

SOLVING COMPLEX DATABASE QUESTIONS

QUESTIONS:

In not less than 10 pages with relevant examples each explain the following.

1. Cardinality
2. Entity, entity type and entity set
3. Schema
4. DBMS
5. RDBMS
6. Normalization
7. DDL, DML, DCL
8. Field, record, tuple and table
9. E-R model
10. Attributes and relations
11. Database transaction

1. CARDINALITY

Cardinality refers to the uniqueness of data values contained in a particular column of a database table. There are 3 types of cardinality: high-cardinality, normal-cardinality, and low-cardinality.

It can simply be referred to as how each table links to another which could be one-to-one, one-to-many or many-to-many.

2 (a). ENTITY

An entity in relation to data modeling can be seen as a real world object with an independent existence which can be differentiated from other objects.

In relation to RDBMS, a particular record is called an entity, e.g., a student ID or a customer name is an entity.

2 (b). ENTITY TYPE

Entity refers to the category a particular entity belongs to.

There are 2 entity types which are ***Tangible*** and ***Intangible*** entity types with explanations below:

Tangible Entity Type: Tangible entity are real world things that exist physically and example of such are car, person, table, phone etc.

Intangible Entity Type: Intangible entity type are those entities that exists logically and have no physical existence, an example include: bank account.

Example: A table name students in a university database can be seen as an entity type.

2 (c). ENTITY SET

Entity set refers to a collection or set of all entities of a particular entity type at any point in time. The type of all the entities should be the same.

Example: The collection of all the data in a student table in the university database is an entity set.

3. SCHEMA

Schema in relation to database refers to how data is organized or constructed within a relational database.

This is inclusive of logical constraints such as table names, field, data types and the relationship between these entities.

4. DBMS

DBMS stands for database management system and these refer to the software system used to store, retrieve and query data.

DBMS can simply be seen as the user interface that allows users to create, read, update and delete data in a database.

Example: Some known examples of **DBMS** include MySQL, PostgreSQL, Oracle, Microsoft access, sql server etc.

5. RDBMS

RDBMS stands for relational database management system and this refers to the technology used to create, update, administer and interact with a relational database and **examples** of such includes Oracle, MySQL, Microsoft SQL server, IBM DB2 etc.

6. NORMALIZATION

Normalization in relation to data modeling refers to the organization of related data in a table which helps eliminate redundancy and increases data integrity in relational database.

An example of relational database normalization can be seen in the table below.

Customers Table

customerid	customername	country
1	Alex Jones	United Kingdom
2	John Doe	USA
3	Maria Rodriguez	Spain

Orders Table

customersid	orderid	orderdate
2	4	2022-24-06
4	9	2022-23-06

The relationship can be seen in the customersid field which is known as normalization in relational database.

7. DDL, DML, DCL

DDL stands for data definition language and it refers to the standard of commands used to define data structures and modify data and example includes: “CREATE”, “DROP”, “ALTER”

DDM stands for data manipulation language which refers to a subset of commands used in the manipulation of data in a relational database and examples include: “INSERT” “UPDATE” “DELETE”

DCL stands for data control language and this refers to commands used to control access (authorize) to data stored in a database and examples include: “GRANT”, “REVOKE”, “COMMIT”

8. FIELD, RECORD, TUPLE, TABLE

FIELD

A field is an element in which one piece of information is store and example include: the name of a student under the studentname column in a students table.

RECORD

A record can be seen as a group of fields within a table that are relevant to a specific entity.

TUPLE

A tuple is simply a row contained in a table in the table space.

TABLE

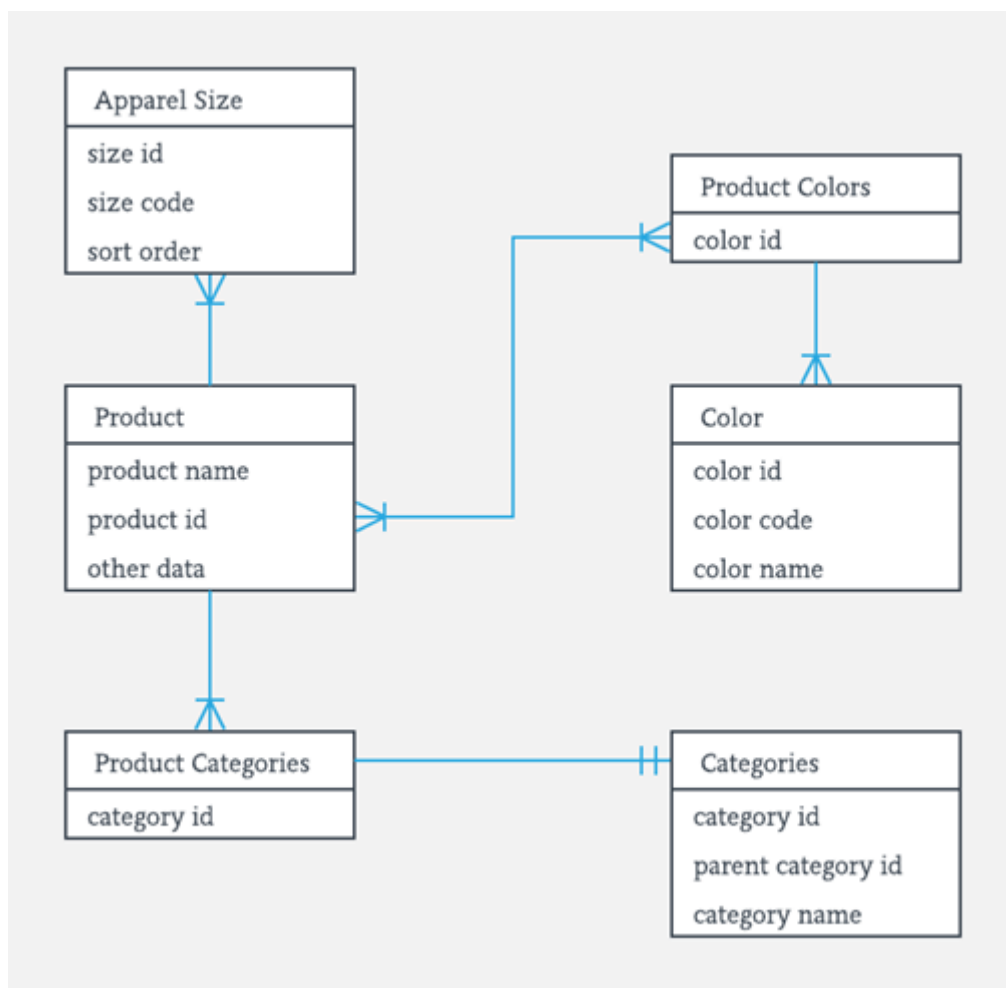
Table in relation to relational database is a collection of data, organized in terms of rows and columns.

Example: A customers table that contains information such as first and last names, gender, e-mail addresses of the customers.

9. E-R MODEL

ER stands for entity relation and this describes the structure of a database with the help of a diagram, which is known as Entity Relationship Diagram (ER Diagram).

The diagram below is an entity relationship diagram which is an ER model.



10. ATTRIBUTES AND RELATIONS

ATTRIBUTES

Attributes are the properties which describe an entity in a relational database and a perfect example for that is a column in an entity table.

RELATIONS

Relations are the established associations between two or more tables in a relational database.

11. DATABASE TRANSACTION

A transaction is a set of database read and write operations where either all or none of the operations succeed and a perfect example of that is a bank transfer transaction.