NORMALISATION

**“It’s a process of reducing a larger table into many small tables to eradicate redundancy and anomalies”**

Redundancy in relation may cause insertion, deletion, and update anomalies. So, it helps to minimize the redundancy in relations.

**Normal forms** are used to eliminate or reduce redundancy in database tables.

**1. First Normal Form**

If a relation contain composite or multi-valued attribute, it violates first normal form or a relation is in first normal form if it does not contain any composite or multi-valued attribute. A relation is in first normal form if every attribute in that relation is **singled valued attribute**.

In the below example the table is already in the First Normal Form.

|  |
| --- |
| **COLLEGE** |
| RegNo – PK |
| Sname |
| Semester |
| DOB |
| Mail-id |
| Phone |
| BookNo - PK |
| Bname |
| Author |
| DOI |
| DOR |
| Fine |

### 2. Second Normal Form

To be in second normal form, a relation must be in first normal form and relation must not contain any partial dependency. No non-prime attribute (attributes which are not part of any candidate key) is dependent on any proper subset of any candidate key of the table.

|  |
| --- |
| **COLLEGE** |
| RegNo – PK |
| Sname |
| Semester |
| DOB |
| Mail-id |
| Phone |
| BookNo - PK |
| Bname |
| Author |
| DOI |
| DOR |
| Fine |

|  |
| --- |
| **STUDENTS** |
| RegNo – PK |
| Sname |
| Semester |
| DOB |
| Mail-id |
| Phone |

In this example the above table breaks into below Students and Books table which are in 2NF.

|  |
| --- |
| **BOOKS** |
| BookNo- PK |
| RegNo – FK |
| Bname |
| Author |
| DOI |
| DOR |
| Fine |

**3. Third Normal Form**

A relation is in third normal form, if there is **no transitive dependency** for non-prime attributes as well as it is in second normal form.

|  |
| --- |
| **STUDENTS** |
| RegNo – PK |
| Sname |
| Semester |
| DOB |
| Mail-id |
| Phone |

|  |
| --- |
| **BOOKS** |
| BookNo- PK |
| Bname |
| Author |

|  |
| --- |
| **LIBRARY** |
| BookNo- PK |
| RegNo – PK |
| DOI |
| DOR |
| Fine |

|  |
| --- |
| **STUDENTS** |
| RegNo – PK |
| Sname |
| Semester |
| DOB |
| Mail-id |
| Phone |

|  |
| --- |
| **BOOKS** |
| BookNo- PK |
| RegNo – FK |
| Bname |
| Author |
| DOI |
| DOR |
| Fine |

The above tables are then decomposed into 3 different tables, which are in 3NF.The attributes like “DOI” and “DOR” which have transitive relationship are segregated in a different table.