

Normalization Proofs

● Projected FDs :

1) Medicine: (Medicine_name, disease)

Medicine_name \rightarrow disease

The closure of {Medicine_name} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

2) Medical_Store: (store_name, store_address)

No Functional Dependencies as we have all attributes as compound key

As the relation Medical_Store does not have any FDs so this relation is in BCNF.

3) Staff: (staff_id, gender, name, age)

Staff_id \rightarrow {gender, name, age}

The closure of {Staff_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

4) Admit_Department: (room_id, available_beds, per_day_cost, Ac_non_ac)

Room_id \rightarrow {Available_beds, per_day_cost, AC_non_ac}

The closure of {Room_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

5) Doctor: (Doctor_id, Doctor_name, gender, Specialization)

Doctor_id \rightarrow {Doctor_name, gender, specialization}

The closure of {Doctor_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

Note : Assume that Each Doctor has only one Specialization.

6) Admit_Department: (room_id, available_beds, per_day_cost, Ac_non_ac)

Room_id \rightarrow {Available_beds, per_day_cost, AC_non_ac}

The closure of {Room_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

7) Patient: (Patient_id, Patient_name, age, Room_id)

Patient_id → {Patient_name, age, Room_id}

The closure of {Patient_name} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

8) Apollo_Medical_Store_online: (Product_id, age_group, Exp_date, Mfg_date, Online_sale_price, Medicine_name)

Product_id → {age_group, exp_date, mfg_date, online_sale_price, medicine_name}

The closure of {Product_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

9) Buy_Offline : (Medicine_name,store_name,Store_Address, Offline_sale_Price, Available_qty, Exp_date, Mfg_date)

{Medicine_name,store_name,Store_Address}
→ { Offline_sale_Price, Available_qty, Exp_date, Mfg_date }

The closure of {Medicine_name,store_name,Store_Address} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

10) Department_Staff: (staff_id, room_id)

Staff_id → Room_id

The closure of {Staff_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

Note: Each staff is working only in one room.

11) Rating: (doctor_id, patient_id, Given_rating)

{Doctor_id, Patient_id} → Given_Rating

The closure of {Doctor_id, Patient_id} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

12) Admit_data: (Bed_no, Patient_id, Duration, Admit_date, Room_id)

Bed_no → { Patient_id, Duration, Admit_date, Room_id }

The closure of {Bed_no} determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

13) Appointment : (Doctor_id, Patient_id, Start_date, end_date, charge_taken)

$\{\text{Doctor_id}, \text{Patient_id}\} \rightarrow \text{Start_date}$

$\{\text{Doctor_id}, \text{Patient_id}\} \rightarrow \text{end_date}$

$\{\text{Doctor_id}, \text{Patient_id}\} \rightarrow \text{charge_taken}$

The closure of $\{\text{Doctor_id}, \text{Patient_id}\}$ determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

14) Test : (Patient_id, Lab_tech_name, test_name, result)

$\{\text{Patient_id}, \text{Lab_Tech_name}, \text{Test_name}\} \rightarrow \text{result}$

The closure of $\{\text{Patient_id}, \text{Lab_Tech_name}, \text{Test_name}\}$ determines all the attributes of this relation so it is a super-key. Hence, this relation is in BCNF.

15) Health_Record:

$\{Patient_id, doctor_id, medicine_name\} \rightarrow$
 $\{prescription, visit_date, next_visit_date\}$
 $\{Patient_id\} \rightarrow \{visit_date, next_visit_date\}$

So as we see above third FD violates BCNF property so that we decompose this into 2 tables.

1) Health_record (Patient_id, Doctor_id, medicine_name, prescription)

$\{Patient_id, doctor_id, medicine_name\} \rightarrow$
 $\{prescription\}$

Now this table follows BCNF property.

2) Patient_visit(Patient_id, visit_date, Next_visit_date)

$\{Patient_id\} \rightarrow \{visit_date, next_visit_date\}$

Now this table also follows BCNF property.