Problem-2:

1. Apply the simple BCNF procedure to define BCNF tables using the FD list Table 2. Show the result of each step in your analysis. For the final result, you should show the tables, columns, primary key of each table, foreign keys, and unique constraints. You do not need to provide CREATE TABLE statements.

Table 2: FDs for the Big Patient Table

|  |
| --- |
| PatNo → PatAge |
| PatZip9 → PatCity |
| VisitNo → VisitDate  PatNo → PatZip9  ProvNo → ProvSpecialty |
| VisitNo → PatNo |
| VisitNo, ProvNo → Diagnosis  ProvNo → ProvEmail  ProvEmail → ProvNo |

Soln:

Step 1: Arrange FD’s into groups by Determinant.

PatNo->PatAge,PatZip9

PatZip9->PatCity

VisitNo->VisitDate,PatNo

VisitNo,ProvNo->Diagnosis

ProvNo->ProvSpeciality,ProvEmail

ProvEmail->ProvNo

Step 2: For each FD group, make a table with the determinant as the primary key. In the table list, the primary keys are underlined.

Pat(PatNo,PatAge,PatZip9)

FOREIGN KEY(PatZip9) REFERENCES(PatZ)

PatZ(PatZip9,PatCity)

Visit(VisitNo,VisitDate,PatNo)

FOREIGN KEY(PatNo) REFERENCES(Pat)

VisP(VisitNo,ProvNo,Diagnosis)

FOREIGN KEY(VisitNo) REFERENCES(Visit)

FOREIGN KEY(ProvNo) REFERENCES(Prov)

Prov(ProvNo,ProvSpeciality,ProvEmail)

FOREIGN KEY(ProvEmail) REFERENCES(PEmail)

PEmail(ProvEmail,ProvNo)

FOREIGN KEY(ProvNo) REFERENCES(Prov)

Step 3: Merge the tables with same columns. Tables Prov and PEmail are merged.

Pat(PatNo,PatAge,PatZip9)

FOREIGN KEY(PatZip9) REFERENCES(PatZ)

PatZ(PatZip9,PatCity)

Visit(VisitNo,VisitDate,PatNo)

FOREIGN KEY(PatNo) REFERENCES(Pat)

VisP(VisitNo,ProvNo,Diagnosis)

FOREIGN KEY(VisitNo) REFERENCES(Visit)

FOREIGN KEY(ProvNo) REFERENCES(Prov)

Prov(ProvNo, ProvEmail,ProvSpeciality, UNIQUE(ProvEmail).