University of Windsor

School of Computer Science
Faculty of Science
COMP-3150: Database Management System (Fall 2022)

Lab#	Date	Title	Due Date	Grade Release Date
Lab2	Week 02	**Conceptual Modeling: ERD**	Two-Week Lab October 05, 2022, Wednesday Midnight EDT	October 10, 2022

This lab aims to make your project descriptions from Lab1 more concrete, refined and turned into an Entity-Relationship Diagram (ERD). An ERD is a systematic tool for representing and describing the data elements available in an application. For instance, it will help us create a data model of all the entities in my movie database application and explicitly define how they are related.

Overview

An ERD has three components:

1. **Entities:** An entity is a thing. In business domain terms, it's a concept or glossary-level term. In relational database terms, as you will see later in this term, it is a table.
2. **Relationships:** The real insight from this type of diagram comes when we see how entities relate to one another, or relationships. Relationships can be thought of as *verbs* that link two or more *nouns*.
3. **Attributes:** For each entity or relationship, there can be more than one attribute. Attributes provide detailed information about the entity or the relationship.

Step 1. Identifying Entities and Relationships

There are four main steps to creating an ERD:

1. Create boxes for each *entity* or primary business concept relevant to your model.
2. Model the *relationships* between each by drawing lines to connect related entities. Label the relationships using verbs or a numeric notation.
3. Identify relevant *attributes* for each entity. For a conceptual model, focus on the most important attributes. As your model evolves, make your attribute lists more specific.
4. Relationships could have *attributes* which describe when, where, or how the relationship occurs between two or more entities. Identify possible attributes for each relation.

The above steps identify entities, attributes, and relationships from your project description. It is also necessary to identify the cardinality ratios of the relationships found. For example, `Movie` and `Director` are two entities from my project description. `Director` has an attribute `Name`. There is also a relationship between directors and movies in that directors make movies. This relationship is one-to-many because one director can make many movies in his lifetime.

When looking and thinking about identifying entities, relationships and attributes for your problem domain, you may want to consider the following information:

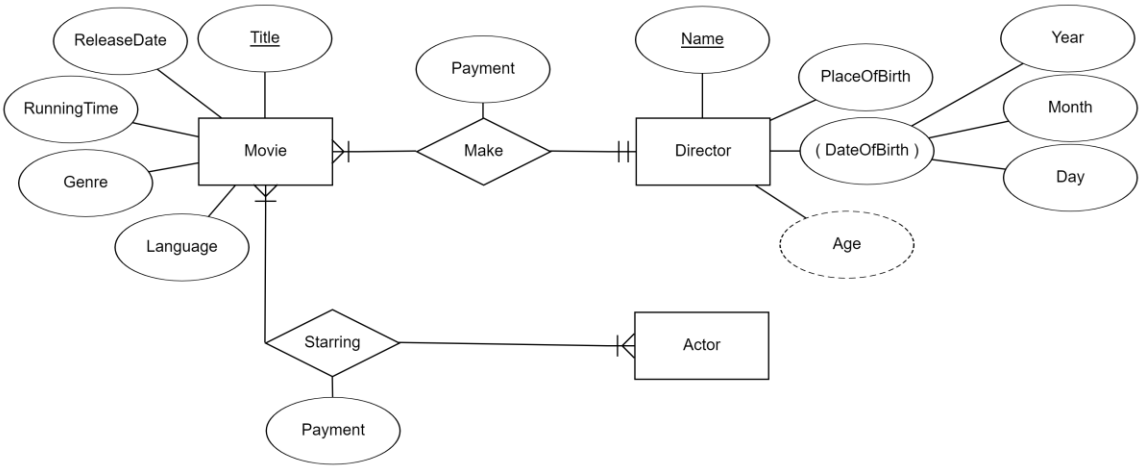
- Entities and their attributes are often represented as *nouns* in our English writing, e.g. movie, director, etc.
- Entities' attributes have atomic values (e.g., year), but entities themselves are a collection of several atomic attributes.
- Attributes cannot participate in relationships!

Relationships are often described using *verbs* in our descriptions. So, some of the verbs could be our potential relationships. For instance, *"a director may make many movies"* `Make` would be the relationship between `Director` and `Movie` entities.
Relationships' attributes also have atomic values that describe when, where, or how the relationship occurs between two or more entities. So, they are often represented as *adverbs*. For example, *"a director is paid $50K*

to make a movie", the `Payment` would be an attribute of `Make` relationship.

Step 2. Drawing Entities and Relationships

Once you have identified your entities, attributes and relationships, you can draw the corresponding ERD. In general, entities are drawn using rectangles, relationships using diamonds and attributes using ovals, as shown below:



There are ER diagraming tools available online for free. For instance, I used ERDPlus at (erdplus.com/standalone) for above ER diagram.

In ER diagram, we follow `PascalCase` naming convention, i.e., the first letter of words for entities, relationships, and attributes should be capital, and two-word names must concatenate with no additional character like dash or hyphen.

Your ERD must have at least 5 entities, 5 relationships and 20 attributes. Specify the *cardinality* of the relationships.

Final Step. Deliverables

You should complete the steps described above and submit the following items in one single `zip` file `Lab2_uwinid.zip`:

- (90%) `Lab2_uwinid.zip`
  - (70%) `ERD.jpg` → Screenshot of the ERD.
  - (20%) `Report.pdf` → Lab report including name, student id, and a one-line description of each entity, relationship and attributes.
  - (Optional) `ReadMe.txt` → Optional additional information that helps lab instructor or grader to evaluate.
- (10%) Naming (PascalCase) and Formats

Please follow the naming convention as you lose marks otherwise. Instead of `uwinid`, use your own account name, e.g., mine is hfani@uwindsor.ca, so, `Lab2_hfani.zip`