# Original Table

| order_id | customer_id | cake_type | size | quantity | price | rating | feedback |
|---|---|---|---|---|---|---|---|
| 101 | 1 | Chocolate Fudge | small | 1 | 700 | 5 | Delicious! |
| 102 | 2 | Vanilla Delight | medium | 2 | 1500 | 4 | Sweet and fresh |

---

## 1NF (First Normal Form)

- ✓ **Already in 1NF**
- ✓ All fields are atomic.
- ✓ No repeating groups.

---

## 2NF (Second Normal Form)

- ✓ Primary key: order_id
- ✓ All non-key attributes (customer_id, cake_type, size, etc.) are fully dependent on order_id.
- ✓ **Already in 2NF.**

---

## 3NF (Third Normal Form)

- ✓ Let's look for transitive dependencies:
- ✓ cake_type, size, and price are related.
- ✓ That means cake_type + size → price is a **transitive dependency**.

**To achieve 3NF, split the table into:**

- ✓ **customerorder:**

| order_id | customer_id | cake_type | size | quantity | rating | feedback |
|---|---|---|---|---|---|---|

| order_id | customer_id | cake_type | size | quantity | rating | feedback |
|---|---|---|---|---|---|---|
| 101 | 1 | Chocolate Fudge | small | 1 | 5 | Delicious! |
| 102 | 2 | Vanilla Delight | medium | 2 | 4 | Sweet and fresh |

✓ **cake :**

| cake_type | size | price |
|---|---|---|
| Chocolate Fudge | small | 700 |
| Vanilla Delight | medium | 1500 |

✓ **Now both tables are in 3NF.**

---

## BCNF (Boyce-Codd Normal Form)

✓ Check all functional dependencies:
✓ order_id → customer_id, cake_type, size, quantity, rating, feedback ✔
✓ cake_type + size → price ✔
✓ **BCNF is satisfied.**

---

## 4NF (Fourth Normal Form)

✓ Check for **multivalued dependencies**:
✓ One order refers to one cake and has one customer.
✓ No multivalued dependencies.
✓ **4NF is satisfied.**

---

## 5NF (Fifth Normal Form)

- ✓ Check for join dependencies or complex reconstruction issues:
- ✓ All tables are properly broken down, and no lossy decomposition exists.
- ✓ **5NF is satisfied**.