

Entity Relation Model Mapping and Normalization

ER-Model Mapping to Database Relational Schema :

Dentist(SSN, FName, LName, Speacialization, Salary, DOB)

Patient(PID, PName, PAddress, DOB, PhNumber)

Insurer(Name, Address)

PaymentPlan(PlanID, Status, StartDateOfPlan, LastDateOfPlan, TotalRemainingAmt, DueDay, AfterEveryMonth, (**PID**, **BillID**))

Payment(ReceiptID, Date, PaidAmount, Time)

Money(ReceiptID, PaymentMode)

Insurance(ReceiptID, PolicyNumber, **InsurerName**)

Dentist_Patient_Appointment(SSN, PID, (Date, Time))

Patient_Bill(PID, BillID, TotalAmount)

Bill_Full_Payment(, (**PID**, **BillID**), ReceiptID)

PaymentPlan_Payment_Installment(ReceiptID, InstallmentNumber, **PlanID**)

Patient_have_Insurer(PID, InsurerName, InsuranceContract)

CurrentPatient_Refers_NewPatient(**CurrentPatient_PID**, NewPatient_PID)

Normalization :

1. Dentist(SSN, FName, LName, Speacialization, Salary, DOB) –

This relation is already in the BCNF. As there is no multivalued, composite attribute and nested tables which qualifies it for 1NF.

2NF – There is no partial dependency on prime attribute.

3NF – No Transitive functional dependency. BCNF – No transitive FD.

2. Patient(PID, PName, PAddress, DOB, PhNumber)

1NF – As we are storing only one PhNumber there is no multivalued attribute, and it qualifies for other rules also.

2NF – As there is no composite key there is no partial dependency on the prime attribute. 3NF – No transitive FD
BCNF – No transitive FD

3. Insurer(Name, Address) It is in BCNF
4. PaymentPlan(PlanID, Status, StartDateOfPlan, LastDateOfPlan, TotalRemainingAmt, DueDay, AfterEveryMonth, (**PID**, **BillID**))
1NF – Its in first NF
2NF – As key is not composite its in the 2NF
3NF – No transitive functional dependency exists BCNF – No transitive FD
5. Payment(ReceiptID, Date, PaidAmount, Time)
1NF – Yes
2NF – Yes, No composite key means no partial dependency
3NF – No transitive FD so its in the 3NF BCNF – Yes
6. Money(ReceiptID, PaymentMode) Its in the BCNF
7. Insurance(ReceiptID, PolicyNumber, **InsurerName**)
1NF – Yes, no composite, multivalued and nested element present in the relation
2NF – Yes, no partial dependency because by knowing the policy number we cannot guess the insurer name
3NF – no transitive FD BCNF – Yes
8. Dentist_Patient_Appointment(SSN, **PID**, (Date, Time)) Its already in BCNF
9. Patient_Bill(PID, BillID, TotalAmount)
1NF – yes
2NF – no partial dependency
3NF – Yes because non-prime attribute could not determine a prime attribute BCNF – yes
10. Bill_Full_Payment((**PID**, **BillID**), ReceiptID) It is already in BCNF
11. PaymentPlan_Payment_Installment(ReceiptID, InstallmentNumber, **PlanID**) It is already in BCNF because there is no functional dependency in which a non-prime attribute could determine a prime attribute
12. Patient_have_Insurer(PID, InsurerName, InsuranceContract)
It is already in BCNF because there is no functional dependency in which a non-prime attribute could determine a prime attribute
13. CurrentPatient_Refers_NewPatient(**CurrentPatient_PID**, NewPatient_PID)
1NF – no multivalued, composite attribute and nested tables
2NF – No composite key or no partial dependency
3NF – No transitive functional dependency
It is already in BCNF