

Group 8

DBMS

Hospital DB Management System

FD's & Normalization Proof

1. Patient

- Key: Patient_ID
- Minimal FD Set:
 - A. Patient ID \rightarrow Gender
 - B. Patient ID \rightarrow Patient_Name
 - C. Patient ID \rightarrow Date_of_Birth
- Patient_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

2. Doctor

- Key: Doctor_ID
- Minimal FD Set:
 - A. Doctor_ID \rightarrow Experience
- Doctor_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

3. Vehicle

- Key: Vehicle_ID
- Minimal FD Set:
 - A. Vehicle_ID \rightarrow No_plate
 - B. Vehicle_ID \rightarrow Vehicle_Type
- Vehicle_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

4. Employee

- Key: Employee_ID
- Minimal FD Set:
 - A. Employee_ID \rightarrow Employee_Name
 - B. Employee_ID \rightarrow Date_of_Birth

- C. Employee_ID \rightarrow Gender
- D. Employee_ID \rightarrow Joining_Date
- E. Employee_ID \rightarrow Retirement_Date
- F. Employee_ID \rightarrow Salary
- G. Employee_ID \rightarrow Qualification
- H. Employee_ID \rightarrow Department_ID
- Employee_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

5. Bill

- Key: Bill no
- Minimal FD Set:
 - A. Bill no \rightarrow Amount
 - B. Bill no \rightarrow Card_Relief
 - C. Bill no \rightarrow Payment_Status
 - D. Bill no \rightarrow Bill_date
 - E. Bill no \rightarrow Payment_Mode
 - F. Bill_no \rightarrow Patient_ID
- Bill no which is a super key and determinant of all FDs, therefore this relation is BCNF.

6. Bed

- Key: Bed_ID
- Minimal FD Set:
 - A. Bed_ID \rightarrow Patient_ID
 - B. Bed_ID \rightarrow Room_No
 - C. Bed_ID \rightarrow Floor_No
 - D. Bed_ID \rightarrow Ward_No
- Here, Bed_ID is the superkey and it determines all the attributes of the relation BED. Thus, the relation BED is in BCNF.

7. Trustee

- Key: {Trustee_ID , Donation_date}
- Minimal FD Set:
 - A. {Trustee_ID, Donation_date} \rightarrow Amount
- Here, Trustee_ID is the superkey and it determines all the attributes of the relation TRUSTEE. Thus, the relation TRUSTEE is in BCNF.

8. Address_Contact_Information

- Key: ID
- Minimal FD Set:

- A. $ID \rightarrow Apartment_No$
- B. $ID \rightarrow Street_No$
- C. $ID \rightarrow Street_Name$
- D. $ID \rightarrow City$
- E. $ID \rightarrow State$
- F. $ID \rightarrow Pin_code$
- Here, ID is the superkey and it determines all the attributes of the relation ADDRESS_CONTACT_INFORMATION. Thus, the relation ADDRESS_CONTACT_INFORMATION is in BCNF.

9. Inventory

- Key: Inventory_ID
- Minimal FD Set:
 - A. $Inventory_ID \rightarrow Inventory_Name$
 - B. $Inventory_ID \rightarrow Price$
 - C. $Inventory_ID \rightarrow Quantity$
- Here, Inventory_ID is the superkey and it determines all the attributes of the relation INVENTORY. Thus, the relation INVENTORY is in BCNF.

10. Department

- Key: Department_ID
- Minimal FD Set:
 - A. $Dept_ID \rightarrow Department_Name$
 - B. $Dept_ID \rightarrow Room_No$
 - C. $Dept_ID \rightarrow Floor_No$
 - D. $Dept_ID \rightarrow HOD_ID$
- Here, Department_ID is the superkey and it determines all the attributes of the relation DEPARTMENT. Thus, the relation DEPARTMENT is in BCNF.

11. Death Records

- Key: Patient_ID
- Minimal FD Set:
 - A. $Patient_ID \rightarrow Date_of_death$
 - B. $Patient_ID \rightarrow Cause_of_death$
- Patient_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

12. Donor

- Key: {Donor_ID, Donation_date}
- Minimal FD Set:
 - A. $\{Donor_ID, Donation_date\} \rightarrow Reimbursement$

- B. $\{ \text{Donor_ID}, \text{Donation_date} \} \rightarrow \text{Donation_Type}$
- Donor_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

13. General Information

- Key: ID
- Minimal FD Set:
 - A. $\text{ID} \rightarrow \text{Blood_group}$
 - B. $\text{ID} \rightarrow \text{Height}$
 - C. $\text{ID} \rightarrow \text{Weight}$
- ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

14. Available_Time

- Key: $\{ \text{Employee_ID}, \text{Available_from} \}$
- Minimal FD Set:
 - A. $\{ \text{Employee_ID}, \text{Available_from} \} \rightarrow \text{Available_to}$
- $\{ \text{Employee ID}, \text{Available from} \}$ which is a super key and determinant of all FDs, therefore this relation is in BCNF.

15. Driver

- Key: $\{ \text{Driver_ID} \}$
- Minimal FD Set:
 - A. $\text{Driver_ID} \rightarrow \text{License_No}$
- Driver_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

16. Attendance

- Key: $\{ \text{Employee_ID}, \text{Date_Of_Leave} \}$
- Minimal FD Set:
 - A.
- There is no FDs in minimal FD set. $\{ \text{Employee_ID}, \text{Date_Of_Leave} \}$ is a key. Therefore, the Relation is in BCNF.

17. Driven_By

- Key: $\{ \text{Driver_ID}, \text{Vehicle_ID} \}$
- Minimal FD Set:
 - A. $\{ \text{Driver_ID}, \text{Vehicle_ID} \} \rightarrow \text{Nurse_ID}$

- {Driver_ID,Vehicle_ID} which is a super key and determinant of all FDs, therefore this relation is in BCNF.

18. Mobile_No

- Key: {ID, Mobile_No}
- Minimal FD Set:
A.
- There is no FDs in minimal FD set. {ID, Mobile_No} is a key. Therefore, the Relation is in BCNF.

19. Email-Id

- Key: {ID,Email_ID}
- Minimal FD Set:
A.
- There is no FDs in minimal FD set. {ID, Email_ID} is a key. Therefore, the Relation is in BCNF.

20. Examined_By

- Key: {Doctor_ID, Patient_ID, Admit_Date}
- Minimal FD Set:
A. {Doctor_ID, Patient_ID, Admit_Date} → Discharge Date
B. {Doctor_ID, Patient_ID, Admit_Date} → Vehicle_ID
C. {Doctor_ID, Patient_ID, Admit_Date} → Driver_ID
- {Mstaff_ID, Patient_No, Admit_Date} which is a super key and determinant of all FDs, therefore this relation is BCNF.

21. Department_Has_Inventory

- Key: {Department_ID, Inventory_ID , Quantity_Associated}
- Minimal FD Set:
A. { Department_ID, Inventory_ID } → Quantity_Associated
- { Department_ID, Inventory_ID } which is a super key and determinant of all FDs, therefore this relation is BCNF.

22. Available_Day

- Key: Employee_ID
- Minimal FD Set:
A. Employee_ID → Days_of_week
- Employee ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

23. Donor_name

- Key: Donor_ID
- Minimal FD Set:
 - A. Donor_ID \rightarrow Donor_name
- Donor_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.

24. Trustee_name

- Key: Trustee_ID
- Minimal FD Set:
 - A. Trustee_ID \rightarrow Trustee_name

Trustee_ID which is a super key and determinant of all FDs, therefore this relation is BCNF.