1. **Insertion Anomaly**: Cannot Insert new VisitNo(V10022) unless ProvNo also inserted

**Update Anomaly**: Multiple rows have to be changed if PatCity(Denver) changed for VisitNo(V10021)

**Deletion Anomaly**: Deleting 4th row removes details of PatNo(P2) and ProvNo(D3)

1. Step 1: Arrange the FDs into groups by determinant

PatNo → PatAge, PatZip9

PatZip9 → PatCity

VisitNo → VisitDate, PatNo

ProvNo → ProvSpecialty, ProvEmail

ProvEmail → ProvNo

VisitNo, ProvNo → Diagnosis

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.

**Patient**(PatNo, PatAge, PatZip9)

FOREIGN KEY (PatZip9) REFERENCES PatientZip

**PatientZip**(PatZip9, PatCity, PatNo)

FOREIGN KEY (PatNo) REFERENCES Patient

**Visit**(VisitNo, VisitDate, PatNo)

FOREIGN KEY (PatNo) REFERENCES Patient

**Provision**(ProvNo, ProvSpecialty, ProvEmail)

**ProvisionEmail**(ProvEmail, ProvNo)

FOREIGN KEY (ProvNo) REFERENCES Provision

**Result**(VisitNo, ProvNo, Diagnosis)

FOREIGN KEY (VisitNo) REFERENCES Visit

FOREIGN KEY (ProvNo) REFERENCES Provision

Step 3: Merge tables with the same columns. The Patient and PatientZip tables are merged. The Provision and ProvisionEmail tables are merged. UNIQUE constraints are added for PatZip9 and ProvEmail.

**Patient**(PatNo, PatAge, PatZip9, PatCity)

UNIQUE (PatZip9)

**Visit**(VisitNo, VisitDate, PatNo)

FOREIGN KEY (PatNo) REFERENCES Patient

**Provision**(ProvNo, ProvSpecialty, ProvEmail)

UNIQUE (ProvEmail)

**Result**(VisitNo, ProvNo, Diagnosis)

FOREIGN KEY (VisitNo) REFERENCES Visit

FOREIGN KEY (ProvNo) REFERENCES Provision

1. LenderName, InstName, and StdEmail are determinants.

The tables Student, Lender, and Institution should not be split because they are in BCNF and determinants are unique. Unique constraints should be added for LenderName, InstName, and StdEmail.

**Student** (StdNo, StdName, StdEmail, StdAddress, StdCity, StdState, StdZip )

UNIQUE(StdEmail)

**Lender**(LenderNo, LenderName)

UNIQUE(LenderName)

**Institution**(InstNo, InstName, InstMascot)

UNIQUE(InstName)

1. OrdNo → ItemNo (1&2, 3&4)

OrdNo → QtyOrd (3&4)

OrdNo → CustNo (None)

OrdNo → CustBal (None)

OrdNo → CustDisc (None)

OrdNo → ItemPrice (1&2, 3&4)

OrdNo → Orddate (None)