

## Hospital Data Book

1) The database described in the following is intended for use in a hospital setting. As of this writing it consists of twelve tables relevant to a medical environment, including the people (employees and patients), supplies (medications, prescriptions, pharmaceutical orders), locations (addresses, units), etc. The database will aid healthcare workers in being accountable, accurate and efficient in their daily activities. For example, a patient's medical history, insurance, reason for visiting, etc., will all be readily available to those with appropriate access, and medication and supply stock can be inventoried, tracked, and ordered when necessary. A database such as this has huge potential for growth, and so some tables were left unexplored for the sake of simplicity. For example, the "LAB\_WORK" table could easily branch out into multiple tables each containing detailed results of a patient's lab work; for now, I've truncated it to only contain information of whether a test was conducted at the time of visit. Some attributes could also be expanded, like VISIT\_REASON and VISIT\_DIAG inside the VISIT table, to allow for more complete and detailed information on patients.

2) Set 1:

Entities related: Doctor, Pharmaceutical Order, Medication

Relationship type: (1:M), (1:M)

Business rule: A DOCTOR can write zero or more PHARMA\_ORDERS, and a single PHARMA\_ORDER can be written by one and only one DOCTOR; a PHARMA\_ORDER can consist of one or more MEDICATIONs, but a MEDICATION can only be listed once (or not at all) per PHARMA\_ORDER

Set 2:

Entities related: Patient, Insurance

Relationship type: (1:M)

Business rule: A PATIENT has zero or one affiliated INSURANCE, but an INSURANCE company can have zero or more PATIENTs

Set 3:

Entities related: Patient, Prescription

Relationship type: (1:M)

Business rule: A PATIENT has zero or more PRESCRIPTIONs, but a PRESCRIPTION is intended for one and only one PATIENT

Set 4:

Entities related: Medication, Prescription

Relationship type: (1:M)

Business rule: A PRESCRIPTION is for one and only one MEDICATION, but a MEDICATION can be listed on zero or more PRESCRIPTIONs

Set 5:

Entities related: Visit, Lab Work, Patient, Doctor/Nurse

Relationship type: (1:M),(1:M),(1:M)

Business rule: A VISIT consists of one and only one PATIENT, one and only one DOCTOR/NURSE, and zero or one LAB\_WORK; LAB\_WORK may be recorded zero or one times per VISIT, DOCTORS/NURSES will conduct zero or more VISITs, and PATIENTs may have one or more VISITs in their lifetime

Set 6:

Entities related: Patient, Employee, Doctor, Address

Relationship type: (1:M)

Business rule: A PATIENT, or EMPLOYEE only has one ADDRESS, but an ADDRESS can have one or more PATIENTs or EMPLOYEEs; a DOCTOR can have only one home ADDRESS and only one OFFICE ADDRESS, but these ADDRESSES can have more than one DOCTOR.

Set 7:

Entities related: Nurse, Unit

Relationship type: (1:M)

Business rule: A NURSE oversees one and only one UNIT; but a UNIT can be overseen by one or many NURSES

3)

PATIENT(PA\_ID, AD\_ID, INS\_ID, SCRIPT\_ID, PA\_LNAME, PA\_FNAME, PA\_BLOODTYPE, PA\_DOB)

MEDICATION(MED\_ID, MED\_GENERIC, MED\_BRAND, MED\_SHAPE, MED\_COLOR, MED\_IMPRINT)

PRESCRIPTION(SCRIPT\_ID, MED\_ID, PA\_ID, EMP\_ID, SCRIPT\_DOSE, SCRIPT\_DATE, SCRIPT\_REFILL, SCRIPT\_REASON)

EMPLOYEE(EMP\_ID, AD\_ID, EMP\_LNAME, EMP\_FNAME, EMP\_JOBTYPE, EMP\_HIREDATE, EMP\_DOB)

DOCTOR(EMP\_ID, DOC\_DEPT, DOC\_SALARY, DOC\_OFFICE\_NUM, AD\_ID)

NURSE(EMP\_ID, UNIT\_ID, NURSE\_SHIFT, NURSE\_HOURLY, NURSE\_HRS)

INSURANCE(INS\_ID, INS\_COMPANY, INS\_PLAN, INS\_COPAY, INS\_DEDUCTIBLE)

LAB\_WORK(LAB\_ID, GLUCOSE, MONO, PAP, STOOL, URINALYSIS)

UNIT(UNIT\_ID, UNIT\_TYPE, UNIT\_FLOOR, UNIT\_NOTES)

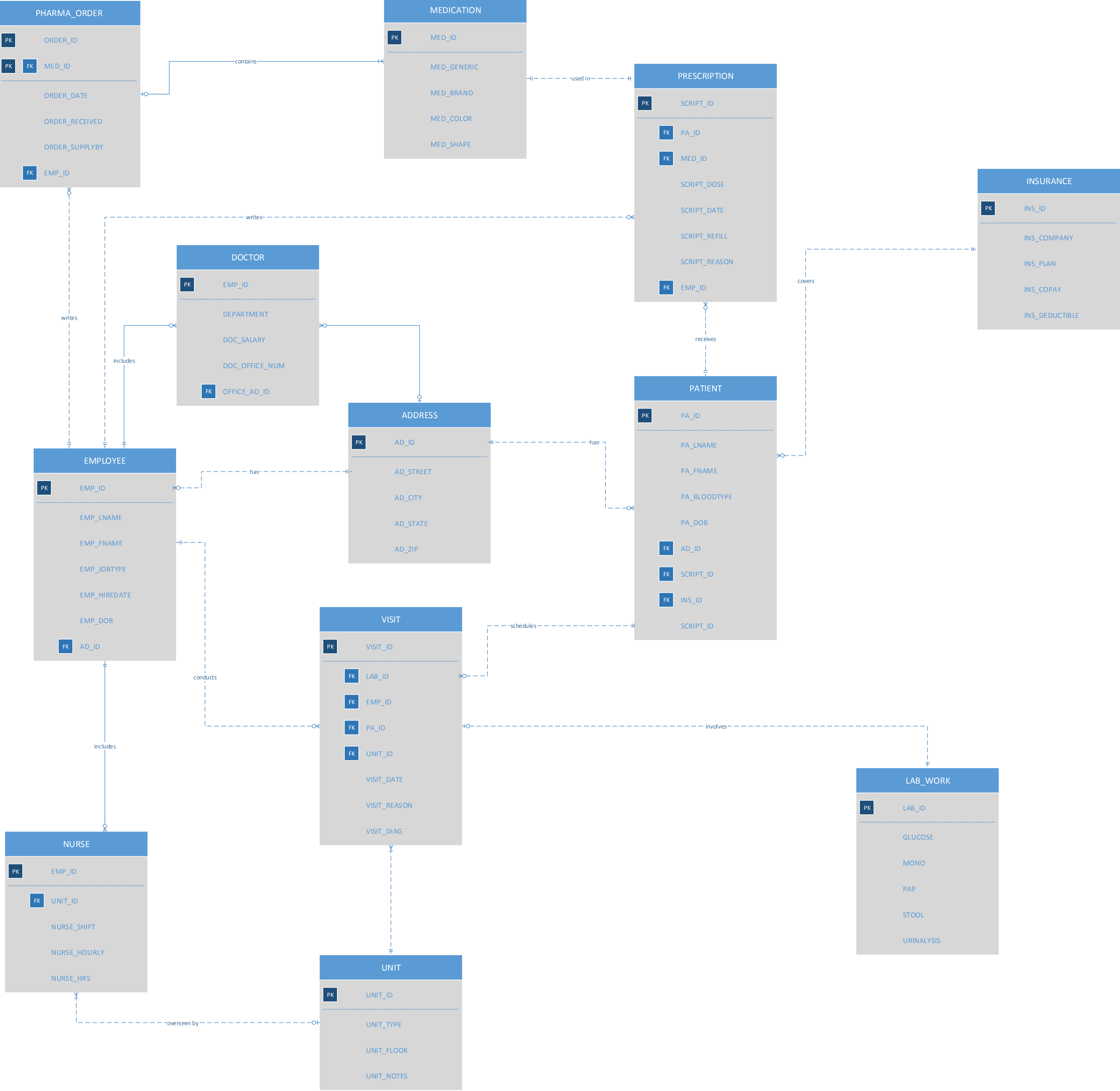
VISIT(VISIT\_ID, LAB\_ID, EMP\_ID, PA\_ID, UNIT\_ID, VISIT\_DATE, VISIT\_REASON, VISIT\_DIAG)

PHARMA\_ORDER(**ORDER\_ID**, **MED\_ID**, ORDER\_DATE, ORDER\_RECEIVED,  
ORDER\_SUPPLYBY, EMP\_ID)

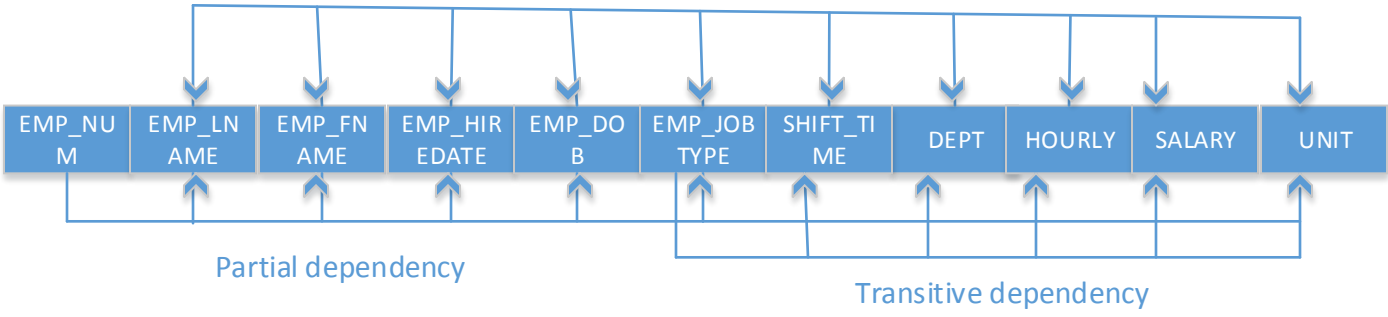
ADDRESS(**AD\_ID**, AD\_STREET, AD\_CITY, AD\_STATE, AD\_ZIP)

| TABLE NAME   | ATTRIBUTE NAME | CONTENTS                          | TYPE         | FORMAT     | RANGE         | REQUIRED | PK OR FK | FK REFERENCE    |
|--------------|----------------|-----------------------------------|--------------|------------|---------------|----------|----------|-----------------|
| PATIENT      | PA_ID          | Patient ID number                 | INT          | 999999     | 100000-999999 | Y        | PK       |                 |
|              | PA_LNAME       | Patient last name                 | VARCHAR(20)  | Xxxxxxxxxx |               |          |          |                 |
|              | PA_FNAME       | Patient first name                | VARCHAR(20)  | Xxxxxxxxxx |               |          |          |                 |
|              | PA_BLOODTYPE   | Patient blood type                | CHAR(3)      | Xx         |               |          |          |                 |
|              | PA_DOB         | Patient date of birth             | DATE         | yyyy-mm-dd |               |          |          |                 |
|              | AD_ID          | Patient address number            | INT          | 999999     | 100000-999999 |          |          | FK ADDRESS      |
|              | INS_ID         | Patient insurance number          | INT          | 999        |               |          |          | FK INSURANCE    |
|              | SCRIPT_ID      | Patient prescriptions             | INT          | 999999     | 100000-999999 |          |          | FK PRESCRIPTION |
| MEDICATION   | MED_ID         | Medication ID number              | INT          | 999999     | 100000-999999 | Y        | PK       |                 |
|              | MED_GENERIC    | Medication generic name           | VARCHAR(20)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | MED_BRAND      | Medication brand name             | VARCHAR(20)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | MED_SHAPE      | Medication shape                  | VARCHAR(10)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | MED_COLOR      | Medication color                  | VARCHAR(10)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | MED_IMPRINT    | Medication imprint                | CHAR(7)      | Xxxxxxx    |               | Y        |          |                 |
|              | SCRIPT_ID      | Prescription ID number            | INT          | 999999     | 100000-999999 | Y        |          | PK              |
| PRESCRIPTION | MED_ID         | Medication ID number              | INT          | 999999     | 100000-999999 | Y        |          | FK MEDICATION   |
|              | PA_ID          | Patient ID number                 | INT          | 999999     | 100000-999999 | Y        |          | PK FK PATIENT   |
|              | SCRIPT_DOSE    | Dosage                            | VARCHAR(20)  | 999999     |               | Y        |          |                 |
|              | SCRIPT_DATE    | Date written                      | DATE         | yyyy-mm-dd |               | Y        |          |                 |
|              | SCRIPT_REFILL  | Number of refills                 | INT          | 999        |               | Y        |          |                 |
|              | SCRIPT_REASON  | Reason for prescription           | VARCHAR(180) | Xxxxxxxxxx |               | Y        |          |                 |
|              | EMP_ID         | Prescriber                        | INT          | 999999     | 100000-999999 | Y        |          | FK EMPLOYEE     |
| EMPLOYEE     | EMP_ID         | Employee ID number                | INT          | 999999     | 100000-999999 | Y        | PK       |                 |
|              | EMP_LNAME      | Employee last name                | VARCHAR(20)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | EMP_FNAME      | Employee first name               | VARCHAR(20)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | EMP_JOBTYPE    | Employee job type                 | VARCHAR(20)  | Xxxxxxxxxx |               | Y        |          |                 |
|              | EMP_HIREDATE   | Employee hire date                | DATE         | yyyy-mm-dd |               | Y        |          |                 |
|              | EMP_DOB        | Employee date of birth            | DATE         | yyyy-mm-dd |               | Y        |          |                 |
|              | AD_ID          | Employee address ID               | INT          | 999999     | 100000-999999 | Y        |          | FK ADDRESS      |
| DOCTOR       | EMP_ID         | Doctor employee ID                | INT          | 999999     | 100000-199999 | Y        |          | PK EMPLOYEE     |
|              | DOC_DEPT       | Doctor department                 | VARCHAR(180) | Xxxxxxxxxx |               | Y        |          |                 |
|              | DOC_SALARY     | Doctor salary                     | INT          | 999999     | 0-999999      |          |          |                 |
|              | DOC_OFFICE_NUM | Doctor office number              | CHAR(4)      | x999       |               |          |          |                 |
| NURSE        | DOC_AD_ID      | Address ID of doctor office (if c | INT          | 999999     | 200000-299999 |          |          | FK ADDRESS      |
|              | EMP_ID         | Nurse employee ID                 | INT          | 999999     | 100000-999999 | Y        |          | PK EMPLOYEE     |
|              | UNIT_ID        | Unit ID number                    | INT          | 999        |               |          |          | FK UNIT         |
|              | NURSE_SHIFT    | Nurse shift                       | VARCHAR(20)  | Xxxxxxxxxx | Day/Night     |          |          |                 |
|              | NURSE_HOURLY   | Nurse hourly rate                 | INT          | 99.99      |               |          |          |                 |

|              |                |                             |              |            |               |   |                  |
|--------------|----------------|-----------------------------|--------------|------------|---------------|---|------------------|
| INSURANCE    | NURSE_HRS      | Number of work hours/ week  | INT          | 99.99      | 0-80          |   |                  |
|              | INS_ID         | Insurance ID number         | INT          | 999        |               | Y | PK               |
|              | INS_COMPANY    | Insurance company name      | VARCHAR(20)  | XXXXXXXXXX |               | Y |                  |
|              | INS_PLAN       | Insurance plan name         | VARCHAR(20)  | XXXXXXXXXX |               | Y |                  |
|              | INS_COPAY      | Insurance copayment         | INT          | 9999       | 0-9999        | Y |                  |
|              | INS_DEDUCTIBLE | Insurance deductible amount | INT          | XXXXXXXXXX |               | Y |                  |
| LAB_WORK     | LAB_ID         | Labwork ID number           | INT          | 999        |               | Y | PK               |
|              | GLUCOSE        | Glucose lab                 | VARCHAR(20)  | XXXXXXXXXX |               |   |                  |
|              | MONO           | Mono lab                    | VARCHAR(20)  | XXXXXXXXXX |               |   |                  |
|              | PAP            | Pap smear                   | VARCHAR(20)  | XXXXXXXXXX |               |   |                  |
|              | STOOL          | Stool analysis              | VARCHAR(20)  | XXXXXXXXXX |               |   |                  |
|              | URINALYSIS     | Urinalysis                  | VARCHAR(20)  | XXXXXXXXXX |               |   |                  |
| UNIT         | UNIT_ID        | Unit ID number              | INT          | 999        |               | Y | PK               |
|              | UNIT_TYPE      | Unit type                   | VARCHAR(20)  | XXXXXXXXXX |               | Y |                  |
|              | UNIT_FLOOR     | Unit floor                  | CHAR(3)      | 999        |               | Y |                  |
|              | UNIT_NOTES     | Unit notes                  | VARCHAR(180) | XXXXXXXXXX |               | Y |                  |
| VISIT        | VISIT_ID       | Visit ID number             | INT          | 999999     | 100000-999999 | Y | PK               |
|              | LAB_ID         | Lab ID number               | INT          | 999        |               |   | FK LAB_WORK      |
|              | EMP_ID         | Employee ID number          | INT          | 999999     | 100000-999999 | Y | FK EMPLOYEE      |
|              | PA_ID          | Patient ID number           | INT          | 999999     | 100000-999999 | Y | FK PATIENT       |
|              | UNIT_ID        | Unit ID number              | INT          | 999        |               | Y | FK UNIT          |
|              | VISIT_DATE     | Date of visit               | DATE         | yyyy-mm-dd |               | Y |                  |
|              | VISIT_REASON   | Reason of visit             | VARCHAR(180) | XXXXXXXXXX |               |   |                  |
|              | VISIT_DIAG     | Diagnoses                   | VARCHAR(180) | XXXXXXXXXX |               | Y |                  |
| PHARMA_ORDER | ORDER_ID       | Order ID number             | INT          | 999999     | 100000-999999 | Y | PK               |
|              | MED_ID         | Medication ID number        | INT          | 999999     | 100000-999999 | Y | PK FK MEDICATION |
|              | ORDER_DATE     | Date order is placed        | DATE         | yyyy-mm-dd |               | Y |                  |
|              | ORDER_RECEIVED | Date order is received      | DATE         | yyyy-mm-dd |               | Y |                  |
|              | ORDER_SUPPLYBY | Name of fulfillment company | VARCHAR(20)  | XXXXXXXXXX |               | Y |                  |
|              | EMP_ID         | Ordered by                  | INT          | 999999     | 100000-999999 | Y | FK EMPLOYEE      |
| ADDRESS      | AD_ID          | Address ID number           | INT          | 999999     | 100000-999999 | Y | PK               |
|              | AD_STREET      | Address street name         | VARCHAR(60)  | XXXXXXXXXX |               |   |                  |
|              | AD_CITY        | Address City                | VARCHAR(20)  | XXXXXXXXXX |               |   |                  |
|              | AD_STATE       | Address State               | CHAR(3)      | Xx         |               |   |                  |
|              | AD_ZIP         | Address ZIP code            | CHAR(5)      | 99999      |               | Y |                  |



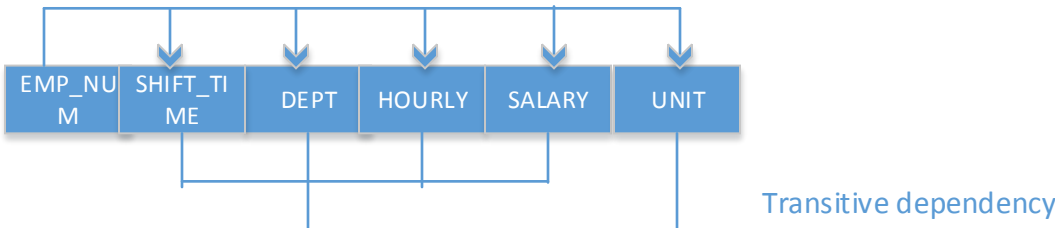
| ENTITY       | RELATIONSHIP | CONNECTIVITY | ENTITY       |
|--------------|--------------|--------------|--------------|
| DOCTOR       | fills        | 1:M          | PHARMA_ORDER |
| DOCTOR       | writes       | 1:M          | PRESCRIPTION |
| DOCTOR       | conducts     | 1:M          | VISIT        |
| MEDICATION   | used in      | 1:M          | PRESCRIPTION |
| PATIENT      | has          | 1:M          | PRESCRIPTION |
| PATIENT      | schedules    | 1:M          | VISIT        |
| INSURANCE    | covers       | 1:M          | PATIENT      |
| PHARMA_ORDER | contains     | 1:M          | MEDICATION   |
| UNIT         | holds        | 1:M          | VISIT        |
| UNIT         | overseen by  | 1:M          | NURSE        |
| LAB_WORK     | used in      | 1:M          | VISIT        |
| ADDRESS      | used by      | 1:M          | DOCTOR       |
| ADDRESS      | used by      | 1:M          | NURSE        |
| ADDRESS      | used by      | 1:M          | PATIENT      |



1NF(EMP\_NUM,EMP\_LNAME,EMP\_FNAME,EMP\_HIREDATE,EMP\_DOB,EMP\_JOBTYPE,SHIFT\_TIME,DEPT,HOURLY,SALARY,UNIT)

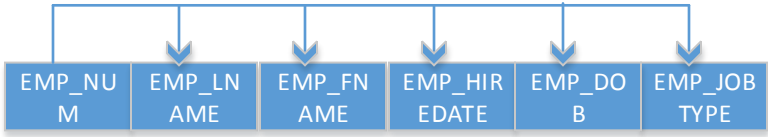
2NF

Table name: EMPLOYEE



EMPLOYEE(EMP\_NUM,SHIFT\_TIME,DEPT,HOURLY,SALARY,UNIT)

Table name: EMPLOYEE



EMPLOYEE(EMP\_NUM,EMP\_LNAME,EMP\_FNAME,EMP\_HIREDATE,EMP\_DOB,EMP\_JOBTYPE)

3NF

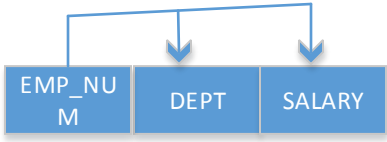


Table name: DOCTOR

DOCTOR(EMP\_NUM,DEPT,SALARY)

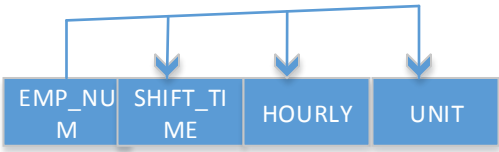


Table name: NURSE

NURSE(EMP\_NUM,SHIFT\_TIME,HOURLY,UNIT)

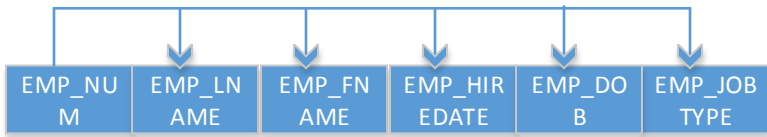
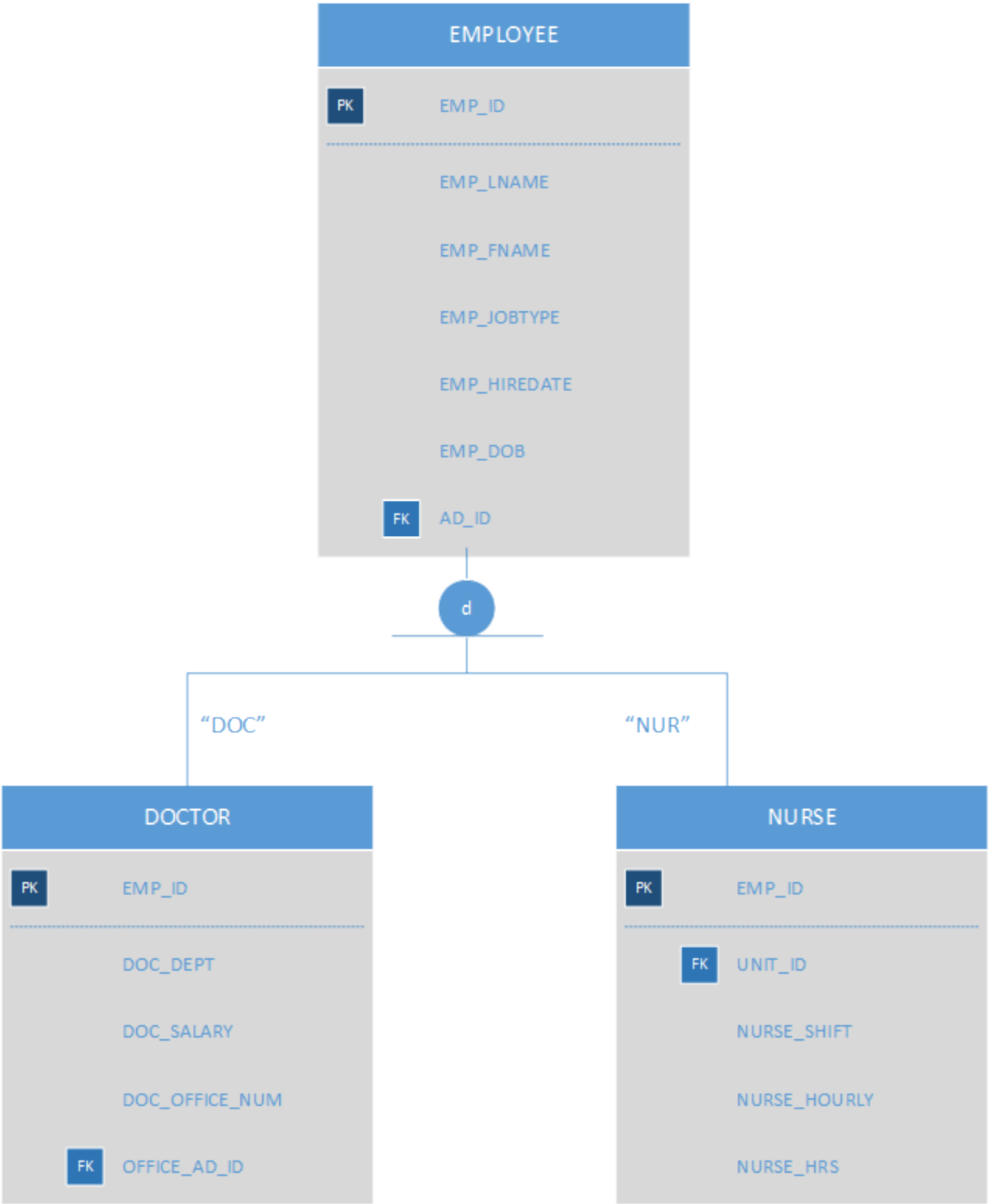


Table name: EMPLOYEE

EMPLOYEE(EMP\_NUM,EMP\_LNAME,EMP\_FNAME,EMP\_HIREDATE,EMP\_DOB,EMP\_JOBTYPE)





QUERY 1  
Find all Universal donors

QUERY 2  
Locate doctors with onsite offices

QUERY 3  
List patients and their medications

QUERY 4  
List selected visit information, such as the attendant doctor/nurse, patient name, location of the unit, reason for patient’s stay, and diagnosis