gradeup

# Normalization for Relational Database Part-2

Content :-
1. Definition of Normalization
2. Normal Forms
a. First Normal Form
b. 2NF
c. 3NF
d. BNCf
e. 4NF
f. 5NF

**Normalization:**It is the process of minimizing redundancy from a set of relations orrelation. Redundancy in relation may causedeletion,insertion and updation anomalies. Minimization of redundancy in relation is done with the help of normalization. For elimination or reducing redundancy in database tables normal forms are used..
There are following normal forms :-
**1st 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 said to be in first normal form if every attribute in that relation is **singled valued attribute**.

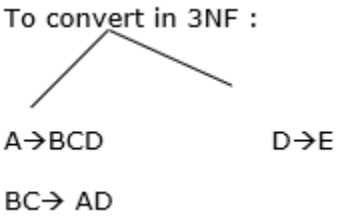
**2nd Normal Form :-**
To achieve the 2nd normal form, a relation must be in 1st normal form and it must not contain any partial dependency. If there is **NO Partial Dependency** in relation the relation is in 2NF i.e. any proper subset of any candidate key dose not depend non-prime attribute (attributes which are not part of any candidate key) of the table .
A→ BCDEF
BC→ ADEF
B→ F
D → E

**Partial Dependency** – If the proper subset of candidate key determines non-prime attribute, it is called partial dependency.

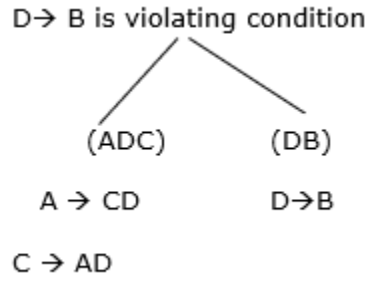
**3rd Normal Form :-**
A relation is in 3rd normal form, if there is no transitive dependency for non-prime attributes as well as it is in **second normal form**.
A relation is in **3NF** if at least one of the following condition holds in every **non-trivial function** dependency M –> N.
M is a super key.
N is a prime attribute (each element of Y is part of some candidate key)

**Transitive dependency –** If X->Y and Y->Z are two FDs then X->Zis called transitive dependency.
R(A,B,C,D,E)
A→ BCDE
BC → ADE
D→ E
CK= A,BC
NPA = D,E
Not in 3NF because of D→E


Gradeup UGC NET **Super Subscription**
Access to all Structured Courses & Test Series




**Boyce-Codd Normal Form (BCNF) –**A relation R is in BCNF if R is in 3NF and for every FD, LHS is super key. A relation is in BCNF iff in every non-trivial functional dependency M –> N, M is a super key.
A → BCD
BC → AD
D→ B
CK = A,BC




**Fourth Normal Form (4NF) :**
Any relation is said to be in the 4NF when it satisfies the following conditions:
- The relation must be in Boyce Codd Normal Form (BCNF).
- The relation should have no multi-valued dependency.

When there are 2 attributes in a table which depend on a 3rd attribute but are independent of each other then there is a multi-valued attribute.
For a functional dependency M->N there will be a multi-valued dependency if there exists multiple values of N for a single value of M.
Thus if a relation does not have any kind of and is in BCNF then that relation will be in 4NF.
Multi-valued dependency is denoted by "->->" this sign.

**Fifth Normal Form(5NF) :-**
**A relation is said to be in 5 NF if satisfy the following condition :-**

- The relation must be in 4NF.
- The relation should have no join dependency and also the joining must be lossless.

In the 5NF the relation must be decomposed in as many sub-relations as possible so as to avoid any kind of redundancy and there must be no extra tuples generated when the sub-relations are combined together by using natural join.
A relation in fifth normal form cannot be decomposed further without any kind of modification in the meaning or facts. Fifth normal form is also known as Project Join Normal Form (PJNF).

gradeup SUPER


# Gradeup UGC NET
## Super Superscription

**Features:**

1. 7+ Structured Courses for UGC NET Exam
2. 200+ Mock Tests for UGC NET & MHSET Exams
3. Separate Batches in Hindi & English
4. Mock Tests are available in Hindi & English
5. Available on Mobile & Desktop

---

Gradeup Super Subscription, Enroll Now