Lecture-02
SSK

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Page 43

Join dependencies & Fifth normal form (5NF)

Supplier Parts Project

SPJ

S#	P#	J#
S_1	P_1	J_2
S_1	P_2	J_1
S_2	P_1	J_1
S_1	P_1	J_1

SP

S#	P#
S_1	P_1
S_1	P_2
S_2	P_1

PJ

P#	J#
P_1	J_2
P_2	J_1
P_1	J_1

↳ Join over P# ↲

JS

J#	S#
J_2	S_1
J_1	S_1
J_1	S_2

S#	P#	J#
S_1	P_1	J_2
S_1	P_2	J_1
S_2	P_1	J_1
S_2	P_1	J_2
S_1	P_1	J_1

→ Join over J#, S#

↓

Original SPJ

SP, PJ & JS are in 5NF but not SPJ.

Constraint 2D (2 decomposable) - If a relational schema can be decomposed into 2 smaller schemas which can be joined back on some attribute to form the original relational schema (no spurious tuple)

SPJ is considered to be n-decomposable where n=3 (>2).
∴ SPJ is 3D (3decomposable)

SPJ is equal to the join of its three projects SP, PJ and JS is equivalent to the following:
if the pair (S_1, P_2) appears in SP
and the pair (P_1, J_1) " " PJ
and the pair (J_1, S_1) " " JS
then the triple (S_1, P_2, J_1) appears in SPJ.

Join dependency -
Let R be a relation schema, and let A, B, ... Z be the subset of the attributes of R. The we say that R satisfies the JD

JD ← *{A, B, ... Z}

iff every possible legal value of R is equal to the join of its projections on A, B, ... Z.

SPJ is having a JD
*{SP, PJ, PJS}

Fifth normal form (5NF)

A schema R is in 5NF (PJNF - Project join normal form) iff every nontrivial JD that holds for R is implied by the candidate keys of R.

Trivial JD

The JD *{A, B, ..., Z} is trivial iff one of its projection A, B, ..., Z is the identity projection (ex - select * from table) of R.

Non-trivial JD

The JD in which none of its projection is identity projection.