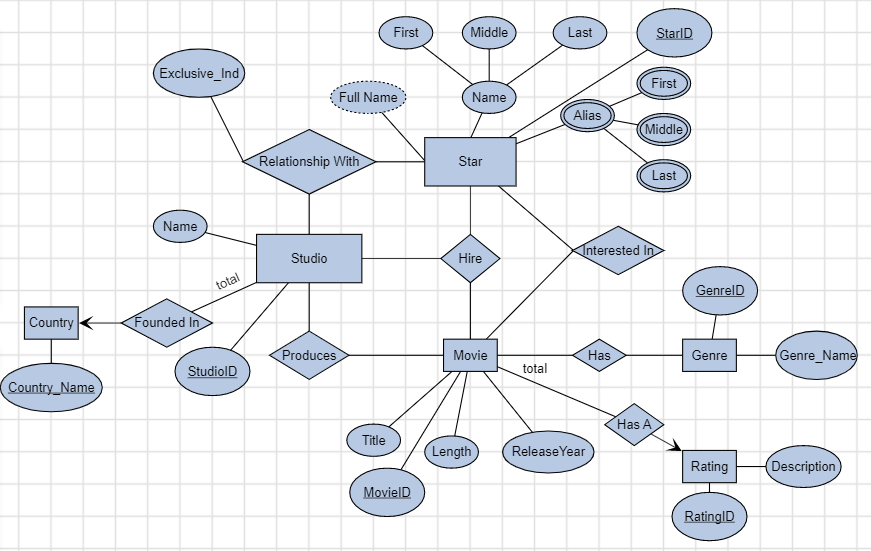
# 8.7 Homework: ER Diagrams & DB Schemas

**H. Diana McSpadden (hdm5s)**

1. [30%] Create an ER diagram for the following database scenario. Make sure to include an indication of the cardinality of relationships and indicate any mandatory relationships (total participation). State any assumptions that you make!

Simple IMDB Database

* Movie stars obviously have names (real and screen in some cases).
* Movie stars star in movies.
* Movies have titles, the year they came out, a genre, a length, and a rating.
* A rating can be G, PG, PG-13, or R.
* Movies are produced by studios.
* There are various different studios around the world.
* Movie studios hire actors to be in their movies and pay them a great deal of money (salary).



**Movies Database Assumptions**

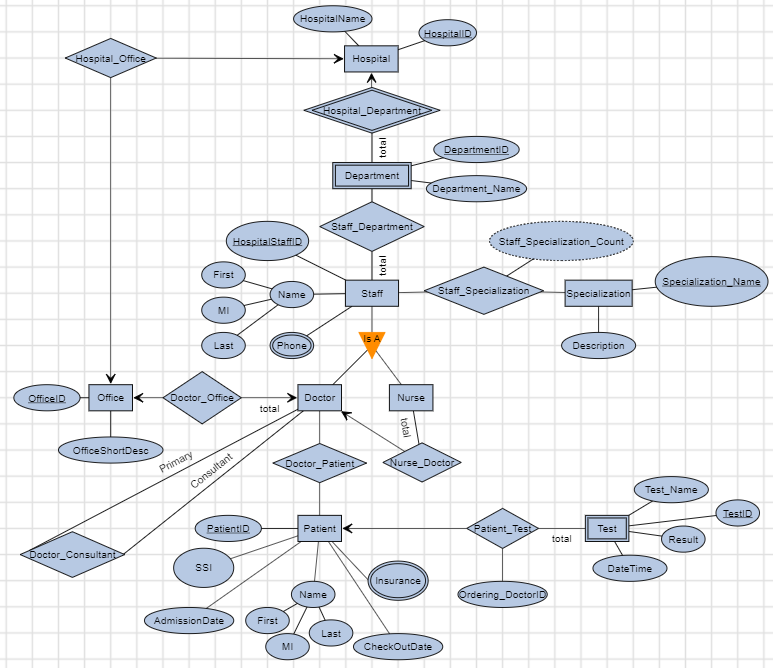
1. Movies exist prior to a Studio starting to produce them and prior to Stars being associated with them.
2. Stars and Movies can be interested in each other prior to being in a contract between the Producer/Star/Movie. This can capture the IMBD information about movies that are “in development.”
3. Stars can be in relationships with Studios prior to, and outside of being in a contract for a Movie. Some Stars are in an exclusive relationship with one Studio, but not all Stars are, so this is handled by a relationship attribute instead of cardinality.
4. A Movie can have many Genres.
5. Every Movie has at least one Genre.
6. A Movie can exist before it has been given a Rating.
7. Several Producers can work together to Produce a Movie.
8. The ID “StudioMovieProducesID” is the unique identifier for the relationship “Produces” between Studio and Movie. This ID is a required attribute of the “Hire” relationship between Studio, Star, and Movie. The “StudioMovieProducesID” can be referenced in multiple Hire relationships, but is unique to one Produces relationship. Some of this functionality must be enforced in the business logic layer (application code and/or stored procedures).
9. I do not have enough information in the description to determine if a Star could be under multiple contracts for a single Movie with multiple Producers, but this model will support that functional requirement if it needs to be supported.

2. [10%] Convert Task 1's ER diagram to a table.

3. [40%] Create an ER diagram for the following database scenario. Make sure to include an indication of the cardinality of relationships and indicate any mandatory relationships (total participation). State any assumptions that you make!

Hospital Database

* Hospital staff consists of doctors and nurses.
* All hospital staff have a hospital ID, name (first name, middle initial, and last name), and phone number.
* Doctors have an office and up to three specializations.
* Doctors have nurses that work with/assist them.
* Nurses have one specialization and belong to a specific department in the hospital.
* All nurses work with doctors (no exception). Many nurses can work with one doctor.
* Doctors sometimes consult with a colleague (who is another doctor).
* Doctors treat patients.
* Patient information is collected by the hospital and include SS# (social security number), name, insurance, date of admission, and date checked out.
* A patient can undergo a number of tests.
* Doctors perform tests.
* Tests have a unique ID, name, a result, and a date and time the test was performed.



**Hospital Database Assumptions:**

1. Staff can only work for one hospital. This model will not work to track staff across multiple hospitals.
   1. HospitalStaffID must be unique across all hospitals using the database.
2. Each department is for only one hospital. As written, this model cannot work to track similar departments across hospitals; however, if that functionality is required, then DepartmentType can be created as a reference table, and each Department can be identified with a DepartmentType. We could then compare same department types across multiple hospitals.
3. It would be possible in this system, by SSI, to track a Patient across multiple hospitals. However, the HIPPA and other security concerns are extremely important to address in the database due to health records, and using SSI.
4. All doctors have an office: as is implied by the “total” annotation on the “Doctor\_Office” relationship.
5. Because Office Numbers (i.e. OfficeShortDescription) may be duplicated across hospitals, a separate OfficeID, unique to the database, is used as the index for the table.
6. The functional requirements for doctors having no more than three specializations, and nurses having one specialization will need to be handled in the Business Logic/Tier and/or programmatically in stored procedures. The count of specializations per Staff person can be inferred from the relation table, as is noted in the schema.
7. The Doctor who orders a Test for a Patient is stored in the Patient\_Test relationship as the Ordering\_DoctorID attribute. This attribute is required (both the database and the Business Logic tier enforce).
8. Patients can have multiple insurers.
9. All Departments are in a Hospital.
10. All Staff are in a Department.
11. All Tests are for a Patient and do not exist without an associated Patient.

4. [20%] Convert Task 3's ER diagram to a table.