“Databases and DB Management Systems”
Online Course

Pre-test/Post-test for Class # 4 – Database Design and Normalization

True-False Questions

1. The term database development is used to describe the process of database design and implementation.

2. The primary objective in database design is to create complete, normalized, non-redundant, and fully integrated conceptual, logical, and physical database models.

3. To analyze the company situation, the database designer must discover what the company’s operational components are, how they function, and how they interact.

4. After the initial declarations, the database designer must carefully probe in order to generate additional information that will help define the problem within the larger framework of company operations.

5. In most modern relational DBMSs, a new database implementation requires the creation of special storage-related constructs to house the end-user tables.

6. Normalization is a process for changing attributes to entities.

7. From a structural point of view, 1NF is better than 2NF.

8. Denormalization produces a lower normal form.

9. Normalization is a very important database design ingredient and the highest level is always the most desirable.

10. All relational tables satisfy the 1NF requirements.

11. A table is in Second Normal Form (2NF) if it is in 1NF and it includes no partial dependencies.

12. It is possible for a table in Second Normal Form (2NF) to exhibit transitive dependency, where one or more attributes may be functionally dependent on nonkey attributes.

13. A table is in Boyce-Codd Normal Form (BCNF) if every determinant in the table is a candidate key.

14. Normalization should be part of the design process.
Multiple Choice

1. Analyzing the company situation, defining problems and constraints, objectives and scope, and boundaries are part of the
   a. database initial study.
   b. database design.
   c. implementation and loading, testing, and evaluation.
   d. operation.
   e. maintenance and evaluation.

2. In creating a logical design, the designer might use tools such as
   a. DFD.
   b. HIPO.
   c. E-R.
   d. all of the above
   e. all of the above

3. The purpose of the database initial study is to
   a. analyze the company situation.
   b. define problems and constraints.
   c. define objectives.
   d. define scope and boundaries.
   e. all of the above

1. Creating the conceptual design, DBMS software selection, creation of the logical design, and creating the physical design are part of the
   a. database initial study phase.
   b. database design phase.
   c. implementation and loading phase.
   d. testing and evaluation phase.
   e. operation phase.

2. During the Entity-Relationship modeling process, the designer must
   a. draw corresponding E-R diagram.
   b. normalize the data model.
   c. make decisions about standard naming conventions.
   d. none of the above
   e. all of the above

3. Normalization works through a series of stages called normal forms. There are
   _________ stages.
   a. 2
   b. 3
   c. 4
   d. 5
4. The term first normal form (1NF) describes the tabular format in which:
   a. all the key attributes are defined.
   b. there are no repeating groups in the table. Row/column intersection can contain one and only one value, not a set of values.
   c. all attributes are dependent on the primary key.
   d. all of the above
   e. none of the above

5. The conflicts between design efficiency, information requirements, and processing speed are often resolved through
   a. conversion from 1NF to 2NF.
   b. conversion from 2NF to 3NF.
   c. compromises that include normalization.
   d. conversion from 3NF to 4NF.

6. A table that has all key attributes defined, has no repeating groups, and all its attributes are dependent on the primary key, is said to be in
   a. 1NF.
   b. 2NF.
   c. 3NF.
   d. 4NF.
   e. BCNF.

7. A table where all attributes are dependent on the primary key and are independent of each other, and no row contains two or more multi-valued facts about an entity, is said to be in
   a. 1NF.
   b. 2NF.
   c. 3NF.
   d. 4NF.
   e. BCNF.

8. A table where every determinant is a candidate key is said to be in
   a. 1NF.
   b. 2NF.
   c. 3NF.
   d. 4NF.
   e. BCNF.

**Short Answer**

1. The _________________________ design stage uses data modeling to create an abstract database structure that represents real-world objects in the most realistic way possible.

2. In order to develop an accurate data model, the designer must have a thorough _________________________ of the company’s data types, extent, and uses.
3. From a database point of view, the collection of data becomes meaningful only when the business ______________________ are defined.

4. A(n) ______________________ rule is a brief and precise narrative of a policy, procedure, or principle within a specific organization's environment.

5. Concurrency ______________________ is a feature that allows simultaneous access to a database, while preserving data integrity.

6. The selection of ______________________ software is critical to the information system's smooth operation.

7. ______________________ design is used to translate the conceptual design into the internal model for a selected database management system, such as DB2, SQL Server, Oracle, Access, Ingress, etc.

8. ______________________ design is the process of selecting the data storage and data access characteristics of the database.

9. Database ______________________ is one of the most important factors in certain database implementations.

10. Data ______________________ is enforced through the proper use of primary and foreign key rules.

11. Normalization is a process for assigning ______________________ to entities.

12. Normalization works through a series of stages called ______________________ forms.

13. The price paid for increased performance through denormalization is a larger amount of ______________________.

14. ______________________ produces a lower normal form.

15. A table is in Boyce-Codd normal form (BCNF) if every determinant in the table is a(n) ______________________ key.

**Essay**

What are the Database Life Cycle phases?

Explain the different tools that may be used by the designer in creating a logical design.

How can a table be in 3NF and not in BCNF?

Explain the Boyce-Codd Normal Form (BCNF).