

# Normal Forms Assignments

## 1NF

First Normal Form (1NF) ensures that each column in a table contains single, indivisible values, and each row is unique. A table violates 1NF if it has composite or multi-valued attributes, such as multiple phone numbers in one cell. 1NF simplifies data, making it consistent and easy to manage.

**Objective:** Ensure the table has atomic values and no repeating groups.

**Problem:** You are given the following table:

StudentID	StudentName	Subjects	Grades
1	Alice	Math, Science	A, B
2	Bob	English, History	B, A
3	Charlie	Science, Math	C, B

**Task:**

1. Normalize the table into 1NF by removing multi-valued attributes.
2. Write SQL queries to:
  - Create the normilized table(s).
  - Insert the normalized data into the table(s).

## 2NF

A relation is in 2NF if it is in 1NF and any non-prime attribute (attributes which are not part of any candidate key) is not partially dependent on any proper subset of any candidate key of the table. In other words, we can say that, every non-prime attribute must be fully dependent on each candidate key.

**Objective:** Ensure the table is in 1NF and remove partial dependency.

**Problem:** Consider the following 1NF table:

EnrollmentID	StudentID	StudentName	CourseID	CourseName	Instructor
1	1	Alice	101	Math	Dr. Smith
2	1	Alice	102	Science	Dr. Brown
3	2	Bob	103	English	Dr. White

**Task:**

1. Identify partial dependencies in the table and normalize it into 2NF.
2. Write SQL queries to:
  - Create the 2NF-compliant table(s).

- Insert the normalized data into the table(s).

## 3NF

A relation is in Third Normal Form (3NF) if it is already in Second Normal Form (2NF) and does not have transitive dependencies for non-prime attributes.

**Objective:** Ensure the table is in 2NF and remove transitive dependency.

**Problem:** Consider the following 2NF table:

StudentID	CourseID	CourseName	Instructor	InstructorEmail
1	101	Math	Dr. Smith	smith@university.com
1	102	Science	Dr. Brown	brown@university.com
2	103	English	Dr. White	white@university.com

**Task:**

1. Identify transitive dependencies in the table and normalize it into 3NF.
2. Write SQL queries to:
  - Create the 3NF-compliant table(s).
  - Insert the normalized data into the table(s).