INDIAN INSTITUTE OF TECHNOLOGY PATNA

CS501- DATABASE SYSTEMS AND DATAMINING

Assignment -3

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problem: -

Find the highest normal form of relation R (a, B, Y, J, E) with functional dependency set

(B > d, a > Y, By -> 0, dy -> BEZ

solution!-

Find the Candidate key.

(i) dis functionally dependent on B

(ii) a > Y Y is functionally dependent on a

(iii) Br > 6 8 is functionally dependent on Br. from the eqn (ii)

Y can be determined by CUB.

so, Y'cr S can be determined from our

(iv) div > BE

BE is Gunchendry dependent on div

Since E and Vian be determined by

WB

Therefore, will are the cardidate keys.

1) Check INF

Condition:

(i) each attributes should be atomic or indivisible.

R(d, B, V, S, E) does not have multi value attributes.

(2) Check 2NF

Condition:

(DRShould be INF - already venified

(ii) All non-prime attributes are fully dependent. On the entire candidate key

B > 0 - B is a candidate key and wis fully functionally dependent on any proper Subselt of Candidate key satisfies 2NF

d → V i dis a candidate tay, Y 15 fully dependent on it.

so it satisfies 2NF.

BV > 8: Both Band V together form a composite candidate key on it: So it satisfies 2 NF

LV -> BE Both of and V together
form a Composite Candida key

BE Untilly functionally

dependent on dy. so it

Solisties 2NF.

Since all churchenal dependencies satisfies almeady satisfy if.

instale where we will not the some

3. 3NF (Third Normal Point)

In 3NF, the relation must be 2NF.

* There should be no transitive dependent

there a non-prime attribute.

on another non-prime attribute.

Let's evaluate the FD.

B Ja, Bisa cardidate toy, and as is fully dependent on it so Satisfies 3NF

0 > V: 2 is a candidate key; and V 18 fully bunetional dependent on it so satisfies 3NF

BV > 8: 8 18 fully dependent on BV; which is a Superbay, So it Satisfies 3NF

dependent on dy, which is a superbuy, so it Satisfies 3 NF since all functional dependencies satisfy 3NF the rolation already Satisfies.

BCNF (BOYCE CODD NORMAL FORM)

IN BCNF, every non- trivial functional dependency x->y, x must be a supertay.

Let's evaluate the functional dependencies BJW: B is a condidate key, and as is fully functional dependent So it sansfier BCNF.

W > Y: wis a condidate key, and Y 18 fully furchonaly dependent on it. so it satisfies BCNF.

BV -> 8: BY is a candidate key, and S is fully bunchonaly dependent on it, so it sotisties Benf.

QV > BE: QY is a condidate key, and BE 12 fully functionally dependent on it so satisfies BONF. in above, FD sets, left side Keys, of B, d, BY, dry & all superkays. so relation satisfies BCNF.

BCNF is highest Normal Form.