Chapter 1

1) Discuss the meaning of each of the following terms:

(a) data
(b) database
(c) database management system
(d) application program
(e) data independence
(f) views.

2) Describe the two-tier client-server architecture and the three-tier client-server architecture.

3) Describe the problems with the two-tier client-server architecture and discuss how these problems were overcome with the three-tier client-server architecture.

4) Discuss the advantages and disadvantages of DBMSs.

5) Define three principal integrity rules for the relational model.

6) Describe with a schema the main phases involved in database design

7) Give the difference between conceptual database design and logical database design.

8) A transaction is ACID. Explain this sentence.

9) Give an illustrative example of a transaction
Chapter Relational Model

1) Discuss each of the following concepts in the context of the relational data model:
   (a) relation
   (b) attribute
   (c) domain
   (d) tuple
   (e) relational database.

2) Discuss the properties of a relational table.

3) What does a null represent?

QMC
Row is synonymous with the term:

A. record.  
B. relation.
C. column.  
D. field.

When the values in one or more attributes being used as a foreign key must exist in another set of one or more attributes in another table, we have created a(n):

A. transitive dependency.
B. insertion anomaly.
C. referential integrity constraint.
D. normal form.

A relation is considered a:

A. Column.
B. one-dimensional table.
C. two-dimensional table.
D. three-dimensional table.
In the relational model, relationships between relations or tables are created by using:

A. composite keys.
B. determinants.
C. primary keys.
D. foreign keys.

Table is synonymous with the term:

A. record.
B. relation.
C. column.
D. field.

Which of the following is not a restriction for a table to be a relation?

A. The cells of the table must contain a single value.
B. All of the entries in any column must be of the same kind.
C. The columns must be ordered.
D. No two rows in a table may be identical.

An attribute is a(n):

A. column of a table.
B. two dimensional table.
C. row of a table.
D. key of a table.

A tuple is a(n):

A. column of a table.
B. two dimensional table.
C. row of a table.
D. key of a table.
**Fill in the blanks**

A relation________.
A) has rows containing data about an entity  
B) has columns containing data about attributes of the entity  
C) has cells that hold only a single value  
D) has no two identical rows  
E) All of the above.

A relation is also known as a(n)________.
A) table  
B) tuple  
C) relationship  
D) attribute  
E) field

A tuple is also known as a(n)________.
A) table  
B) relation  
C) row  
D) field  
E) file

An attribute is also known as a(n)________.
A) table  
B) relation  
C) row  
D) field  
E) file

A key consisting of one or more columns that is a primary key in another relation is a(n)________.
A) composite primary key  
B) primary key  
C) foreign key  
D) dependency
Chapter Normalization

Every time attribute A appears, it is matched with the same value of attribute B, but not the same value of attribute C. Therefore, it is true that:

A. \( A \rightarrow B \).

B. \( A \rightarrow C \).

C. \( A \rightarrow (B,C) \).

D. \( (B,C) \rightarrow A \).

The different classes of relations created by the technique for preventing modification anomalies are called:

A. normal forms.

B. referential integrity constraints.

C. functional dependencies.

D. None of the above is correct.

A functional dependency is a relationship between or among:

A. tables.

B. rows.

C. relations.

D. attributes.
For some relations, changing the data can have undesirable consequences called:

A. referential integrity constraints.

B. modification anomalies.

C. normal forms.

D. transitive dependencies.

If attribute A determines both attributes B and C, then it is also true that:

A. A → B.

B. B → A.

C. C → A.

D. (B,C) → A.

If attributes A and B determine attribute C, then it is also true that:

A. A → C.

B. B → C.

C. (A,B) is a composite determinant.

D. C is a determinant.

Normalization is a process used to deal with which of the following modification anomalies?
A) Insertion anomaly
B) Update anomaly
C) Deletion anomaly
D) A and B
E) A, B and C
Fill in the blanks

If the removal of facts about one entity results in the unintentional lose of data about another entity, this is referred to as a(n) ________.
A) normalization anomaly
B) insertion anomaly
C) update anomaly
D) deletion anomaly
E) removal anomaly

Suppose that you need to update one value of the column SalesCost in a relation. The way the relation is constructed, this value actually needs to be changed in three different rows. However, you only change the value in two of the rows. You have just created an a(n) ________.
A) normalization anomaly
B) insertion anomaly
C) update anomaly
D) deletion anomaly
E) removal anomaly

A table that meets the definition of a relation is in ________.
A) First Normal Form
B) Second Normal Form
C) Third Normal Form
D) Boyce-Codd Normal Form
E) Fourth Normal Form

If by knowing the value of A we can find the value of B, then we would say that B is ________ on A.

Given the functional dependency A → (B, C), then it is true that ________ and ________.

A(n) ________ is one or more columns in one relation that also is the primary key in another table.

If a table is a relation then it is in ________.

Saying that two entities are functionally dependent means that ________.
A) the entities are always connected by a mathematical equation
B) for one of the entities, if we are given the value of that entity, we can determine the value of one other entity
C) for both of the entities, if we are given the value of that entity, we can determine the value of one other entity
D) the functional dependency will have to be removed through normalization
E) All of the above.

Given the functional dependency A → (B, C), A is a(n) ________.
A) independent variable
B) dependent variable
C) determinant
D) composite determinant  
E) C and D

Given the functional dependency \((A, B) \rightarrow C\), then __________.
A) \(A \rightarrow B\)  
B) \(A \rightarrow C\)  
C) \(B \rightarrow A\)  
D) \(B \rightarrow C\)  
E) None of the above is correct.

(T or F)

Attribute Y is functionally dependent on attribute X if the value of attribute X determines the value of Y.

The functional dependency noted as \(A \rightarrow B\) means that the value of A can be determined from the value of B.

In the functional dependency shown as \(A \rightarrow B\), B is the determinant.

Functional dependencies can involve groups of attributes.

A determinant of a functional dependency may or may not be unique in a relation.

Undesirable consequences of changing the data in a relation are called "modification anomalies."

Any table that meets the definition of a relation is in 2NF.

Breaking a relation into two relations may create the need for a referential integrity constraint to be defined between the two relations.
Chapter SQL

1) What are the two major components of SQL and what function do they serve?

2) Explain the function of each of the clauses in the SELECT statement (they are given in the execution order). What restrictions are imposed on these clauses?

FROM
WHERE
GROUP BY
HAVING
SELECT
ORDER BY

3) Explain how the GROUP BY clause works. What is the difference between the WHERE and HAVING clauses?

4) Describe the alternative strategies that can be applied if there is a child record referencing a parent record that we wish to delete.