

Reading: Advanced Relational Model Concepts

Estimated time needed: 15 minutes

Introduction

In this module, you have learned about advanced relational concepts such as functional dependencies, multi-valued dependencies, and candidate keys.

Review your knowledge:

- Functional dependency (FD): This refers to a relationship between attributes where the value of one attribute uniquely determines the value of another.
- Multi-valued dependency (MVD): This describes a relationship between attributes where one attribute determines a set of possible values for another.
- Candidate key: This denotes a minimal set of attributes that uniquely identifies each row in a relation.

Now, in this reading, let's apply the concepts learned in this module to a real-world example of a database.

Objectives

After completing this reading, you will be able to evaluate your knowledge of Advanced relational model concepts.

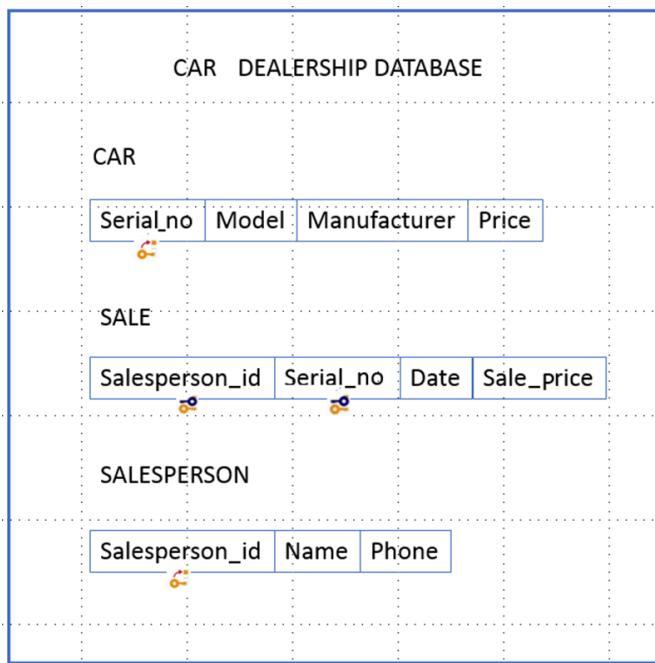
Here you are going to:

- Apply advanced relational concepts like functional dependencies, multi-valued dependencies, and candidate keys to the "Car Dealership" database schema.
- Identify constraints within the schema based on these concepts.
- Understand the impact of these concepts on data integrity and manipulation.

Exercise

In this exercise, we will work on a relational database schema called Car Dealership, designed to keep track of automobile sales in a car dealership.

Schema diagram for the Car Dealership relational database:



Relational instance of SALE:

Salesperson_id	Serial_no	Date	Sale_price
10001	1we4ds87	12/03/2020	\$ 10,000.00
10005	d63jw3ty	12/03/2020	\$ 5,000.00
10009	sy63bjd1	13/03/2020	\$ 25,000.00
10001	k2k4edr8	13/03/2020	\$ 49,000.00
10051	w3r334ac	13/03/2020	\$ 8,000.00

Now, let's go through some questions based on the above database schema of Car Dealership and the relational instance of SALE:

1. Identify FDs in the Car Dealership schema:
 - A. Analyze each pair of attributes in each relation (Car, Sale, Salesperson, Customer).
 - B. For each pair, consider if the value of one attribute always determines the value of the other.

C. List all identified FDs for each relation.

► Answer

2. Explore MVDs:

A. Consider if any attribute in the schema determines a set of possible values for another.

B. For example, does "Car Model" determine a set of possible values for "Sale Price"?

C. List any identified MVDs for the schema.

► Answer

3. Determine candidate keys:

A. Analyze each relation and identify any subset of attributes that uniquely identifies each row.

B. Remember, a candidate key must not contain any redundant attributes.

C. List all identified candidate keys for each relation.

► Answer

4. Discuss the implications:

A. How do the identified FDs and MVDs impact data integrity and manipulation in the schema?

B. Could any data inconsistencies arise due to violating these constraints?

C. How do candidate keys affect query optimization and data retrieval?

► Answer

Congratulations! You have completed this reading and are ready for the next topic.

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