**Normalization Notes**

UNF 🡪 You will have a single table. Indent multivalued attributes. Give the table a name and identify the PK.

1NF🡪 No multivalued attributes = No repeating attributes. You will have 2 tables.

Multivalued attribute: An attribute that can have more than one value. It's an attribute that can have more than one possible value. This is something you don’t want because each field in a database should have 1 value.

Ex) surgeon can have more than one skill.

EX) Customer can have multiple phone numbers.

EX) An owner can have more than one address.

EX) A Business owner can have more than one business.

2NF🡪 No partial dependency. You will only need to check for this in the M:N table. You will have 3 tables. It only occurs in tables that have a composite key. It refers to the concept of when attributes depend on only part of the key. When you have attributes that are not fully dependent on the full Primary key you have partial dependency.

3NF 🡪 No non-key dependency = No transitive dependency.   When you have attributes that rely on other attributes that are not key attributes. You will usually have 4 tables. In the case where your 2NF is already in 3NF then you will have 3 tables.

Rules:

* Remove derived attributes before you start UNF.
* All attributes in each table have to be fully dependent on the PK.
* To indicate PK do underline.
* To indicate FK use \*
* To indicate PFK use underline and \*.

Example Normalization scenario:

Given the following attributes create a fully normalized model:

StudentNo

 StudentName

 Major

CourseNo

CourseName

InstructorNo

InstructorName

InstructorLocation

Grade

Solution:

|  |  |  |  |
| --- | --- | --- | --- |
| **UNF** | **1NF** | **2NF** | **3NF** |
| Unf steps  Student (  StudentNo   StudentName   Major   CourseNo   CourseName   InstructorNo  InstructorName  InstructorLocation  Grade) | 1nf steps  (No multivalued attributes)    Student (  StudentNo  StudentName  Major)    StudentCourse (  \*StudentNo  CourseNo  CourseName  InstructorNo  InstructorName  InstructorLocation  Grade) | 2nf steps  (No partial dependency)    Student (  StudentNo  StudentName  Major)    CourseGrade (  \*StudentNo  \*CourseNo  Grade)    Course(  CourseNo  CourseName  InstructorNo  InstructorName  InstructorLocation) | 3nf steps  3NF  (No transitive dependency)      Student (  StudentNo  StudentName  Major)    CourseGrade (  \*StudentNo  \*CourseNo  Grade)    Course (  CourseNo  CourseName  \*InstructorNo)    Instructor (  InstructorNo  InstructorName  InstructorLocation) |