

5. Relational Database Design

pefine Normalization. Normalization is a step by step decomposition of complex records into simple records. Normalization is a process of organizing data in database in more efficient forms. This process is also called a canonical 8.2 Write short note on: Functional Dependency) Functional dependency provides a of a relation money to began ii) The Functional dependency is a relationship that exists between two attributes. iii) It typically exists between primary key and non-key attribute within a Fable. 2 mos Hich in) In a relation R with attributes X and y represented as R(X,Y), where Y is Functionally dependent on X or we can say X Functionally determines Y. v) This dependency is denoted by (-) vi) All the attributes before arrow is called determinant and attribute ofter annow is called as determine.

Consider an employee table.

Alleway Proj-id Hours Emp- id salary Ename E1 44 404 50k 10 Mahesh 31 E4 20 K 304 Syrosh 15K E 6 23 25K Ganash 12 E2 15/2 Mohesh 50 K

CASE 1: XHY

Empad - E-name

As per above constraint, it is possible to have multiple employees with same enome but different empid.

employees with some empid and

different ename.

CASE 2066 XIH YR VIE 20 100 100

Emp_id - Enamp, Salary

possible to have multiple employees

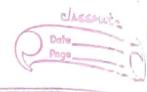
with same ename and solony.

CASE 3: XY - ZW 10 Hours, Allowarp

of As per above constraint, it is possible to have multiple emp-id & projid pair with same values of hours & allowance

0.2	Explain various normal Forms with an example. Various Normals Forms as Follows -					
3	· Various Normals Forms as Follows -					
) First Namal Form (2NF)					
•	=> INF states that all attributes in					
	relation must have atomic values and all					
	attributes in a tiple must have a					
	attributes in a tuple must have a					
	single volue from the domain of that					
	- A soldie is a TNE if every room					
	- A relation is in INF, if every row					
	contains exactly one value for each					
1	attribute. The said one to be be					
	- For reignification portion in in					
	Consider an employee table,					
	a) The sale of the ANF is					
	a) The relation schema not in INF is					
	represented as-					
	Empid Ename Esalary Ecity					
	empror Cridities					
	b) Empid Enome Esalong Ecity					
- 1	b) Empid Enome Esology Ecity 10 X 10K Mumbai, Pune					
	12 Y 20k Mumbai					
	17 W 8K Mumbail Delhi					
	1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1					
	2 - 1 1 1 TNF 4 a Frity					
	c) To convert into INF, the Ecity					
	attribute is divided in atomic domains					
	it may infroduce some data					
	xedind ancu					

redundancy



	Empid	Ename	Esalony	Caity
	10	×	lok	Mumbai
	10	X	lok	Pune
	12	Y	20k	Mumbai
	13	2 -	7K	Pune
	17	W	8K	Mumbai
_	17	Water	8K	Delhi

to domain redundancy.

- 2) Second Normal Form (2NF)
- and all non-key attribute in relation one fully functionally dependent a the primary key of the relation.

INF. short 2NF means, it should be in

there should not be any partial dependency on primary key attributes. For erg;

Consider relation R(AB,C,D,E,F) with FD's as below,

AHBC, BHDC, DHEF

- ?) The condidate key is LAD)
- AIDIBIC, E, F) selected as

All attributes are partially dependent on primary key.

Hence, Relation R is not in ENF.



- ii) The 2NE Relation Schema is, . RI (A,B,CID) with FDs A-1 BC, BHDC . R2 (DIEIF) with FDS DHEF
- 3) Third Normal Form (BNF) =) A relation is In BNF, if it is RNF and all non-prime attributes of relation are non-transitively dependent on the every key.

 A relation R is in BNE, if non-thivial

FD X+A holds true where x is superly and A is prime attributes.

Consider relation R(A,B,C,D,E,F) and the FD's below -

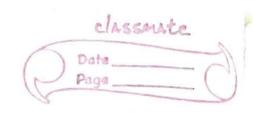
AMBC, BMD, DHEF

i) Here, (A) is the condidate key and selected as primary key.

All attributes are full functionally dependent on primary key.
Hence, R is in ENF

But non-prime attributes BIDIEIF are transitively depend on try. So, R is not in SNF.

ii) 3NF relation ochema is, R, (A,B,c) with A+BC R2 (B,D) with B-10 R3 (D,E,F) with D-1 EF



4) Boyce- Codd- Normal Form (BCNF)

=) A relation R is said to be in

BCNF, if and only if every determinant
is a condidate key.

For above example (s)

	Relation	FDs	Determinant	Key	BCNES
_		AHBC	A . Va	A Aron	YES
	IN (Z)		B	B	YES
	R2 (B1D)	BAD	0	D	YES
1	R3 (D, C,F)	V-1,C/-			