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Assignment 3

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1. Supply Company

Assumptions:

- Employees assist multiple customers, and any customer can be helped by different employees.
- The cage code represents a storage location for parts within the store.
- A customer order may include multiple parts.

1NF:

I first eliminate all repeating groups to structure the data into a single table. However, due to partial dependencies, this would not be in 2NF. The primary keys are customerNumber, date, time, and partNumber. Partial dependencies exist: employeeName depends on customerNumber, date, and time. partName, partType, cageCode, and unitPrice depend only on partNumber. customerName and customerType depend only on customerNumber.

order
<u>customerNumber</u> customerName customerType <u>date</u> <u>time</u> employeeName <u>partNumber</u> partName partType cageCode quantityOrdered unitPrice

2NF:

I eliminate partial dependencies by separate attributes based on their dependencies.

order_quantity
<u>customerNumber</u> <u>date</u> <u>time</u> <u>partNumber</u> quantityOrdered

order_employee
<u>customerNumber</u> <u>date</u> <u>time</u> employeeName

part
<u>partNumber</u> partName partType cageCode unitPrice

customer
<u>customerNumber</u> customerName customerType

3NF:

A transitive dependency exists: cageCode depends on partType, not directly on partNumber. To resolve this, I move cageCode into a separate table called part_location.

order_quantity
<u>customerNumber</u> <u>date</u> <u>time</u> <u>partNumber</u> quantityOrdered

order_employee
<u>customerNumber</u> <u>date</u> <u>time</u> employeeName

part
<u>partNumber</u> partName <i>partType</i> cageCode unitPrice

part_location
<u>partType</u> cageCode

customer
<u>customerNumber</u> customerName customerType

2. Mental Health Company

Assumptions:

- A patient is given an appointment at a specific time and date at a particular branch with one therapist.
- Patients may have multiple appointments in a single day and may see different therapists.
- The appointmentDateTime column represents both date and time of the appointment.

1NF:

I first structure the data into a single table, ensuring there are no repeating groups. This makes it 1NF. The primary keys are staffNo, patNo, appointmentDate, and appointmentTime. Partial dependencies exist: therapistName depends only on staffNo, patName depends only on patNo, branchNo is dependent on both staffNo and appointmentDate.

appointment
<u>staffNo</u> therapistName <u>patNo</u> patName <u>appointmentDate</u> <u>appointmentTime</u> branchNo

2NF:

To reach 2NF, I break the table into separate relations to remove all partial dependencies.

appointment
<u>staffNo</u> <u>patNo</u> patName <u>appointmentDate</u> <u>appointmentTime</u>

staff
<u>staffNo</u> therapistName

staff_branch
<u>staffNo</u> <u>appointmentDate</u> branchNo

3NF:

A transitive dependency exists: patName depends on patNo, which is not part of the appointment table's primary key. To resolve this, I separate patient details into the patient table.

appointment
<u>staffNo</u> <u>patNo</u> <u>appointmentDate</u> <u>appointmentTime</u>

staff
<u>staffNo</u> therapistName

staff_branch
<u>staffNo</u> <u>appointmentDate</u> branchNo

patient
<u>patNo</u> patName

3. Maid Better Temp Agency

Assumptions:

- Each employee is uniquely identified in the system.
- Each contract applies to only one event.
- Different contracts can exist for the same event due to different service needs.
- Each employee can work on multiple contracts.
- The event location depends only on the event number (eventNo), not directly on the contract.

1NF:

I first structure the data into a single table, ensuring there are no repeating groups. This makes it 1NF. The primary keys are eNo and contractNo. Partial dependencies exist: eName depends only on eNo, and eventNo and eventLoc depend only on contractNo.

employee_hour
<u>eNo</u> eName <u>contractNo</u> hour eventNo eventLoc

2NF:

To achieve 2NF, I remove partial dependencies by splitting the table into separate relations.

employee_hour
<u>eNo</u> <u>contractNo</u> hour

employee
<u>eNo</u> eName

contract
<u>contractNo</u> eventNo eventLoc

3NF:

eventLoc is transitively dependent on contractNo via eventNo. We need to move eventLoc to a separate table.

employee_hour
<u><i>eNo</i></u> <u><i>contractNo</i></u> hour

employee
<u><i>eNo</i></u> eName

contract
<u><i>contractNo</i></u> <i>eventNo</i>

event
<u><i>eventNo</i></u> eventLoc