Explain 2NF and 3NF with real example

Example: 2NF Employee table

|  |  |  |
| --- | --- | --- |
| **Employee\_ID** | **Department** | **Employee\_AGE** |
| **100** | **IT** | **35** |
| **101** | **HR** | **32** |
| **102** | **Legal** | **30** |
| **103** | **Finance** | **38** |
| **104** | **R&D** | **36** |

In the given table, non-prime attribute Employee\_ID, is dependent on Employee\_ID which is a proper subset of a candidate key. That's why it violates the rule for 2NF.

To convert the given table into 2NF, we decompose it into two tables:

Employee\_DETAIL table:

|  |  |
| --- | --- |
| **Employee\_ID** | **Employee\_AGE** |
| **100** | **35** |
| **104** | **36** |
| **103** | **38** |

Employee\_Department table:

**Employee\_ID Department**

|  |  |
| --- | --- |
| **100** | **IT** |
| **101** | **HR** |
| **103** | **Finance** |
| **104** | **R&D** |

Example: 3NF EMPLOYEE\_DETAIL table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **EMP\_ID** | **EMP\_NAME** | **EMP\_ZIP** | **EMP\_STATE** | **EMP\_CITY** |
| 100 | Raj | 101001 | MH | Mumbai |
| 101 | Jay | 200201 | MP | Indore |
| 102 | Sam | 656009 | AP | Hyderabad |
| 103 | Ram | 090009 | KL | Kochi |
| 104 | Kay | 200020 | GA | Panji |

Super key in the table above:

{EMP\_ID}, {EMP\_ID, EMP\_NAME}, {EMP\_ID, EMP\_NAME, EMP\_ZIP}.so on

**Candidate key:** {EMP\_ID}

|  |  |  |
| --- | --- | --- |
| **EMP\_ID** | **EMP\_NAME** | **EMP\_ZIP** |
| 100 | Raj | 101001 |
| 101 | Jay | 200201 |

|  |  |  |
| --- | --- | --- |
| 104 | Kay | 200020 |

EMPLOYEE\_ZIP table:

|  |  |  |
| --- | --- | --- |
| **EMP\_ZIP** | **EMP\_STATE** | **EMP\_CITY** |
| 101001 | MH | Mumbai |
| 200201 | MP | Indore |
| 200020 | GA | Panji |