



SNS COLLEGE OF ENGINEERING



Kurumbapalayam(Po), Coimbatore - 641 107

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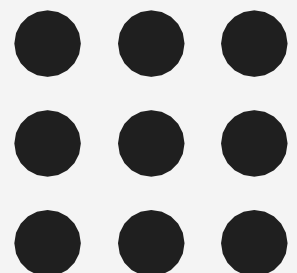
Department of Artificial Intelligence and Data Science

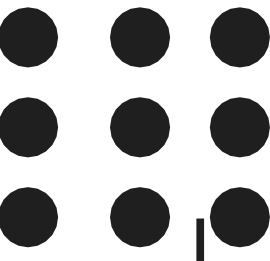
COURSE NAME : 23ITB204 -MODERN DATABASE
MANAGEMENT SYSTEMS

II YEAR / III SEMESTER

Unit 2

Topic : **Join Dependency and 5th Normal Form**





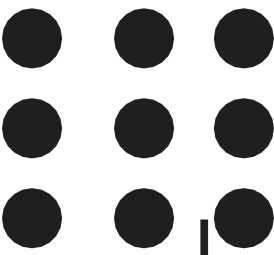
Join Dependencies and Fifth Normal Form

Concept of Join Dependencies

- Join decomposition is a further generalization of Multivalued dependencies.
- If the join of R1 and R2 over C is equal to relation R, then we can say that a Join Dependency (JD) exists.

Where R1 and R2 are the decompositions R1(A, B, C) and R2(C, D) of a given relations R (A, B, C, D).

- Alternatively, R1 and R2 are a lossless decomposition of R.
- A JD \bowtie (R1, R2, ..., Rn) is said to hold over a relation R if R1, R2, ..., Rn is a lossless-join decomposition.
- The \bowtie (A, B, C, D), (C, D) will be a JD of R if the join of join's attribute is equal to the relation R.
- Here, \bowtie (R1, R2, R3) is used to indicate that relation R1, R2, R3 and so on are a JD of R.



Concept of Fifth Normal Form

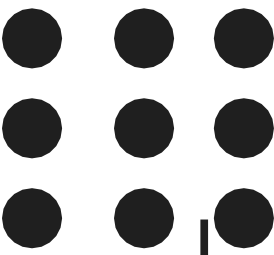
The database is said to be in 5NF if -

- i) It is in 4th Normal Form
- ii) If we can decompose table further to eliminate redundancy and anomalies and when we rejoin the table we should not be losing the original data or get a new record (join Dependency Principle)

The fifth normal form is also called as project join normal form

For example - Consider following table

Seller	Company	Product
Rupali	Godrej	Cinthol
Sharda	Dabur	Honey
Sharda	Dabur	Hairoil
Sharda	Dabur	Rosewater
Sunil	Amul	Icecream
Sunil	Britania	Biscuits



Here we assume the keys as {Seller, Company, Product}

The above table has multivalued dependency as Seller \rightarrow {Company, Product}. Hence table is not in 4th Normal Form.

To make the above table in 4th normal form we decompose above table into two tables as

Sellercompany

Seller	Company
Rupali	Godrej
Sharda	Dabur
Sunil	Amul
Sunil	Britania

Sellerproduct

Seller	Product
Rupali	Cinthol
Sharda	Honey
Sharda	Hairoil
Sharda	Rose water
Sunil	Ice cream
Sunil	biscuits

The above table is in 4th Normal Form as there is no multivalued dependency. But it is not in 5th normal form because if we join the above two table we may get



Seller	Company	Product
Rupali	Godrej	Cinthol
Sharda	Dabur	Honey
Sharda	Dabur	Hairoil
Sharda	Dabur	Rosewater
Sunil	Amul	Icecream
Sunil	Amul	Biscuits
Sunil	Britania	Ice cream
Sunil	Britania	Biscuits

Newly added records which are not present in original table

Sellercompany

Sellerproduct

To avoid the above problem we can decompose the tables into three tables as Seller_Company, Seller_Product, and Company Product table

Seller	Company
Rupali	Godrej
Sharda	Dabur
Sunil	Amul
Sunil	Britania

Seller	Product
Rupali	Cinthol
Sharda	Honey
Sharda	Hairoil
Sharda	Rose water
Sunil	Ice cream
Sunil	biscuits

Company	Product
Godrej	Cinthol
Dabur	Honey
Dabur	Hair oil
Dabur	Rosewater
Amul	Ice cream
Britania	biscuit

Thus the table in in 5th normal form.



THANK YOU