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

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 (6TH AND 7TH 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

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
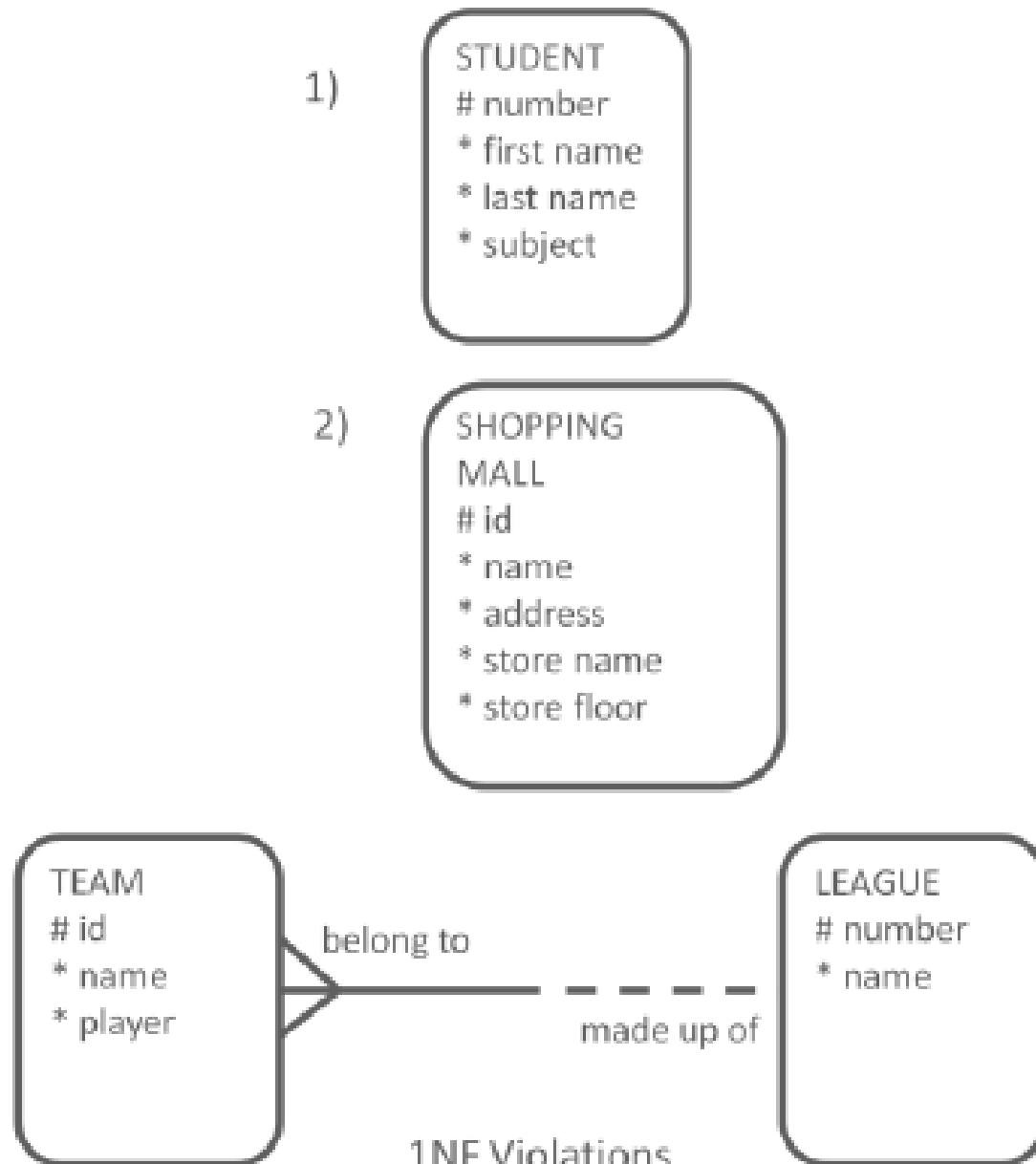\# code
* name
* address

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

1)

SUBJECT
id
* name

— Taken by →
← Takes

STUDENT
number
* first name
* last name
* ~~subject~~

2)

STORE
name
* floor

— located in →
← house

SHOPPING MALL
id
* name
* address
* ~~store name~~
* ~~store floor~~

3)

TEAM
id
* name
* ~~player~~

— belong to →
← made up of

LEAGUE
number
* name

have / belong to

PLAYER
number
* name
o position

1NF Solutions