




# RELATIONAL DATABASES

BSc IoT



# Objectives

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

# Purpose

- The primary purpose of normalisation is to remove data redundancy and to ensure you store data in the correct or most appropriate place in the database

# Normalisation

- Normalisation is derived from complex mathematical rules, the data modeller's goal is to eliminate redundancy.
- Normalisation is a series of steps followed to obtain a database design that allows for efficient access and storage of data in a relational database.
- The steps reduce data redundancy and the chances of data becoming inconsistent.

# Normalisation

- A process used to eliminate problems of data redundancy
- One goal of the data modeller is to store the information in one place and in the best possible place
- If you follow the normalisation rules you will achieve this goal
- You will learn the first three rules of normalisation. There are more rules up to Fifth Normal form and beyond (6<sup>th</sup> and 7<sup>th</sup> are academic exercises). For most business models, 3NF is enough.

# 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
- There should only be one value for each attribute whether it is a name, an address line, a phone number, a product weight etc

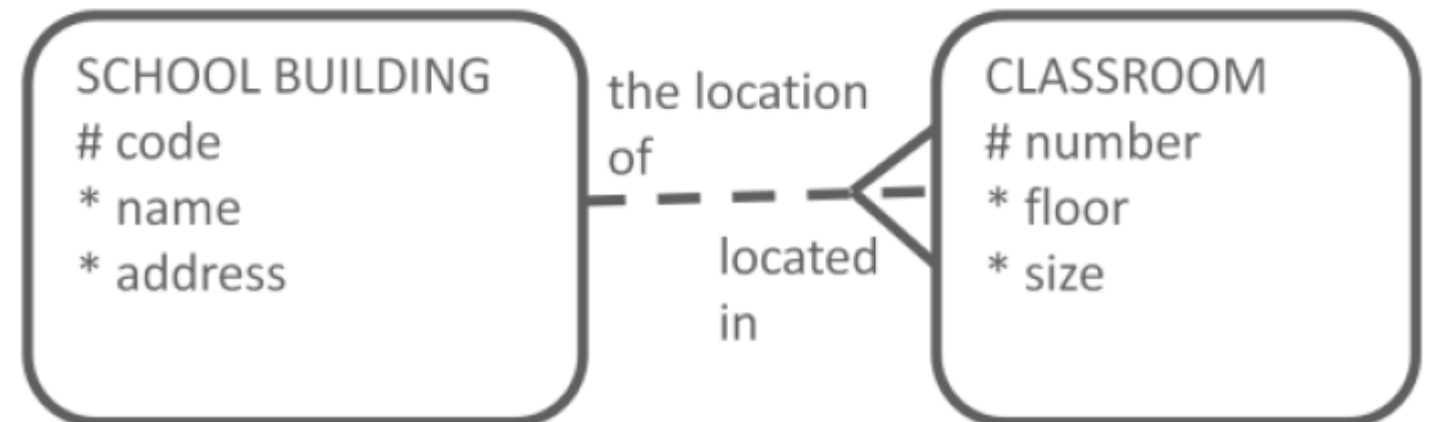
- Classrooms exist in a school building, classroom is multi-valued and violates 1NF.
- Resolve this by creating a 1:M relationship with a new entity.
- CLASSROOM is now its own entity. All attributes have only one value per instance.
- Both entities are in First Normal Form

## SCHOOL BUILDING 1NF

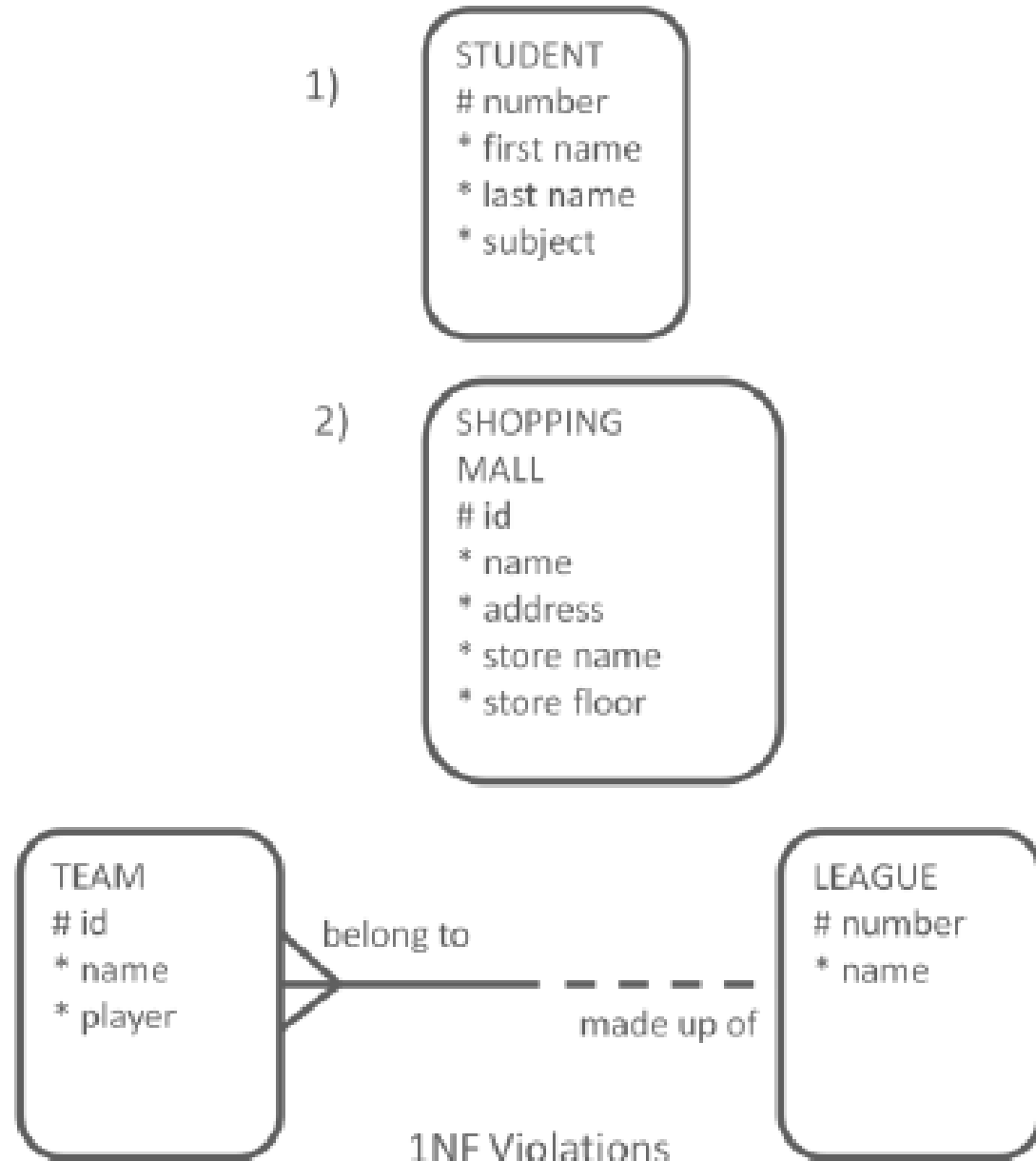


The classroom attribute will have multiple values.

**This entity is not in First Normal Form.**



# 1NF Violations





# 1NF Solutions

