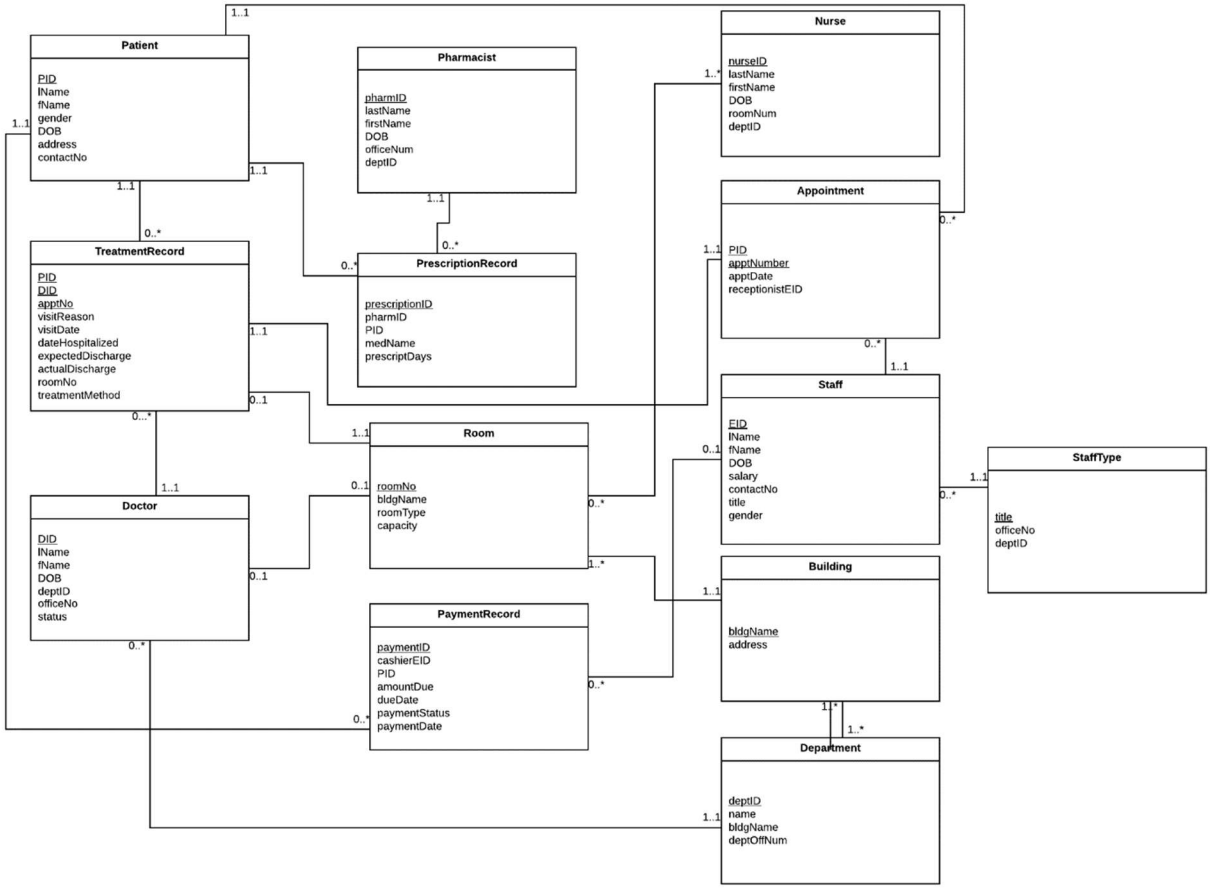
1. Conceptual database design:

   Here is a small image of the ER Diagram. A larger version is available in ER.pdf.



Constraints include Room- a doctor may only have one office, and an office may only be used by one doctor. This is different for different employees- all receptionists share the same office, for example.

StaffType was pulled out of staff to ensure our tables were in third normal form. All staff of the same type are in the same department, office, and have the same title, so storing these in Staff is redundant.

2. Logical Database Design

Patient

PID	lName	fName	Gender	DOB	Address	contactNo
1	Shields	Linus	M	1927-11-08	449 Bluestem Avenue	297406007

Treatment Record

PID	DID	apptNo	visitReas	vistDate	dateHos	exDisch	actDisch	roomNo	treatMeth
1	25	1	Sick	2018-10-7	2018-11-16	2018-12-7	NULL	181	Inpatient

Doctor

DID	lName	fName	DOB	deptID	officeNO	Status
1	Belvard	Jamaal	1965-7-31	4	2	trainee

Pharmacist

pharmID	lName	fName	DOB	deptID	officeNum
1	Westley	Kevan	1970-2-15	5	63

PrescriptionRecord

prescriptionID	pharmID	PID	medName	prescriptDays
1	20	24	Pepto Bismol	269

Room

roomNo	bldgName	roomType	Capacity
1	L	Doctor Office	1

PaymentRecord

paymentID	cashierEID	PID	amountDue	dueDate	payStatus	payDate
1	2	1	109120	2019-2-27	Outstanding	NULL

Nurse

nurseID	lName	fName	DOB	deptID	roomNum
1	Hrinishin	Gabriela	1979-5-27	1	173

Appointment

PID	apptNo	apptDate	ReceptionistEID
1	1	2018-10-27	1

Staff

EID	lName	fName	DOB	DID	Salary	contactNo	Title	Gender
1	Legion	Roshelle	1972-3-14	1	51711	6195709673	Receptionist	F

StaffType

Title	officeNo	deptID
Receptionist	171	2

Building

bldgName	Address
I	3 Moose Trail

Department

DID	Name	bldgName	deptOffNum
1	Hospitalization	M	173

3. Normalization analysis

FDs:

Patient:
{PID -> lName, fName, gender, DOB, address, contactNo}

Room:
{roomNo -> bldgName, roomType, capacity}

Doctor:
{DID -> lName, fName, DOB, deptID, officeNo, status}

Pharmacist:
{pharmID -> lName, fName, DOB, deptID, officeNo}

PrescriptionRecord:
{prescriptionID -> pharmID, PID, medName, prescriptDays}

Nurse:
{nurseID -> lName, fName, DOB, deptID, roomNo}

Appointment:
{PID, apptNumber -> apptDate, receptionistEID}

Treatment Record:
{PID, DID, apptNo -> visitReason, visitDate, dateHospitalized, expectedDischarge, actualDischarge, roomNo, treatmentMethod}

PaymentRecord:
{paymentID -> cashierEID, PID, amountDue, dueDate, paymentStatus, paymentDate}

The above tables are in 3NF since the only FD is a superkey determining everything else.

Building:
{bldgName -> address}, {address -> bldgName}

Department:
{number -> name, bldgName, deptOffNum}, {name -> deptID, bldgName, deptOffNum}

StaffType:
{title -> officeNo, deptID}, {officeNo -> title, deptID}, {deptID -> title, officeNo}

The above tables are in 3NF since attributes are all determined by superkeys. Both have multiple candidate keys- in fact, every member of stafftype is a candidate key.

Staff:
{EID -> lName, fName, DOB, deptID, salary, contactNo, title, gender}, {deptID -> title}, {title -> deptID}

This is not 3NF, since neither deptID or title are superkeys or prime attributes. This could be corrected by dropping deptID, since we can get that information from StaffType.

4. Query Description

Our query chose to figure out which receptionists scheduled appointments for patients receiving Viagra prescribed by a given pharmacist. This allows a pharmacist to discover who is aware of the medication a patient is taking. Without this feature, it may be difficult to discover who is involved in the stages of a patient's hospital lifetime in the case of an emergency. Starting with a Pharmacist ID, it checks the PrescriptionRecord table for a matching ID and Viagra as the prescription. Then it checks the Patient ID associated with that prescription, and finds appointments for that patient, checking the receptionist that made the appointment and printing them out.