



SNS COLLEGE OF TECHNOLOGY, COIMBATORE-35



(AN AUTONOMOUS INSTITUTION)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

19CST202-DATABASE MANAGEMENT SYSTEM

## UNIT-III

### Database Design

Topic: Normal Form and 1NF

#### Normal Forms:

- Normalization is the process of organizing the data in the database.
- Normalization is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate undesirable characteristics like Insertion, Update, and Deletion Anomalies.
- Normalization divides the larger table into smaller and links them using relationships.
- The normal form is used to reduce redundancy from the database table.

	1NF	2NF	3NF	4NF	5NF
Decomposition of Relation	R	R <sub>11</sub> R <sub>12</sub>	R <sub>21</sub> R <sub>22</sub> R <sub>23</sub>	R <sub>31</sub> R <sub>32</sub> R <sub>33</sub> R <sub>34</sub>	R <sub>41</sub> R <sub>42</sub> R <sub>43</sub> R <sub>44</sub> R <sub>45</sub>
Conditions	Eliminate Repeating Groups	Eliminate Partial Functional Dependency	Eliminate Transitive Dependency	Eliminate Multi-values Dependency	Eliminate Join Dependency

### First Normal Form (1NF)

- A relation will be 1NF if it contains an atomic value.
- It states that an attribute of a table cannot hold multiple values. It must hold only single-valued attribute.
- First normal form disallows the multi-valued attribute, composite attribute, and their combinations.

**Example:** Relation EMPLOYEE is not in 1NF because of multi-valued attribute EMP\_PHONE.

**EMPLOYEE table:**

EMP_ID	EMP_NAME	EMP_PHONE	EMP_STATE
14	John	7272826385, 9064738238	UP
20	Harry	8574783832	Bihar
12	Sam	7390372389, 8589830302	Punjab

The decomposition of the EMPLOYEE table into 1NF has been shown below:

EMP_ID	EMP_NAME	EMP_PHONE	EMP_STATE
14	John	7272826385	UP
14	John	9064738238	UP
20	Harry	8574783832	Bihar

12	Sam	7390372389	Punjab
12	Sam	8589830302	Punjab