

# BCNF → Boyce-Codd Normal form  
To be in a BCNF we should satisfy 2 condition-

- 1) It should be in 3NF.
- 2) And for any dependency,  $A \rightarrow B$ , A should be a super key.  
→ it means  $A \rightarrow B$ , A cannot be a non-prime attribute if B is a prime attribute.

S-id	Sub	professor
101	CS100	A
102	math101	B
103	CS100	C
104	chem101	D
105	CS100	A

(S-id, sub) → professor  
professor → subject

S-id	prof-id
101	1
101	2
102	3
102	4
105	1

prof-id	name	Sub
1	X	CS100
2	Y	math
3	Z	CS100
4	W	chem

[BCNF]

Any problem?

Person id	Shop-type	Nearest shop name
1	A	Eagle
1	B	Snippets
2	C	Merlin Books
3	D	ABC
3	B	Sunny Todd
3	A	Eagle Eye

$C \rightarrow B$   
 $AB \rightarrow C$  (lost a dependency)

Person	Shop

Shop	type

# 4NF → Already in BCNF  
No multi valued dependency

S-id	Course	hobby
21	CS2	Dance
21	Math	Singer
34	Chem	Dance
24	Bio	Coaching
51	Phy	Hockey

$A \rightarrow B$        $A \rightarrow C$

1NF ~~X~~



7615ACFC-4  
CID-4B06...

Cust Name	Item	Shipping Address	Newsletter	Supplier	Supplier Phone	Price
Alan Smith	Xbox One	35 Palm St, Miami	Xbox News	Microsoft	(800) BUY-XBOX	250
Roger Banks	PlayStation 4	47 Campus Rd, Boston	PlayStation News	Sony	(800) BUY-SONY	300
Evan Wilson	Xbox One, PS Vita	28 Rock Av, Denver	Xbox News, PlayStation News	Wholesale	Toll Free	450
Alan Smith	PlayStation 4	47 Campus Rd, Boston	PlayStation News	Sony	(800) BUY-SONY	300

non atomic column



2061E70B-4D  
907-4048...

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Alan Smith	Xbox One	35 Palm St, Miami	Xbox News	Microsoft	(800) BUY-XBOX	250
Roger Banks	PlayStation 4	47 Campus Rd, Boston	PlayStation News	Sony	(800) BUY-SONY	300
Evan Wilson	Xbox One	28 Rock Av, Denver	Xbox News	Microsoft	(800) BUY-XBOX	250
Evan Wilson	PS Vita	28 Rock Av, Denver	PlayStation News	Sony	(800) BUY-SONY	200
Alan Smith	PlayStation 4	47 Campus Rd, Boston	PlayStation News	Sony	(800) BUY-SONY	300

any partial dependency?

candidate key (Cust id, item) → C → M

customer

Cust-id	name	address

items

id	name	supplier	price

2NF

purchase → join table of Cust-id

Cust-id	item-id

3NF?

cost

id	name	address

item

id	name	price	supplier id

foreign

supplier

id	name	phone

purchase

Cust-id	item-id

3NF