Review questions Chapter 3 Relational Model

1. Define the following terms as they apply to the relational model of data: *domain, attribute, n-tuple, relation schema, relation state, relational database schema and relational database state.*

   -Domain: Set of all possible data values in an attribute.

   -Attribute: Header of columns in a relation.

   -N-tuple: N number of values in a tuple.

   -Relation schema: Structure of a relation.

   -Relation state: Value of all the attributes in a relation in a specific moment.

   -Relational database schema: Set of all the relation schemas in the database.

   -Relational database state: Set of all the relation states in the database.

2. Why are duplicate tuples not allowed in a relation?

   -Because it allows the proper functioning of the relational model and ensures the integrity of the data.

3. Draw a table with informal and formal definitions about Relations.

Informal	Formal
Table	Relation
Column name	Attribute
All possible values in a column	Domain
Row	Tuple
Table definition	Schema of a relation
Populated table	State of the relation

4. There are three main types of constraints. Can you explain them?
   - Inherent or implicit constraints: Based on the relational model itself.
     - Duplicate tuples, list as a value for an attribute, etc.
   - Schema-based or Explicit constraints: Express in the schema what is expressed in the model.

    - Key, Entity integrity and Referential integrity constraints.
  - Application based or explicit constraints: Specified and enforced by the application programs

5. Discuss the entity integrity and referential integrity constraints.

- Entity integrity: There are constraints that prevent value errors.
  - No tuple can have NULL as a value for the primary key, even if it is a key composed of several attributes.

*We can also apply restrictions to several attributes to not accept the null value when creating the DB.

- Referential Integrity: There are constraints involving two relations.
  - FOREIGN KEY: Is a key attribute of a relation that is used as an attribute in a different relation and needs to exist in the main relation to ensure the reference with the second relation.

6. What constraints may be violated by INSERT, DELETE and UPDATE a relation?

- INSERT:
- Domain: Attribute values are not within the defined domain.
- Key: The value of the key attribute already exists in another tuple of the relation.
- Referential: The referenced foreign key does not exist as a primary key in the main relation.
- Entity: The primary key contains null value.
- DELETE:
- Referential: There is a referential relation in the tuple that you want to delete.

* In its case: (it is defined in the manager)

-RESTRICT: Deletion is not allowed.

-CASCADE: The tuple and all the related ones are deleted.

-SET NULL: If deleted, the relations are set to NULL.

-SET DEFAULT: If deleted, a default value is set.

- UPDATE:
- Domain: Attribute values are not within the defined domain.
- Not Null: Does not meet the defined null constraints.