both of them applied and which types of users will be effected by them. Note that, you have to discuss the Three-Schema Architecture and the users who deal with each level and what type of interface would each need. Then apply the suitable SQL commands to build a complete schema with defining the role of each command in the mapping process.

Topic No. 4

Choose a database application with which you are familiar. Design a schema and show a sample database state for that application. Declare the types of additional information and constraints would you like to represent in the schema. Discuss the suitable DBMS languages that can be used in mapping the schema levels. Think of several users of your database, and design a view for each. Then decide the suitable architecture for your database and discuss why you choose this architecture.

Topic No. 5

A Web-based system to make AIRLINE reservations and sell airline tickets, discuss which DBMS architecture would you choose to establish the database of this system, Why you choose it and Why would the other architectures not be a good choice. Think of different users for this database and state the types of applications and type of interface would each need. Draw a complete ERD for the proposed form of this database which must contain at least 7 relations, and discuss the meaning and difference between the entity, entity types and entity set.

Topic No. 6

Consider the LIBRARY relational database schema that contains at least 5 tables. Write appropriate SQL DDL statements for declaring this database schema and specify the keys and referential triggered actions. Based on your expected form of the library database, choose some attributes that should have indexes specified on them, then show how can the key and foreign key constraints be enforced by the DBMS. State how you can convert your database from the 1st NF to the 3rd NF by clarifying the steps. Specify a number of queries in SQL that are needed by your database application. Note, the queries must cover all types of queries you have been studied during this course.

Topic No. 7

In your own words, Discuss the role of a high-level data model in the database design process. Describe the all the terms of the ER and the relationships types and explain the difference between them. Discuss the conventions for displaying an ER schema as an ER diagram by using an example from your choice then display how you will ensure the achieving of referential integrity constraints on this database. You have to define your database by SQL DDL.

Topic No. 8

Suppose that you have the following requirements for a university database that is used to keep track of students' transcripts: The university keeps track of the students name, student number, current address, phone, birth date, gender, class ('freshman', 'sophomore', ... , 'graduate'), major department. Each department is described by a name, department code, office number and college. Each student can study more than a course that has a course name, description, course code, number of semester hours, level, and offering department. Finally, a grade record refers to a student, a particular course, and the total degree of all courses he has studied.

Design the ERD for this database and implement the schema for this database application using the suitable SQL commands. First show all the functional dependencies that should hold among the database attributes. Then design relation schemas for the database that are each in 3NF with clarifying the conditions you have applied to reach the 3NF. Specify the key attributes of each relation. Note make any appropriate assumptions to render the specification complete.

Topic No. 9

In your own words, discuss the Component modules of the DBMS and what are their interactions and how do these interactions work. Then, apply component modules on a real database from your choice and define each module by the suitable instructions that you have learned. Finally, discuss the different types of user-friendly interfaces and the types of users who typically use each.

Topic No. 10

Choose a database application with which you are familiar. Design a schema and show a sample database state for that application. Declare the types of additional information and constraints would you like to represent in the schema in order to convert your database from the 1st NF to the 3rd NF by discussing all the required steps and determine the cardinality in all the NF stages. Note, you have to define and construct the schema by the suitable SQL commands. Finally, draw a complete ERD for your proposed schema.

b) Notes: please, your research must contain the following elements:

- The research project should be comprehensive in all dimensions of the required topic and cover all its aspects and elements.

GOOD LUCK,

Examiner(s)

**Head of Department /
Program Coordinator**