
ORACLE
Academy

Database Design

6-2
Normalization and First Normal Form

ORACLE Academy

Objectives

This lesson covers the following objectives:

- Define the purpose of normalization in database models
- Define the rule of First Normal Form in the normalization process
- Determine if an entity conforms to the rule of First Normal Form
- Convert an entity to First Normal Form if needed

Purpose

- Think about storing your friends' phone numbers in three different places: your address book, your cell phone, and a sheet of paper that you have taped to your refrigerator.
- It's a lot of work if a friend changes his/her phone number.
- You have to change it in your address book, cell phone, and the sheet of paper taped to you

Purpose

- What happens if data is stored in more than one place in a database?
- What if someone changes the information in one place and not the other—how do you know which information is correct?
- Redundancy like this causes unnecessary problems in a database.

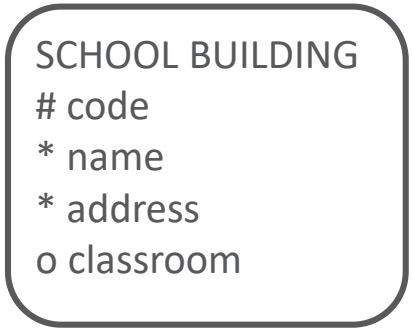
Purpose

- Normalization is a process that is used to eliminate these kinds of problems.
- One of your goals as a database designer is to "store information in one place and in the best possible place“.
- If you follow the rules of normalization, you will achieve this goal.

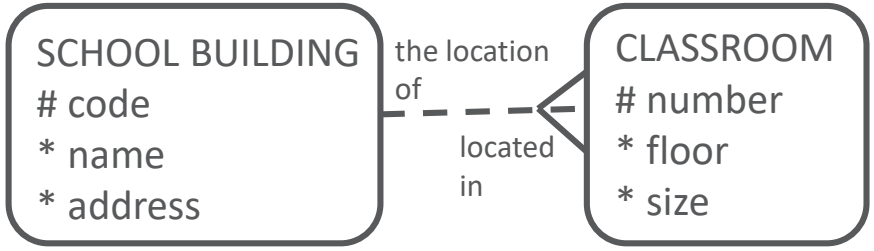
First Normal Form (1NF)

- First Normal Form requires that no multi-valued attributes exist.
- To check for 1NF, validate that each attribute has a single value for each instance of the entity.
- One code, one name, and one address exist for the school building, but not one classroom.

SCHOOL BUILDING 1NF



The classroom attribute will have multiple values.
This entity is not in First Normal Form.

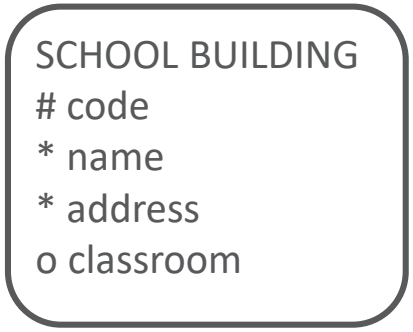


CLASSROOM is now its own entity.
All attributes have only one value per instance.
Both entities are in First Normal Form.

First Normal Form (1NF)

- Since many classrooms exist in a school building, classroom is multi-valued and violates 1NF.
- If an attribute is multi-valued, create an additional entity and relate it to the original entity with a 1:M relationship.

SCHOOL BUILDING 1NF



The classroom attribute will have multiple values.
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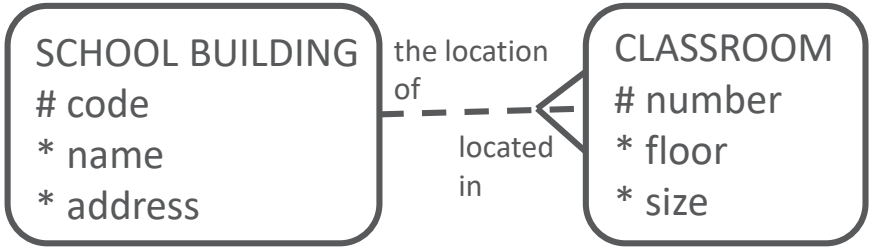
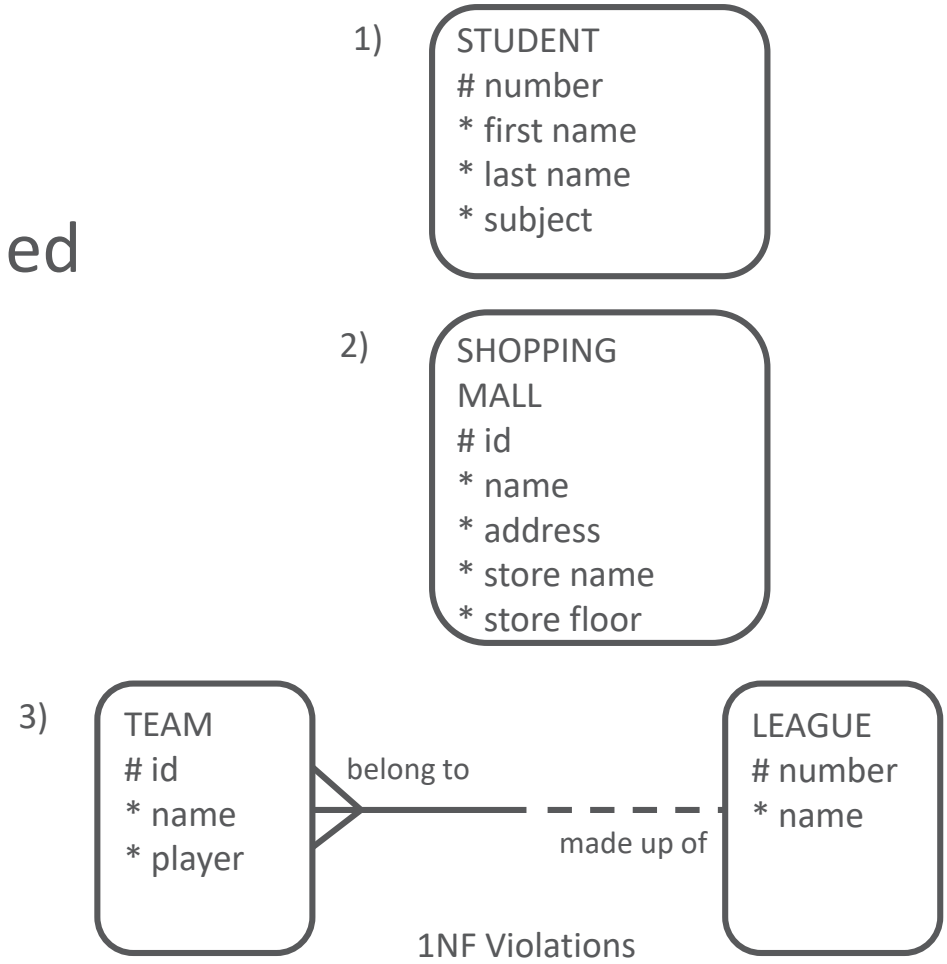


CLASSROOM is now its own entity.
All attributes have only one value per instance.
Both entities are in First Normal Form.

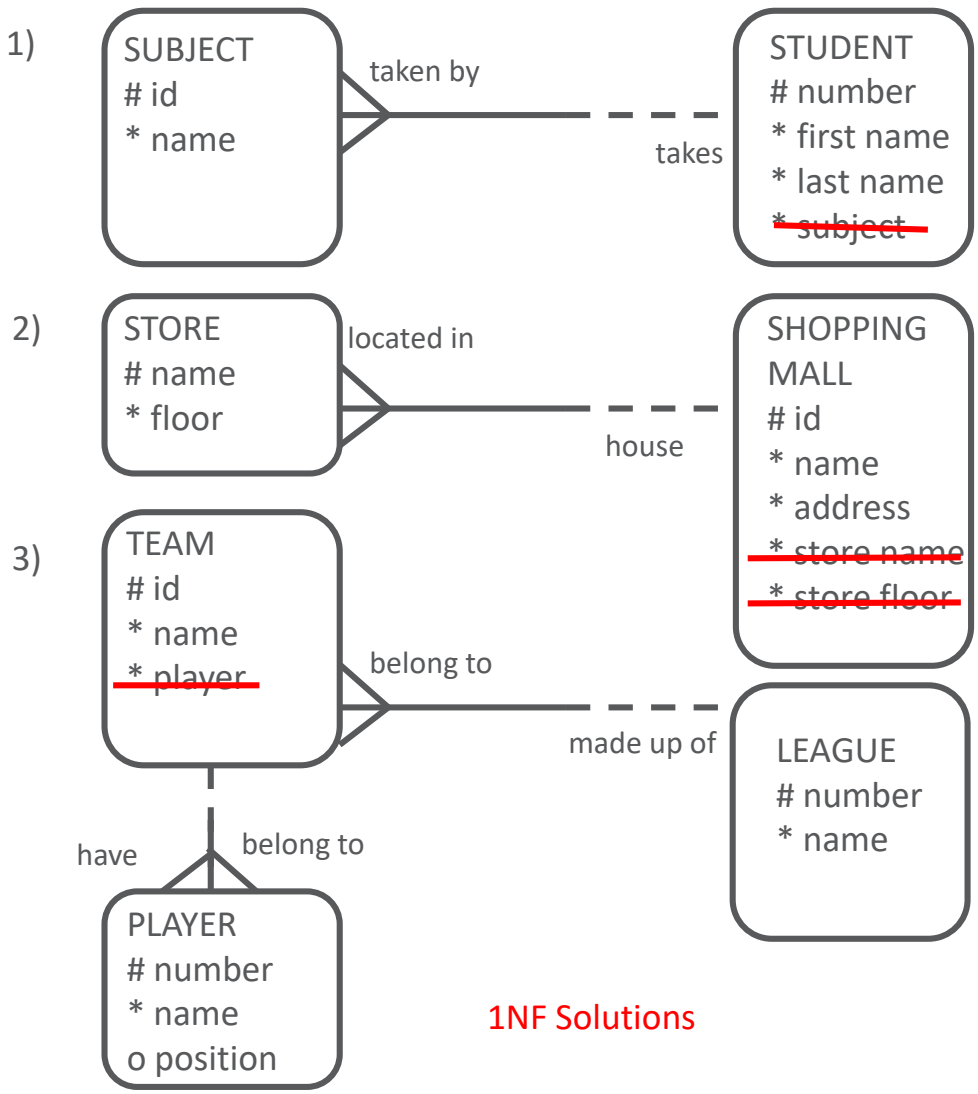
1NF Violations

- Examine the entities.
- Are there any multi-valued attributes?



1NF Solutions

- When all the attributes in an entity are single-valued, that entity is said to be in First Normal Form.



Terminology

Key terms used in this lesson included:

- First Normal Form (1NF)
- Normalization
- Redundancy

Summary

In this lesson, you should have learned how to:

- Define the purpose of normalization in database models
- Define the rule of First Normal Form in the normalization process
- Determine if an entity conforms to the rule of First Normal Form
- Convert an entity to First Normal Form if needed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