

Fourth Normal Form

- Criteria: not ≥ 2 multi-valued dependencies
- Consider:

Customer(name, address, loan_number)

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Customer(name, address, loan_number)

- Primary key?
- Multi-valued dependencies

name \twoheadrightarrow address

name \twoheadrightarrow loan_number

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- Criteria: not ≥ 2 multi-valued dependencies
- Consider:

Customer(name, address, loan_number)

- Primary key?
- Multi-valued dependencies

name \twoheadrightarrow address

name \twoheadrightarrow loan_number

- Solution: separate into two relations

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- Another example:

Pizaa_Delivery(Restaurant, Pizza_Variety, Delivery_Area)

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- Another example:

Pizaa_Delivery(Restaurant, Pizza_Variety, Delivery_Area)

| <u>Restaurant</u> | <u>Pizza Variety</u> | <u>Delivery Area</u> |
|-------------------|----------------------|----------------------|
| A1 Pizza | Thick Crust | Springfield |
| A1 Pizza | Thick Crust | Shelbyville |
| A1 Pizza | Thick Crust | Capital City |
| A1 Pizza | Stuffed Crust | Springfield |
| A1 Pizza | Stuffed Crust | Shelbyville |
| A1 Pizza | Stuffed Crust | Capital City |
| Elite Pizza | Thin Crust | Capital City |
| Elite Pizza | Stuffed Crust | Capital City |
| Vincenzo's Pizza | Thick Crust | Springfield |
| Vincenzo's Pizza | Thick Crust | Shelbyville |
| Vincenzo's Pizza | Thin Crust | Springfield |
| Vincenzo's Pizza | Thin Crust | Shelbyville |