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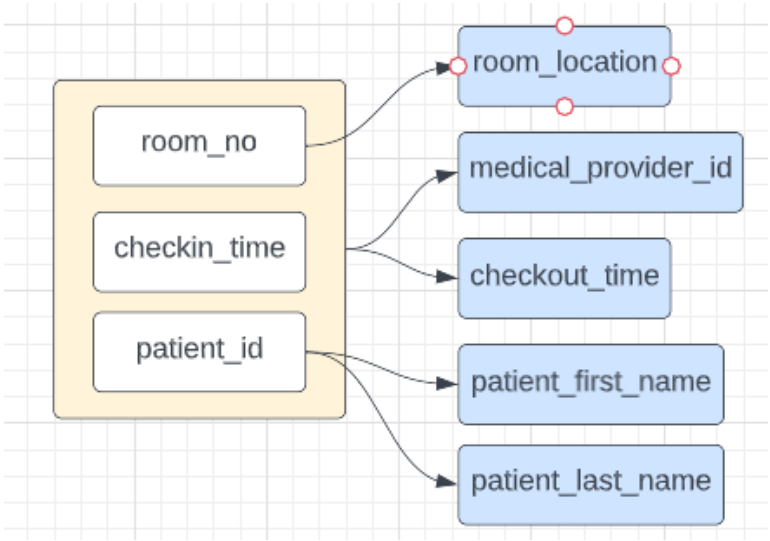
A8 - Normalization / BCNF:

Patient_check_in table

Table: **PATIENT_CHECK_IN** (room_no, checkin_time, patient_id, patient_first_name, patient_last_name, medical_provider_id, checkout_time, room_location)

Functional Dependencies:
Room_no, checkin_time, patient_id → medical_provider_id, checkout_time, patient_first_name, patient_last_name, room_location

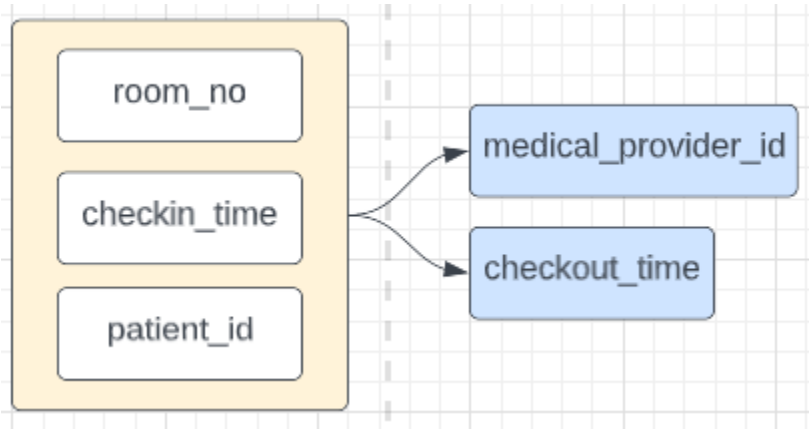
	room_no	checkin_time	pateint_id	medcial_provider_id	checkout_time	patient_first_name	patient_last_name	room_location
2	1	12	123456789	888999777	14	hi	king	main
3	2	13	987654321	111222333	14	hel	lo	sub
4	3	15	789654321	444555666	16	my	name	wing
5	4	7	345126789	777333555	8	ama	zing	main



Decomposition(2NF): split partial dependency (becomes 3NF as well)

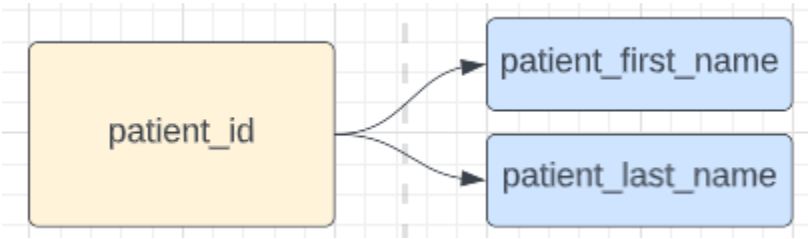
Functional Dependencies:
Room_no, checkin_time, patient_id → medical_provider_id, checkout_time

1	room_no	checkin_time	pateint_id	medcial_provider_id	checkout_time
2	1	12	123456789	888999777	14
3	2	13	987654321	111222333	14
4	3	15	789654321	444555666	16
5	4	7	345126789	777333555	8



Functional Dependencies:
patient _id → patient_first_name, patient_last_name

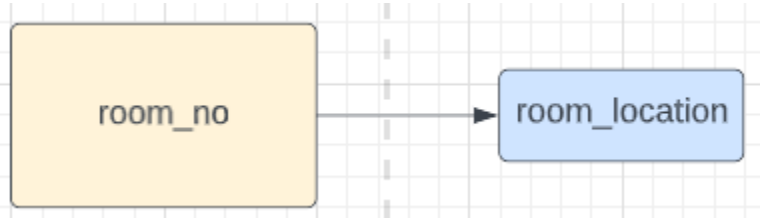
patient_id	patient_first_name	patient_last_name
123456789	hi	king
987654321	hel	lo
789654321	my	name
345126789	ama	zing



Functional Dependencies:

room_no → room_location

room_no	room_location
1	main
2	sub
3	wing
4	main



This table is in 2NF because all non-key attributes are fully functionally dependant on the primary keys

Conversion to 3NF

This table is in 3NF because all non-key attributes are non-transitively dependant on the primary keys

Conversion to BCNF

room_no, checkin_time, patient_id are keys that determine the rest of the attributes. Patient_id, and room_no have a decomposition table to determine the patient_last_name, patient_first_name and the room_location.

None of the other attributes have the keys dependent on them. So this relation is in BCNF.

Compute room_no, checkin_time, patient_id+
Checkin_time+ = {checkin_time}
Room_no+ = {room_no, room_location}
patient _id+ = {patient_id, patient_first_name, patient_last_name}
Checkin_time, patient_id+ = {checkin_time, patient_id, patient_first_name, patient_last_name}
Checkin_time, room_no+ = {checkin_time, room_no, room_location}

Checkin_time, room_no, patient_id+ = {room_location, patient_first_name, patient_last_name, room_location}

All Tables (in BCNF):

Table: **APPOINTMENT**
Functional Dependencies:
appt_id → patient_id, medical_provider_id, appt_creation_date, appt_date, appt_time, appt_reason

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key, appt_id
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key, appt_id
- This table is in BCNF because all attributes are dependant on the primary (candidate) key, appt_id

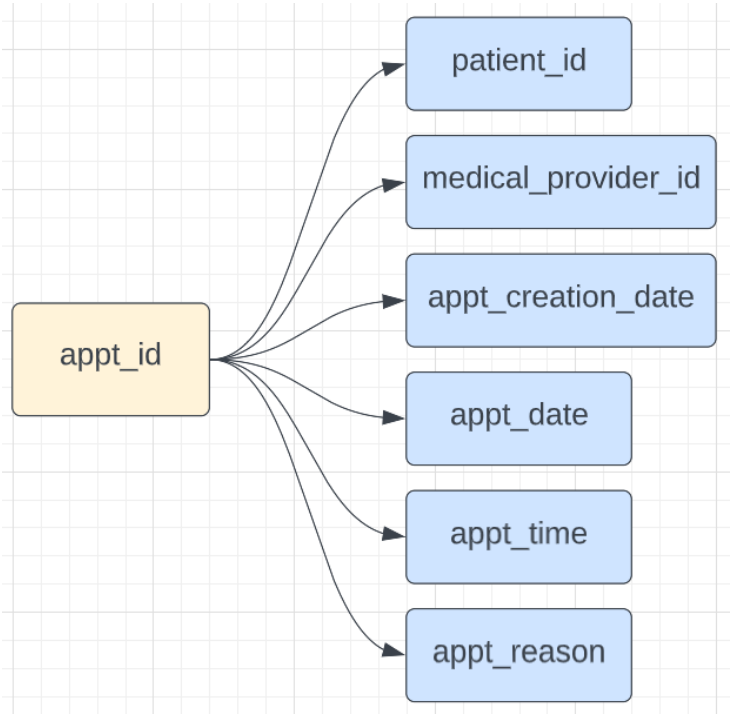


Table: **EMPLOYEE_AVAILABILITY**
Functional Dependencies:
employee_number → available_sick_days, available_pto_days, specified_days_off, weekly_available_days, notes

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key (also a foreign key (1-to-1 relation)), employee_number
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key (also a foreign key (1-to-1 relation)), employee_number
- This table is in BCNF because all attributes are dependant on the primary (candidate) key (also a foreign key (1-to-1 relation)), employee_number

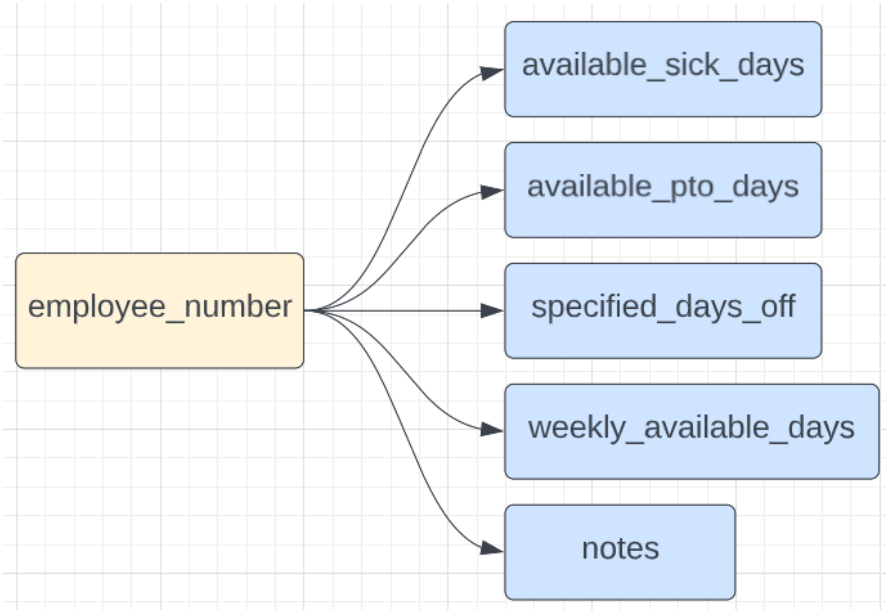


Table: **ITEM_SUPPLY_INFO**
Functional Dependencies:
{Item_id, supplier} → num_recieved, date_recieved, expiry_date

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary keys (also a foreign key), item_id & supplier
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary keys, item_id & supplier
- This table is in BCNF because all attributes are dependant on the primary key item_id & supplier

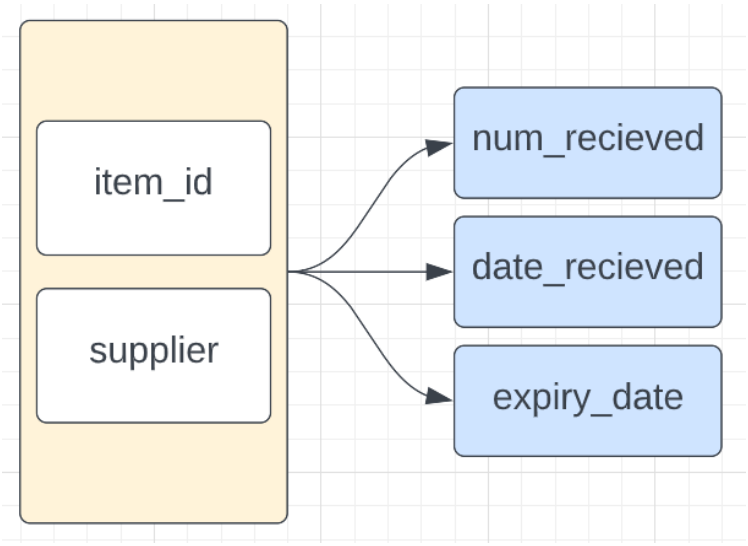


Table: **MEDICAL_STAFF**
Functional Dependencies:
employee_number → medical_provider_id

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key (also a foreign key (1-to-0…1 relation)), employee_number
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key (also a foreign key (1-to-0…1 relation)), employee_number
- This table is in BCNF because all attributes are dependant on the primary (candidate) key, employee_number

Table: **PATIENT_MEDICAL_HEALTH_INFO**
Functional Dependencies:
patient_id → ohip_number, current_meds, notes

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key (also a foreign key (1-to-1 relation)), patient_id
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key (also a foreign key (1-to-1 relation)), patient_id
- This table is in BCNF because all attributes are dependant on the primary (candidate) key, patient_id

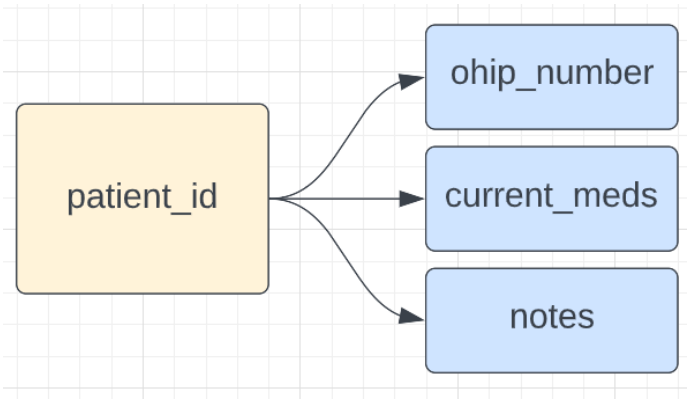


Table: **PATIENTS**
Functional Dependencies:
patient_id → first_name, last_name, gender, DOB, phone_no, email, address

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key, patient_id
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key, patient_id
- This table is in BCNF because all attributes are dependant on the primary (candidate) key, patient_id

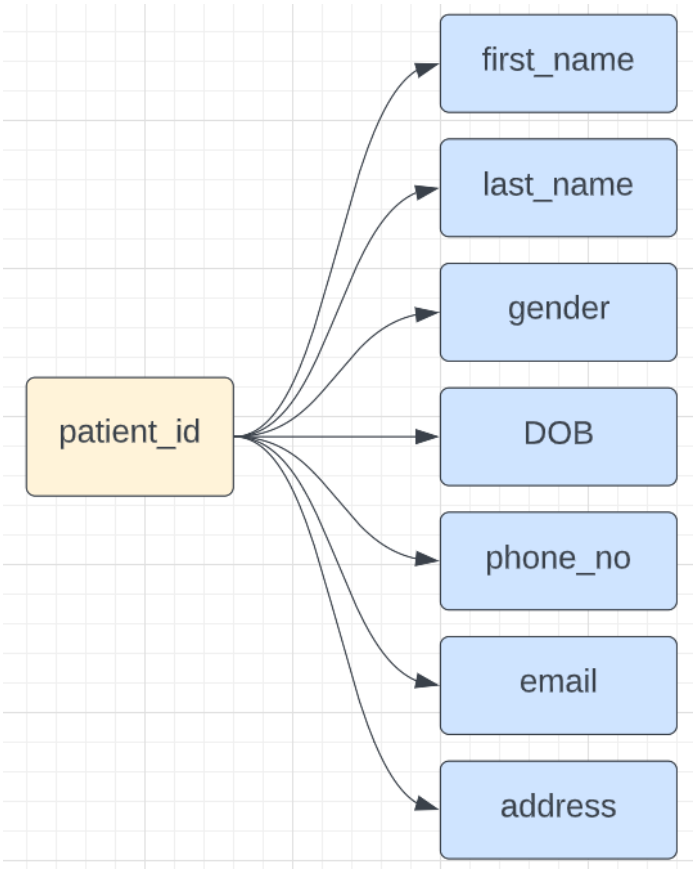


Table: **STAFF**
Functional Dependencies:
employee_number → SIN, first_name, last_name, department, DOB, phone_no, email, address

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key, employee_number
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key, employee_number
- This table is in BCNF because all attributes are dependant on the primary (candidate) key, employee_number

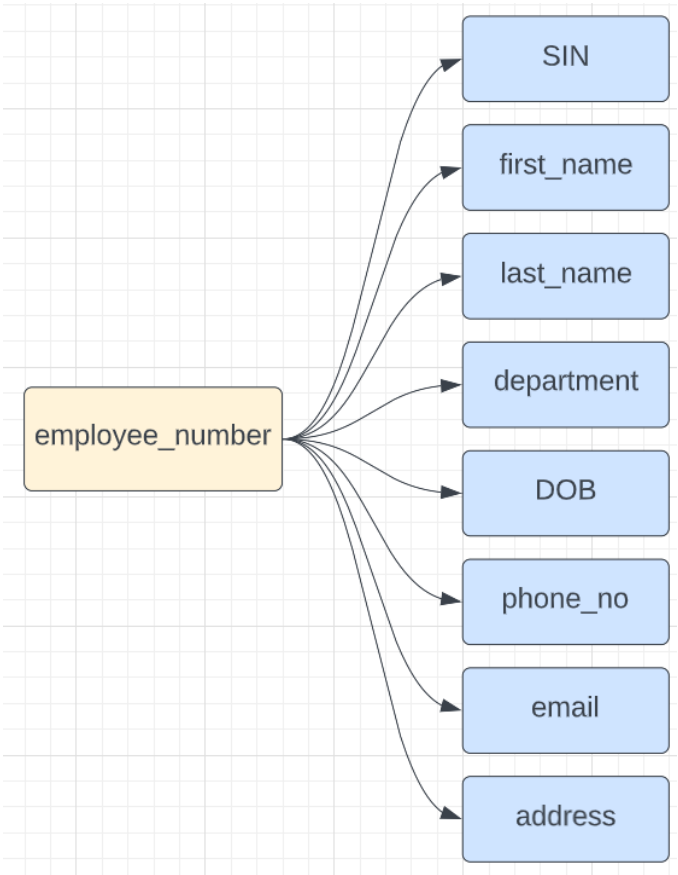


Table: **SUPPLIES**
Functional Dependencies:
item_id → item
item → quantity, storage_location

- This table is in 1NF because all values are atomic
- This table is in 2NF because all non-key attributes are fully functionally dependant on the primary key, item_id
- This table is in 3NF because all non-key attributes are non-transitively dependant on the primary key, item_id
- Item_id is dependent on item, but since item_id is not a non-candidate key attribute, 3NF still holds
- This table is in BCNF because all attributes are dependent on the primary key item_id. Also item is a candidate key so BCNF still holds