



Functional Dependency & Decomposition

By

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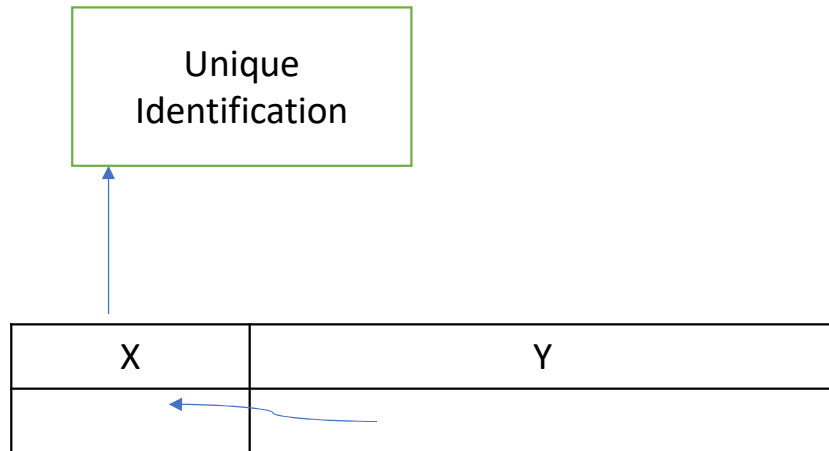


Functional Dependency

- Functional dependency (FD) is a set of constraints between two attributes in a relation. Functional dependency says that if two tuples have same values for attributes $A_1, A_2, \dots, A_n$, then those two tuples must have to have same values for attributes $B_1, B_2, \dots, B_n$.
- Functional dependency is represented by an arrow sign ($\rightarrow$) that is, $X \rightarrow Y$, where X functionally determines Y. The left-hand side attributes determine the values of attributes on the right-hand side.



Cont..



- It is relationship that exists when one attribute uniquely determine another attributes.
- $R \rightarrow$ is a relationship with attribute at X & Y
- It is denoted

- $X \rightarrow Y$

Y is functionally dependent on X

$X \rightarrow Y$

Red color mentioned – uniquely determine or primary key



Eg – Student details

SID	NAME	SURNAME
478	Murugan	K
479	Saravanan	S
480	Arumugam	D

SId – name
SId – surname

Functional Dependent



Eg – Student details cont..



Sid	Name	Surname	Age	Marks
478	Murugan	K	17	78
479	Saravanan	S	18	85
480	Arumugam	D	20	80

Sid – name
Sid – surname
Sid_age
Sid_marks

Functional Dependent

But Sid_age and Sid_marks more than one Sid can have the different age and marks , so that this is not functionally dependent



DECOMPOSITION



- Decomposition is the process of breaking down one table into multiple tables

EMPLOYEE_DEPARTMENT TABLE

Eid	Ename	Age	City	Salary	Deptid	Deptname
E1	ABC	14	KRR	40000	D1	CSE
E2	FOR	15	CBE	50000	D2	IT
E3	ISI	16	MAS	60000	D3	ECE
E4	ERT	17	TDY	70000	D4	MECH
E5	REW	18	ED	80000	D5	EEE

EMPLOYEE TABLE

Eid	Ename	Age	City
E1	ABC	14	KRR
E2	FOR	15	CBE
E3	ISI	16	MAS
E4	ERT	17	TDY
E5	REW	18	ED



DEPARTMENT TABLE

Deptid	Eid	Deptname
D1	E1	CSE
D2	E2	IT
D3	E3	ECE
D4	E4	MECH
D5	E5	EEE

CONT..



PROBLEM

- Consider following relation schema R in which we assume that the grade determine the salary, redundancy is caused

Eid	Ename	Salary	Grade	Deptname
E1	ABC	40000	2	CSE
E2	FOR	50000	3	IT
E3	ISI	60000	4	ECE
E4	ERT	70000	5	MECH
E5	REW	40000	2	EEE

Redundancy



Table 1

Eid	Ename	Grade	Deptname
E1	ABC	2	CSE
E2	FOR	3	IT
E3	ISI	4	ECE
E4	ERT	5	MECH
E5	REW	2	EEE

Cont..



Table 2

Salary	Grade
40000	2
50000	3
60000	4
70000	5
40000	2

- Problem related to the decomposition
- Some queries become more expensive
- We may not be able to reconstruct the corresponding instance of the original relation
- Checking some dependency required
- There may be loss of information during decomposition



Activity



Fill in the blanks

1. Functional dependency (FD) is a set of constraints between _____ attributes in a relation
2. Decomposition is the process of breaking down _____ table into _____ tables
3. Below the table whether belongs to redundancy or not

Eid	Ename	Salary	Grade	Deptname
E1	ABC	40000	2	CSE
E2	FOR	50000	3	IT
E3	ISI	60000	4	ECE
E4	ERT	70000	5	MECH
E5	REW	80000	2	EEE



Thank you