



Multivalued Dependency

- Multivalued dependency
- Fourth normal form (4NF)

- Multivalued dependency occurs when two attributes in a table are independent of each other but, both depend on a third attribute.
- A multivalued dependency consists of at least two attributes that are dependent on a third attribute that's why it always requires at least three attributes.

Multivalued Dependency: Example

BIKE_MODEL	MANUF_YEAR	COLOR
M2011	2008	White
M2001	2008	Black
M3001	2013	White
M3001	2013	Black
M4006	2017	White
M4006	2017	Black

The representation of these dependencies is :

- $\text{BIKE_MODEL} \twoheadrightarrow \text{MANUF_YEAR}$
- $\text{BIKE_MODEL} \twoheadrightarrow \text{COLOR}$

Fourth normal form (4NF)

- A relation will be in 4NF if it is in Boyce Codd normal form and has no multi-valued dependency.
- For a dependency $A \twoheadrightarrow B$, if for a single value of A, multiple values of B exists, then the relation will be a multi-valued dependency.

Fourth normal form (4NF): Example

STUDENT

STU_ID	COURSE	HOBBY
21	Computer	Dancing
21	Math	Singing
34	Chemistry	Dancing
74	Biology	Cricket
59	Physics	Hockey

Fourth normal form (4NF): Example

STUDENT_COURSE

STU_ID	COURSE
21	Computer
21	Math
34	Chemistry
74	Biology
59	Physics

STUDENT_HOBBY

STU_ID	HOBBY
21	Dancing
21	Singing
34	Dancing
74	Cricket
59	Hockey

THANK YOU

