

Recap: A good decomposition is characterized by

(i) the resultant union of smaller tables

should recreate the same attributes as

in the original table.

(ii) Reassembly should produce original content; also referred to as the "Lossless Too" property.

Recap: There are three Normal forms discussed sofar namely: INF, 2NF, 3NF.

E Boyce Godd (BCNF) { Relational design by decomposition?

Defin) A relation R is in BCNF w.r.to a set of fol's if, for all fol's of the form x > B where x, BER, at least one of the following holds:

a) x > B is a trivial fol; or

b) x is the superkey of the relation R.

Def(ii) A relation R is in BCNF if whenever a non-trivial $fd \propto \rightarrow B$ holds in R, then x is a superkey of R.

Normal Forms Test First (INF) Relation should have no multivalued attributes Second (2NF) For relations where primary key contains consures multiple attributes, $\chi \to \beta$ no fol should have a \uparrow \uparrow \uparrow partial key on the totalprime non- determinant (x) Jhird (3NF) There should be gets rid expending $\chi \to \beta$ where the determinant (x) np \uparrow of the fol has a non prime attribute. Boyce-Codd (BCNF) There should be no mon-trivial folls where gets rid to the determinant (x) has $\chi \to \beta$ non-prime attributes. Paumilie: R (A B C) fols: {AB \to C, C \to B} R A B C	
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	4.
where & has	
loops back non prime	
its a problem, attributes.	

	Example: Based on the def 2. Let A > B be a
	Example: Based on the def 2. Let A > B be a non-trivial fd on relation R(ABCD).
	R: ABCD
	R: A B C D a+10 1 20 a+10 4 50
	at 10 4 50
	for A >B, this holds true
	Violation to be a superkey and to there would be no duplicates in the attribute A.
	violation to be a superkey and to there would be
	no duplicates in the attribute A.
	Algorithm: BCNF decomposition
	Output: R & FD's for R. Output: Decomposition of R into BCNF relations with
	"lossless Join".
	steps: Compute keys for R.
	Step 2: Repeat ristil all relations are in BCNF;
	a) Pick any R' with fol A >B that violates BCNF.
	a) Pick any R' with fdA >B that violates BCNF. b) Decompose R' into R', (AB) and R'2(A, "rest")
	c) compute Moscires for R, 2 R2'
	d) compute keys for R, 8 R2'
	Idea: R'AB rest A >B
	Idea: R'AB rest A >B Lisnot prime (riolation)
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à	RIAD M RZ AID. 1
	Ri AB M N2 A Rest

given R(ABCDEFGH) Example: $A \rightarrow BCG$ $G \rightarrow H$ $D \rightarrow EF$ decompose rising BCNF. Solution: Steps: Compute candidate keys of R. given fd: A > BCG compute closure At: ABCG (not key) given fd: G > H compute closure Gt: GH (not key) given fd: D>EF compute closure Dt: DEF (not key) usug edge diagram: RABCDEFGH) ADT: ADBCGEFH W is the candidate Step 2: Check fd's to have key on LHS A -> BCG > partial dependency, not prot in BCNF

D -> EF > partial depend. not in BCNF

Repeat Step 3: pick as fd that violates BCNF and decompose R into R, (XB) & R_2 (x, rest).



R(ABCDEFGH)

using $G \rightarrow H$ $\rightarrow R_1(GH)$ $G^{\dagger}: GH \longrightarrow R_2(GABCDEF)$

rusing D > EF

R21 (DEF) Dt: DEF W

R22 (DGABC)

using $A \rightarrow BCG$ $\rightarrow R221(ABCG)$ $A^{+}:ABCGw$ $\rightarrow R222(AD)$

R(ABCDEFGH)

-> R₂(GH) -> R₂(DEF) -> R₃(ABCG) -> R₄(AD)