

Hands-on Lab: 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 lab, let's apply the concepts learned in this module to a real-world example of a database.

Objectives

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

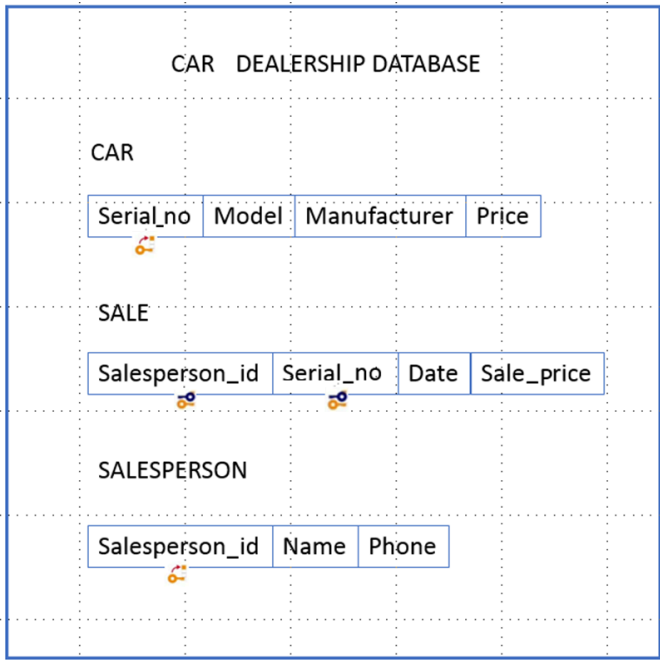
Here you are going to:

- 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 lab and are ready for the next topic.

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