# RELATIONAL DATABASES

INF

# 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

- IT DIVIDES LARGER TABLES INTO SMALLER TABLES AND LINKS THEM USING RELATIONSHIPS

# 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$^{TH}$ AND 7$^{TH}$ 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 MOVIE, A NAME, AN ADDRESS LINE, A PHONE NUMBER, A PRODUCT WEIGHT ETC

# NORMALISATION

| Full Names | Address | Movies Rented | Salutation | Director |
|---|---|---|---|---|
| Janet Jones | First Street Plot 1 | Pirates of the Caribbean, Clash of the Titans | Ms. | Gore Verbinski Louis Leterrier |
| Robert Phil | 3$^{rd}$ Street 34 | Forgetting Sarah marshal, Daddy's Little Girls | Mr. | Nicholas Stoller Tyler Perry |
| Robert Phil | 5$^{th}$ Avenue | Clash of the titans | Mr. | Louis Leterrier |

Movies rented, and Director has multiple values in the cells.

# FIRST NORMAL FORM (1NF)

- THIS RESOLVES THE DATA INTO FIRST NORMAL FORM

| Full Names | Address | Movies Rented | Salutation | Director |
|---|---|---|---|---|
| Janet Jones | First Street Plot 1 | Pirates of the Caribbean | Ms. | Gore Verbinski |
| Janet Jones | First Street Plot 1 | Clash of the Titans | Ms. | Louis Leterrier |
| Robert Phil | 3rd Street 34 | Forgetting Sarah marshal | Mr. | Nicholas Stoller |
| Robert Phil | 3rd Street 34 | Daddy's Little Girls | Mr. | Tyler Perry |
| Robert Phil | 5th Avenue | Clash of the titans | Mr. | Louis Leterrier |

# SCHOOL BUILDING 1NF

- 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
# code
* name
* address
o classroom

The classroom attribute will have multiple values.

This entity is not in First Normal Form.

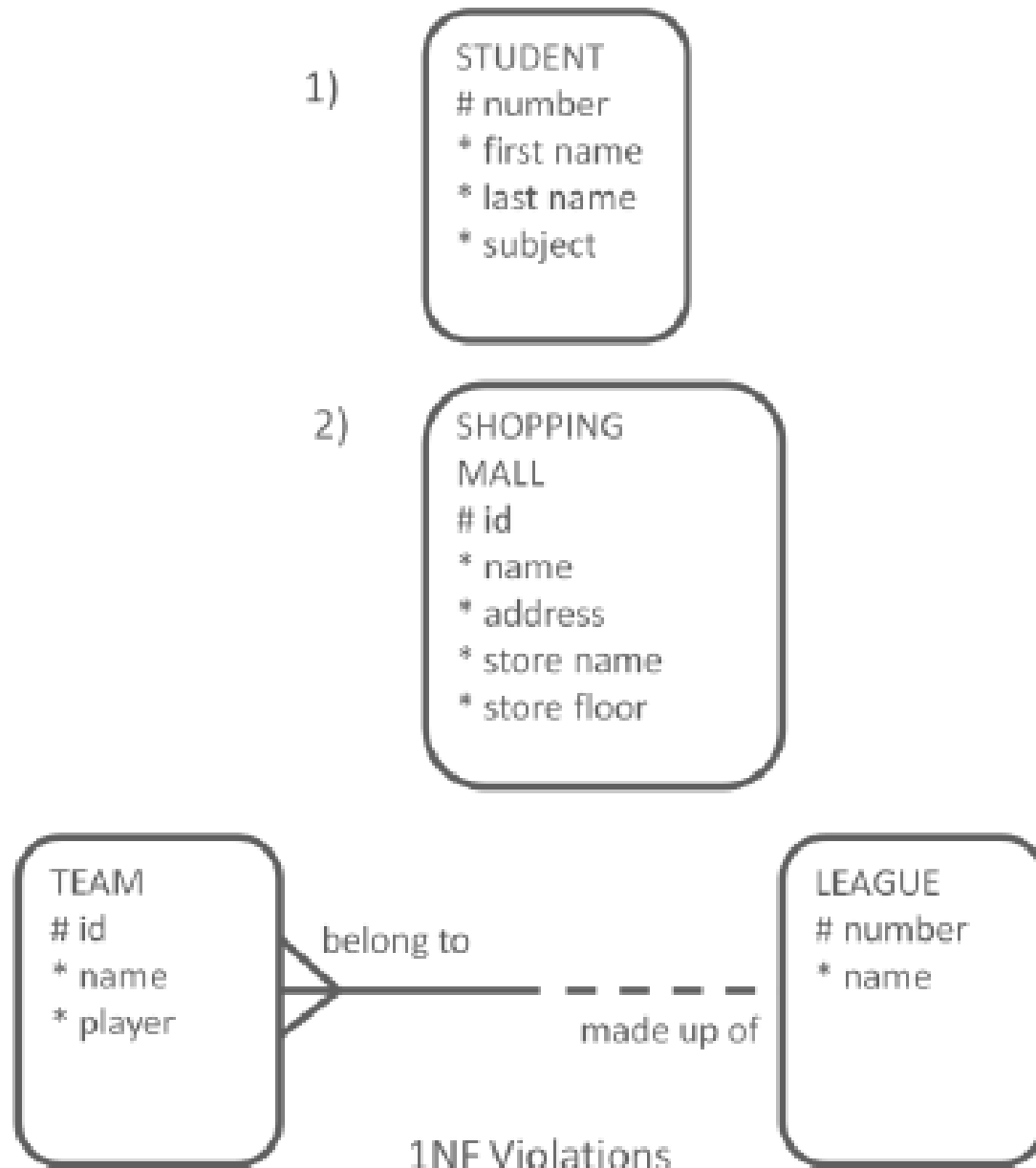SCHOOL BUILDING
# code
* name
* address

the location of

located in

CLASSROOM
# number
* floor
* size

# 1NF VIOLATIONS

1) STUDENT
   # number
   * first name
   * last name
   * subject

2) SHOPPING
   MALL
   # id
   * name
   * address
   * store name
   * store floor

TEAM
# id
* name
* player

belong to

made up of

LEAGUE
# number
* name

1NF Violations

# 1NF SOLUTIONS



1NF Solutions