Developing Data Models for Business Databases

We introduce a new simplified Hospital database that supports some of the activities related to patients visiting physicians at the local hospital. Open a blank ER Assistant diagram and save it as `ERD5_Hospital.erd` file in the `Assign` subfolder of `06_Develop_DM` folder.

Each of the questions is worth **0.5** points.

1. Start the ERD by drawing the `Patient`, `Physician`, and `Visit` entities connected by 1-M relationships, `Attends` from `Patient` to `Visit`, and `Treats` from `Physician` to `Visit`. Define minimum cardinalities so that patients and physicians are mandatory for a visit, but visits are optional for patients and physicians. The list of entity attributes, including primary keys and data types can be found below.
2. Extend the ERD from problem 1 with the `Nurse`, `Item`, and `VisitDetail` entities connected by 1-M relationships, `Contains` from `Visit` to `VisitDetail`, `Provides` from `Nurse` to `VisitDetail`, and `UsedIn` from `Item` to `VisitDetail`. VisitDetail is a weak entity with the 1-M identifying relationship from Visit to VisitDetail. Define minimum cardinalities so that a nurse is optional for a visit detail, an item is mandatory for a visit detail, and visit details are optional for nurses and items. The list of entity attributes, including primary keys and data types are shown below.

Patient	Physician	Visit
PatNo (PK)	PhyNo (PK)	VisitNo (PK)
PatFirstName	PhyFirstName	VisitDate
PatLastName	PhyLastName	VisitPayMethod
PatStreet	PhySpecialty	VisitCharge
PatCity	PhyPhone	
PatState	PhyEmail	
PatZip	PhyHospital	
PatHealthPlan	PhyCertification	

Nurse	Item	VisitDetail
NurseNo (PK)	ItemNo (PK)	DetailNo (PK)
NurseFirstName	ItemDesc	DetailCharge
NurseLastName	ItemPrice	
NurseTitle	ItemType	
NursePhone		
NurseSpecialty		
NursePayGrade		

3. Refine the ERD from problem 2 with a generalization hierarchy consisting of `Provider`, `Physician`, and `Nurse`. The root of the generalization hierarchy is the `Provider` entity with the primary key `ProvNo` replacing the attributes `PhyNo` and `NurseNo`. The other attributes for the Provider entity should be common to Nurse and Physician. You should rename the attributes to be consistent with inclusion in the Provider entity. The generalization hierarchy should be complete and disjoint. Check the ERD for violations of the diagram rules. If you followed the directions carefully, your diagram should not have any errors, but if you do you need to correct them.

The database described below supports the local real estate office in a small town. Open a blank ER Assistant diagram and save it as `ERD6_Real_Estate.erd` file in the `Assign` subfolder of `06_Develop_DM` folder.

4. A home has a unique home identifier, a street address, a city, a state, a zip, a number of bedrooms, a number of bathrooms, and square feet. A home is either owner occupied or rented. An owner has a Social Security number, a name, an optional spouse name, a profession, and an optional spouse profession. An owner can possess one or more homes. Each home has only one owner.
5. Refine the ERD from problem 4 by adding an agent entity. Agents represent owners in the sale of a home. An agent can list many homes, but only one agent can list a home. An agent has a unique agent identifier, a name, an office identifier, and a phone number. When an owner agrees to list a home with an agent, a commission (a percentage of sales price) and a selling price are determined. Transform the office identifier attribute into an entity. Data about an office include the phone number, the manager name, and the address.
6. In the ERD from problem 5, add a buyer entity. A buyer entity has a Social Security number, a name, a phone, preferences for the number of bedrooms and bathrooms, and a price range. An agent can work with many buyers, but a buyer works with only one agent. Revise the ERD further by adding an offer entity type. A buyer makes an offer on a home for a specified sales price. The offer starts and expires on the specified dates. A unique offer number identifies an offer. A buyer can submit multiple offers for the same house.

Submission: You must submit two ERD files: `ERD5_Hospital.erd` and `ERD6_Real_Estate.erd` on Canvas by the designated due date.