Report 9: Database normalization

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1 Which normal form does the `employees` database satisfy? Why?

1.1 The `employees` table

Here is the `employees` table:

emp_no	birth_date	first_name	last_name	gender	hire_date
10001	1953-09-02	Georgi	Facello	M	1986-06-26
10002	1964-06-02	Bezalel	Simmel	F	1985-11-21
10003	1959-12-03	Parto	Bamford	M	1986-08-28
10004	1954-05-01	Chirstian	Koblick	M	1986-12-01
10005	1955-01-21	Kyoichi	Maliniak	M	1989-09-12

All columns in the table except for `emp_no` are dependent and only dependent on `emp_no`; in other words, one `emp_no` value maps to exactly one value in each other column.

Therefore, the `employee` table is in 3NF.

1.2 The `departments` table

The `departments` table has two columns: `dept_no` and `dept_name`. As `dept_name` is only dependent on `dept_no`, the table is in 3NF.

1.3 The `dept_emp` table

The table has a primary key (`emp_no`, `dept_no`) and two other columns `from_date` and `to_date`. These two columns are only dependent on the primary key, so this table is also in 3NF.

1.4 The `dept_manager` table

This table has the same structure as the `dept_emp` table, so it is also in 3NF.

1.5 The `salaries` table

The table has a primary key (`emp_no`, `from_date`) and two other columns `salary` and `to_date`. These two columns are only dependent on the primary key, so this table is also in 3NF.

1.6 The `titles` table

The table has a primary key (`emp_no`, `title`, `from_date`) and one extra column `to_date`. This column is only dependent on the primary key, so this table is also in 3NF.

2 Produce a 3NF of the Order form document by normalization

Note that:

- Order date depends on order number
- Customer name, phone, address and city depend on the customer himself (one city for each customer)
- Product description and price depend on product ID
- Product quantity depends on both order number and product ID (one quantity for each combination of order number and product ID)
- Finally, customer number depends on order number (one customer for each order)

We split each set of dependent columns into one table, and receive the following tables:

- "Orders" table, containing these columns:
  - Order number
  - Order date
  - Customer number
- "Customers" table:
  - Customer number
  - Customer name
  - Customer phone
  - Customer address
  - City
- "Products" number:
  - Product ID

  - Product descr iption
  - Product price
- "Order detail" table:
  - Order number
  - Product ID
  - Product quantity

Figure 1: Tables