IT-214

Database Management System

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Team ID – T210

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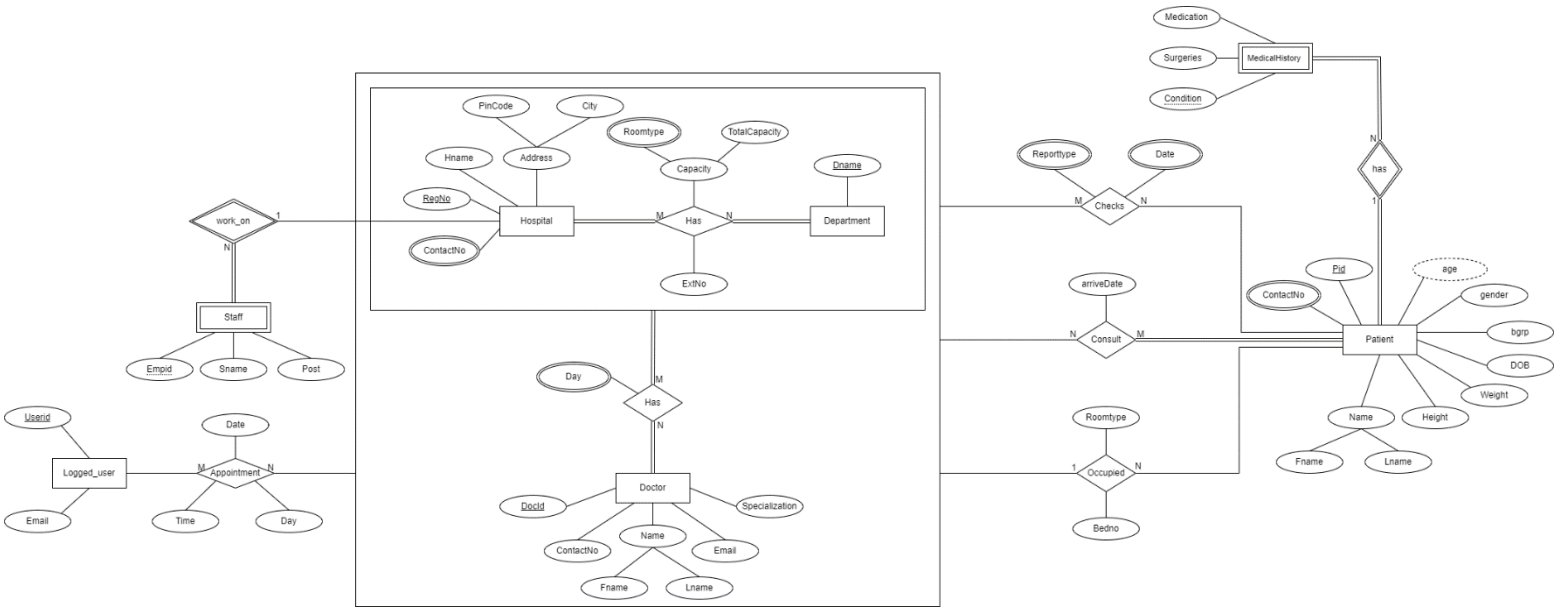
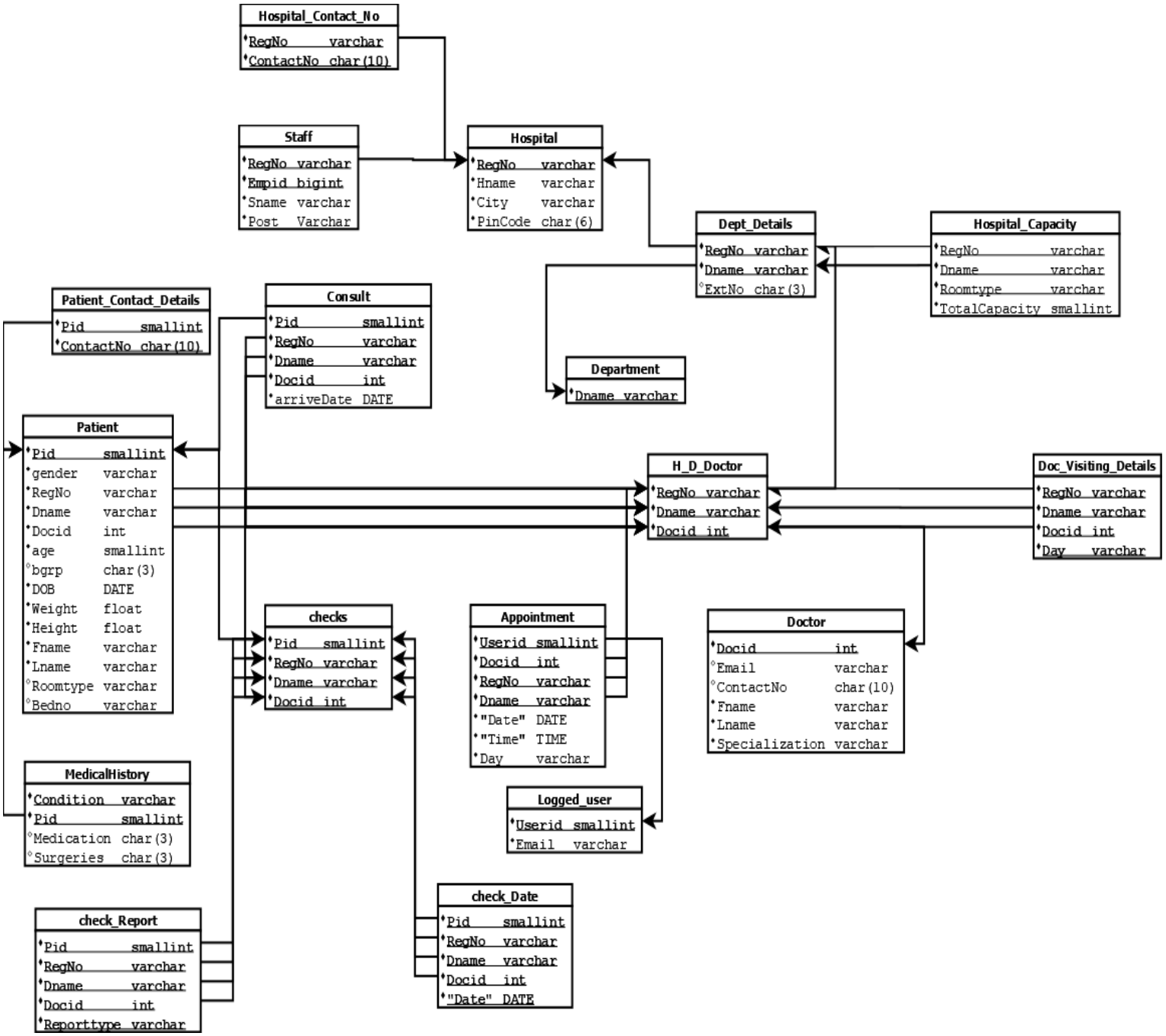
Entity Relationship Diagram – ERD



Relational Schema



Normalization Proofs

1. ‘Logged_user’ relation:

   - Attributes:

     Logged_user {Userid, Email}

   - Functional Dependencies:

     Userid → Email

   Let X = Userid

   X^+ = {Userid, Email}

   Thus, Primary key = Userid

   The left side of all the FDs in minimal set of FDs for the relation ‘Logged_user’ is Userid, which is the primary key of this relation, so ***“Logged_user” is in BCNF.***

2. ‘Hospital’ relation:

   - Attributes:

     Hospital {RegNo, Hname, City, PinCode}

   - Functional Dependencies:

     RegNo → Hname

     RegNo → City

     RegNo → PinCode

   Let X = RegNo

   X^+ = {RegNo, Hname, City, PinCode}

   Thus, Primary key = RegNo

   The left side of all the FDs in minimal set of FDs for the relation ‘Doctor’ is RegNo, which is the primary key of this relation, so ***“Doctor” is in BCNF.***

3. ‘Hospital_Contact_No’ relation:

   - Attributes:

     Hospital {RegNo, ContactNo}

   Here Primary key = {RegNo, ContactNo}

   According to theorem, all attribute primary key relation is always in BCNF. Hence *“Hospital_Contact_No” is in BCNF*.

4. ‘Staff’ relation:

   - Attributes:

   Staff {RegNo, Sname, Post}

   - Functional Dependencies:

     {RegNo, Sname} → Post

   Let X = {RegNo, Sname}

   X^+ = {RegNo, Sname, Post}

   Thus, Primary key = {RegNo, Sname}

   The left side of all the FDs in minimal set of FDs for the relation ‘Staff’ is {RegNo, Sname}, which is the primary key of this relation, so *“Staff” is in BCNF.*

5. ‘Department’ relation:

   - Attributes:

     Department {Dname}

   Here Primary key = {Dname}

According to theorem, all attribute primary key relation is always in BCNF. Hence ***"Department" is in BCNF.***

6. 'Dept_Details' relation:

- Attributes:

  Dept_Details {RegNo, Dname, ExtNo}

- Functional Dependencies:

  {RegNo, Dname} → ExtNo

Let X = {RegNo, Dname}

X^+ = {RegNo, Dname, ExtNo}

Thus, Primary key = {RegNo, Dname}

The left side of all the FDs in minimal set of FDs for the relation 'Dept_Details' is {RegNo, Dname}, which is the primary key of this relation, so ***"Dept_Details" is in BCNF.***

Earlier, this table also had attributes, Roomtype and TotalCapacity, but as the relation was not in BCNF, we have decomposed the table into two tables, 'Dept_Details' and 'Hospital_Capacity' both of which are in BCNF.

7. 'Hospital_Capacity' relation:

- Attributes:

  Hospital_Capacity {RegNo, Dname, Roomtype, TotalCapacity}

- Functional Dependencies:

  {RegNo,Dname,Roomtype} → TotalCapacity

Let X = {RegNo,Dname,Roomtype}

X^+ = {RegNo, Dname, Roomtype, TotalCapacity}

Thus, Primary key = {RegNo,Dname,Roomtype}

The left side of all the FDs in minimal set of FDs for the relation 'Hospital_Capacity' is {RegNo,Dname,Roomtype}, which is the primary key of this relation, so *"Hospital_Capacity" is in BCNF.*

8. 'Doctor' relation:

- Attributes:

  Doctor {Docid, Email, ContactNo, Fname, Lname, Specialization}

- Functional Dependencies:

  Docid → Email

  Docid → ContactNo

  Docid → Fname

  Docid → Lname

  Docid → Specialization

Let X = Docid

X^+ = {Docid, Email, ContactNo, Fname, Lname, Specialization}

Thus, Primary key = Docid

The left side of all the FDs in minimal set of FDs for the relation 'Doctor' is Docid, which is the primary key of this relation, so *"Doctor" is in BCNF.*

9. 'H_D_Doctor' relation:

- Attributes:
  H_D_Doctor {RegNo, Dname, Docid}

Here Primary key = {RegNo, Dname, Docid}

According to theorem, all attribute primary key relation is always in BCNF. Hence *"H_D_Doctor" is in BCNF.*

10. ‘Doc_Visiting_Details’ relation:

- Attributes:
  Doc_Visiting_Details {RegNo, Dname, Docid, Day}

Here Primary key = {RegNo, Dname, Docid, Day}

According to theorem, all attribute primary key relation is always in BCNF. Hence ***“Doc_Visiting_Details” is in BCNF.***

11. ‘Appointment’ relation:

- Attributes:
  Appointment {Userid, Docid, RegNo, Dname, Date, Time, Day}
- Functional Dependencies:
  {Userid, Docid, RegNo, Dname} → Date
  {Userid, Docid, RegNo, Dname} → Time
  {Userid, Docid, RegNo, Dname} → Day

Let X = {Userid, Docid, RegNo, Dname}

X^+ = {Userid, Docid, RegNo, Dname, Date, Time, Day}

Thus, Primary key = {Userid, Docid, RegNo, Dname}

The left side of all the FDs in minimal set of FDs for the relation ‘Appointment’ is {Userid, Docid, RegNo, Dname}, which is the primary key of this relation, so ***“Appointment” is in BCNF.***

12. ‘Patient’ relation:

- Attributes:

  Patient {Pid, Docid, RegNo, Dname, gender, age, bgrp, DOB, Weight, Height, Fname, Lname, Roomtype, Bedno}

- Functional Dependencies:

Pid → Docid

Pid → RegNo

Pid → Dname

Pid → gender

Pid → age

Pid → bgrp

Pid → DOB

Pid → Weight

Pid → Height

Pid → Fname

Pid → Lname

Pid → Roomtype

Pid → Bedno

Let X = Pid

X^+ = {Pid, Docid, RegNo, Dname, gender, age, bgrp, DOB, Weight, Height, Fname, Lname, Roomtype, Bedno}

Thus, Primary key = Pid

The left side of all the FDs in minimal set of FDs for the relation 'Patient' is Pid, which is the primary key of this relation, so ***"Patient" is in BCNF.***

13. 'Patient_Contact_Details' relation:

- Attributes:

  Patient_Contact_Details {Pid, ContactNo}

Here Primary key = {Pid, ContactNo}

According to theorem, all attribute primary key relation is always in BCNF. Hence ***"Patient_Contact_Details" is in BCNF.***

14. ‘MedicalHistory’ relation:

- Attributes:

  MedicalHistory {Condition, Pid, Medication, Surgeries}

- Functional Dependencies:

  {Condition, Pid} → Medication

  {Condition, Pid} → Surgeries

Let X = {Condition, Pid}

X^+ = {Condition, Pid, Medication, Surgeries}

Thus, Primary key = {Condition, Pid}

The left side of all the FDs in minimal set of FDs for the relation ‘MedicalHistory’ is {Condition, Pid}, which is the primary key of this relation, so *“MedicalHistory” is in BCNF.*

15. ‘Checks’ relation:

- Attributes:

  checks {Pid, RegNo, Dname, Docid}

Here Primary key = {Pid, RegNo, Dname, Docid}

According to theorem, all attribute primary key relation is always in BCNF. Hence *“checks” is in BCNF.*

16. ‘Check_Report’ relation

- Attributes:

  check_Report {Pid, RegNo,Dname,Docid,Reporttype}

Here Primary key = {Pid, RegNo, Dname, Docid, Reporttype}

According to theorem, all attribute primary key relation is always in BCNF. Hence *"Check_Report" is in BCNF.*

17. 'Check_Date' relation:

- Attributes:

  check_Date {Pid, RegNo,Dname,Docid,Date}

Here Primary key = {Pid, RegNo,Dname,Docid,Date }

According to theorem, all attribute primary key relation is always in BCNF. Hence *"Check_Date" is in BCNF.*

18. 'Consult' relation:

- Attributes:

  Consult {Pid, RegNo, Dname, Docid, arriveDate}

- Functional Dependencies:

  {Pid, RegNo, Dname, Docid} → arriveDate

Let X = {Pid, RegNo, Dname, Docid}

X+ = {Pid, RegNo, Dname, Docid, arriveDate}

Thus, Primary key = {Pid, RegNo, Dname, Docid}

The left side of all the FDs in minimal set of FDs for the relation 'Consult' is {Pid, RegNo, Dname, Docid}, which is the primary key of this relation, so *"Consult" is in BCNF.*