



Normalization

➤ Modification Anomalies

Ex: (Empid,Empname,Projectid,Projectname)

- Update Anomalies: If any changes in Projectname , it changes to empid,empname in the relation.
- Insertion Anomalies: If Projectid is NULL.
- Deletion Anomalies: If delete projectid,projecctname is deleted, then it has NULL values



Normalization

Sid	Sname	Credits	DeptName	Building	RoomNo
1	Rahul	5	CSE	B1	101
2	Jiva	8	CSE	B1	101
3	Jenny	9	IT	B2	201
4	Palani	9	IT	B2	201
5	Ashok	7	Civil	B3	110
6	Aakash	7	ECE	B1	115
7	Vanitha	8	Civil	B1	110
8	Tom	7	CSE	B1	101



Normalization

➤ Decomposition

➤ the process of breaking down one table into multiple tables.

ID	Name	Age
1	A	20
2	A	21

ID	Name
1	A
2	A

Name	Age
A	20
A	21



Normalization

➤ Decomposition – Lossy:

ID	Name		Name	Age
1	A	⊗	A	20
2	A		A	21

ID	Name	Age
1	A	20
1	A	21
2	A	20
2	A	21



Normalization

- Decomposition – Problems:
 - Some queries more expensive
 - loss of information during decomposition



Normalization

- Decomposition – Properties:
 - Loss-less Join or Non Loss Decomposition – When all information found in the original database is preserved after decomposition.
 - Dependency Preservation – This is a property in which the constraints on the original table can be maintained by simply enforcing some constraints on each of the smaller relations.



NORMALIZATION

➤ a process of organizing the data in database to avoid data redundancy

➤ Forms:

➤ First normal form(1NF)

➤ Second normal form(2NF)

➤ Third normal form(3NF)

➤ Boyce & Codd normal form (BCNF)



NORMALIZATION

- First normal form(1NF) :
 - an attribute (column) of a table cannot hold multiple values. It should hold only atomic values.

emp_id	emp_name	emp_address	emp_mobile
101	Herschel	New Delhi	8912312390
102	Jon	Kanpur	8812121212
			9900012222
103	Ron	Chennai	7778881212
104	Lester	Bangalore	9990000123
			8123450987



NORMALIZATION

- First normal form(1NF) :
 - each attribute of a table must have atomic (single) values.

emp_id	emp_name	emp_address	emp_mobile
101	Herschel	New Delhi	8912312390
102	Jon	Kanpur	8812121212
102	Jon	Kanpur	9900012222
103	Ron	Chennai	7778881212
104	Lester	Bangalore	9990000123
104	Lester	Bangalore	8123450987



NORMALIZATION

- Prime Attribute:
 - Member of some candidate Key.
 - Example: RegisterNo.
- Non-prime Attribute:
 - not a member of any candidate key



NORMALIZATION

- Second normal form(1NF) : A table is said to be in 2NF if both the following conditions hold:
 - Table is in 1NF (First normal form)
 - All the non-key columns are dependent on the table's primary key. (OR)
 - Every attribute is in an candidate Key,
 - Every attribute depend fully on every candidate key.



NORMALIZATION

- (id, projid, hrs, name, projname)
- (id, projid) -> hrs, name, projname
- id -> name
- projid -> projname
- Name and projname – partial dependency
- where name and projname provides redundancy.
- Name modified all relation's names are modified.



NORMALIZATION

- (id, projid, hrs, name, projname)
- (id, projid) -> hrs, name, projname
- id -> name
- projid -> projname
- 2NF: (id, projid, hrs), (id, name),
(projid, projname)



NORMALIZATION – 2NF

➤

teacher_id	subject	teacher_age
111	Maths	38
111	Physics	38
222	Biology	38
333	Physics	40
333	Chemistry	40

Candidate Keys: {teacher_id, subject}

Non prime attribute: teacher_age



NORMALIZATION – 2NF



teacher_id	subject	teacher_age
111	Maths	38
111	Physics	38
222	Biology	38
333	Physics	40
333	Chemistry	40

The table is in first normal form and all the columns depend on the table's primary key.

teacher_id	teacher_age
111	38
222	38
333	40

teacher_id	subject
111	Maths
111	Physics
222	Biology
333	Physics
333	Chemistry



NORMALIZATION

- A table design is said to be in 3NF if both the following conditions hold:
 - Table must be in 2NF
 - Transitive functional dependency of non-prime attribute on any super key should be removed.

OR

Every non prime attribute

- fully FD on every key, and
- non transitively FD on every key



NORMALIZATION

- (id, name, projid, projname)
- id -> name, projid
- projid -> projname
- From projname, can find projid, from projid find id.
- (id, name, projid) and (projid,projname)



NORMALIZATION

- (id, dist, taluk, area, price, rate)
- id – dist, taluk, area, price, rate
- dist, taluk -> id, area, price, rate
- dist -> rate
- area -> price



NORMALIZATION

- Second Normal Form
- (id, dist, taluk, area, price, rate)
- id – dist, taluk, area, price, **rate**
- dist, taluk -> id, area, price, **rate**
- dist -> rate
- area -> price
- price not fully FD



NORMALIZATION

- Second Normal Form
- (id, dist, taluk, area, price)
- id – dist, taluk, area, price, **rate**
- dist, taluk -> id, area, price, **rate**
- area -> price
- (dist, rate)
- dist -> rate



NORMALIZATION

- Third Normal Form
- (id, dist, taluk, area, price)
- id -> area -> price -> it is transitive
- (id, dist, taluk, area)
- (area, price)
- (dist, price) – It is 3NF



Conn...



Thank You.....