RYERSON UNIVERSITY

Faculty of Engineering, Architecture and Science

Department of Mechanical and Industrial Engineering

Course Number	**COE 848**
Course Title	**Fundamentals of Data Engineering**
Semester/Year	2022 Winter
Instructor	**Dr. Faezeh Ensan**
Teaching Assistant	**Shirin Seyedsalehi**

Lab Report No.	**2**

Report Title	**Lab 2 Report**

Section No.	**2**
Submission Date	**February 7th, 2022**
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Name	Student ID	Signature*
Yasar Zaman	*xxxx13595*	Y.Z

(Note: remove the first 4 digits from your student ID)

ERD Diagram
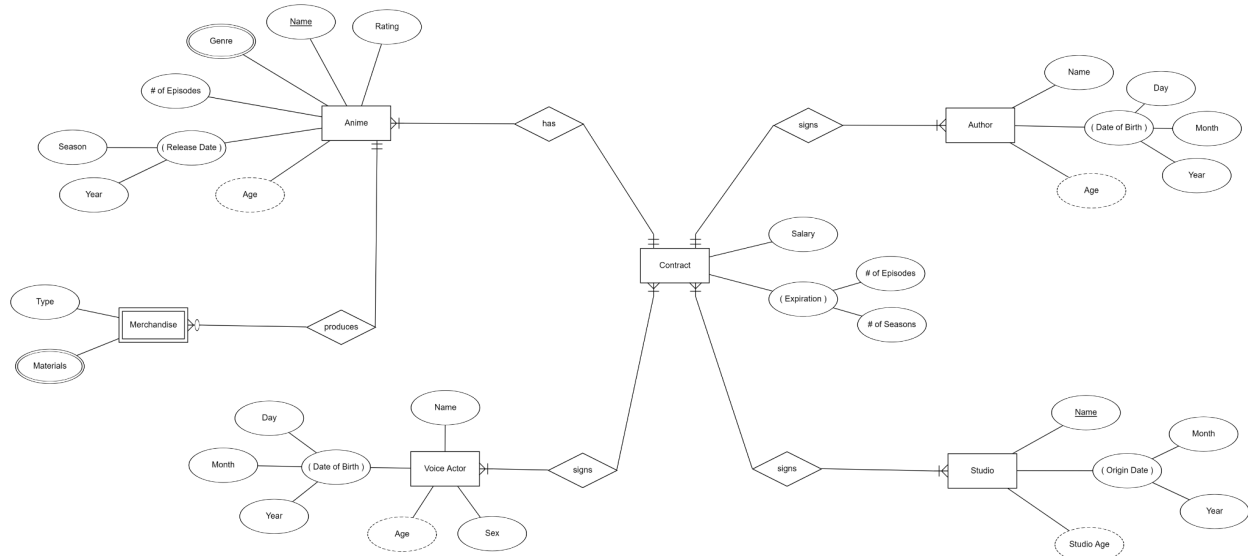
Explanation

Before explaining the cardinality between the entities, listing each entity, and attributes is important so that I can reference them later.

Entities	*Attributes*

Anime	- Rating
	- Name [Unique]
	- Genre [Multivalued]
	- # of Episodes
	- Release Dates (Composite)
	   - Season
	   - Year
	- Age [Derived]

Author	- Name
	- Date of Birth (Composite)
	   - Day
	   - Month
	   - Year
	- Age [Derived]

Studio	- Name [Unique]
	- Origin Date (Composite)
	   - Month
	   - Year
	- Studio Age [Derived]

Voice Actor	- Name
	- Date of Birth (Composite)
	    - Day
	    - Month
	    - Year
	- Age [Derived]
	- Sex

Contract	- Salary
	- Expiration (Composite)
	    - # of Episodes
	    - # of Seasons

Merchandise [WEAK] → Relies on the Anime Rating	- Type - Material [Multivalued]

Entity + Attribute Explanation:

As shown in the table above, I have 6 entities; 5 regular and 1 weak. In this section, I will discuss the reasons for having the attributes.

Firstly, there is the *Anime* entity, which has 6 attributes. The first attribute is the Name, which will be unique. The reason it is unique is because there can not be two different anime with the same name; this causes legal problems in the financial world of the studios that produce it, thus every anime name would be unique.The second attribute will be the Genre, which will be multivalued. An anime can belong to one genre, or multiple. This is similar to Marvel movies that can be classified as Sci-Fi and Action & Adventure. The third attribute will be the Release Date, which will itself have two additional attributes to describe it: the season and the year it was released. The fourth attribute will be the Age of the anime, which can be derived from the Release Date, hence it will be a derived attribute. The next few attributes will be regular attributes as they are an attribute of the *Anime* entity and the values can be shared (two different anime could have the same number of episodes for example): Rating, and # of Episodes.

The notation for this entity would be:

$Anime\ =\ \{Name,\ Genre(s),\ Release\ Date\ (Season,\ Year),\ Age,\ \#\ of\ Episodes,\ Rating\}$

Secondly, there is the *Author* entity, which has 3 attributes. The first attribute is the name of the author. Previously I stated that the name would be unique for the anime; however since this is a person and people can share names, this attribute can not be unique. The second attribute will be the Date of Birth, which will have three additional attributes: Day, Month, and Year. The final attribute will be the Age that can be derived from the Date of Birth attribute.

The notation for this entity would be:

$Author\ =\ \{Name,\ Date\ of\ Birth\ (Day,\ Month,\ Year),\ Age\}$

The next entity is the *Studio* entity, which has 3 attributes. Similar to the *Author* entity, it will have a name; however for a studio, it must be unique for the same reason as to why an anime's name would be unique as previously mentioned. The next attribute for the studio would be its Origin Date, which would have two additional attributes (Month, and Year).
The notation for this entity would be:

$Studio = \{Name, Origin\ Date\ (Month,\ Year),\ Studio\ Age\}$

The fourth entity will be the *Voice Actor* entity which will have four attributes. The first attribute will be the Name; similarly with the *Author* entity, voice actors can share names, thus this would not be a unique attribute. The second attribute would be the Sex of the voice actor, either male or female. The third attribute will be the Date of Birth which will have 3 additional attributes: Day, Month, Year. The last attribute would be Age which would be a derived attribute from the Date of Birth.
The notation for this entity would be:

$Voice\ Actor = \{Name,\ Sex,\ Date\ of\ Birth\ (Day,\ Month,\ Year),\ Age\}$

The fifth entity will be an entity that connects the previous four entities, a *Contract* entity. As learned in class, if we don't have this sort of entity, and connect each entity with relationships without an entity that can connect them all, we can run into redundancies. This means that we must have this entity. The *Contract* entity will include two attributes. The first attribute will be the Salary of the contract and since different contracts can have the same salary, this attribute will be a regular attribute. The second attribute will be the Expiration of the contract in the form of the number of episodes and the number of seasons.
The notation for this entity would be:

$Contract = \{Salary,\ Expiration\ (\#\ of\ Episodes,\ \#\ of\ Seasons)\}$

The final entity will be the *Merchandise* entity. This will be a weak entity since its entire existence revolves around the rating of the anime. It will have two attributes, the first being the type of merchandise it is. There would only be one value (T-Shirt, Pants, or Toy) and thus it would be a regular attribute. The second attribute would be the Materials and would be multivalued as the merchandise can be made of multiple different materials.
The notation for this entity would be:

$Merchandise = \{Type,\ Materials\}\ if\ Anime\{Rating\} > x;\ where\ x\ is\ \epsilon\ R\ +$

Cardinality Explanation:
Now that the entities are explained, it will be simpler to discuss the cardinality and relationships between the entities.

There are a total of 5 relationships:
- Anime + Contract
- Author + Contract
- Studio + Contract
- Voice Actor + Contract
- Anime + Merchandise

Anime + Contract:
The relationship between the *Anime* entity and the *Contract* is that an anime has a contract. Since an anime would only be made by one studio/author/voice actor under the same contract, the cardinality would be 'One (and only one)'. A contract, however, can be made with multiple different anime, thus the cardinality would be 'One or many'.
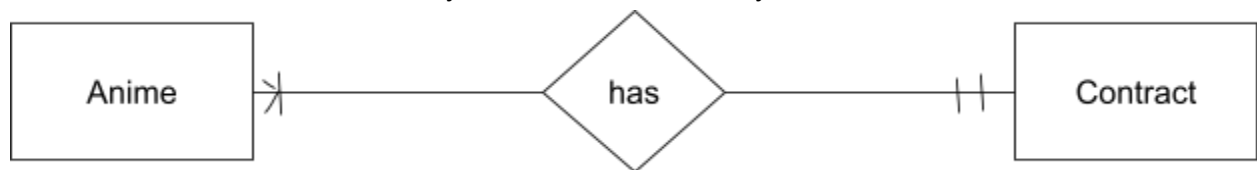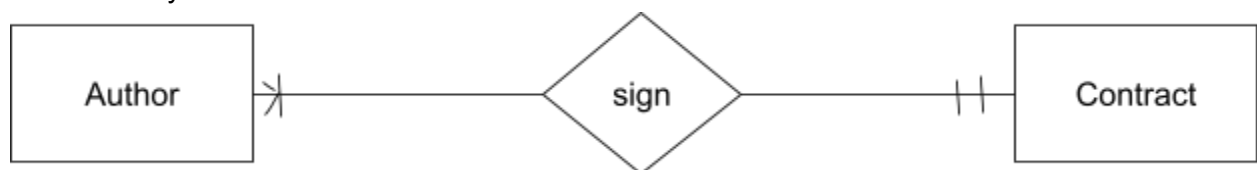

Anime can only have one and only one contract.
A contract can be had by at least 1 anime.

Author + Contract:
The relationship between the *Author* entity and the *Contract* is that an author signs a contract. Since an author would only be signing one contract for their anime, the cardinality would be 'One and only one'. A contract can be signed by multiple authors, thus the cardinality would be 'One or many.'
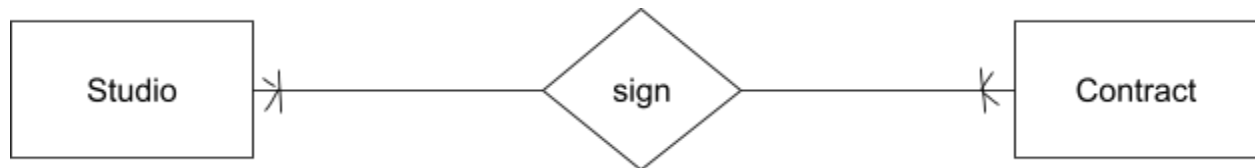

An author can only sign one and only one contract.
A contract has to be signed by at least one author.

Studio + Contract:
The relationship between the *Studio* entity and the *Contract* is that a studio can sign multiple contracts and a contract can be signed by multiple studios. Thus the cardinality would be 'One or many' for both entities.

A studio must sign at least one contract.
A contract must be signed by at least one studio.

Voice Actor + Contract:
The relationship between the *Voice Actor* entity and the *Contract* is that a voice actor can sign multiple contracts for different anime, and a contract can be signed by multiple different voice actors. Thus the cardinality would be 'One or many' for both entities.


A voice actor must sign at least one contract.
A contract must be signed by at least one voice actor.

Anime + Merchandise:
The relationship between the *Merchandise* entity and the *Anime* entity is that there would only be one anime from which merchandise is produced. It would be a different merchandise depending on the anime name and rating. The cardinality of that would be 'One or many.' An anime, however, might not produce merchandise, thus the cardinality of that would be 'Zero or many.'
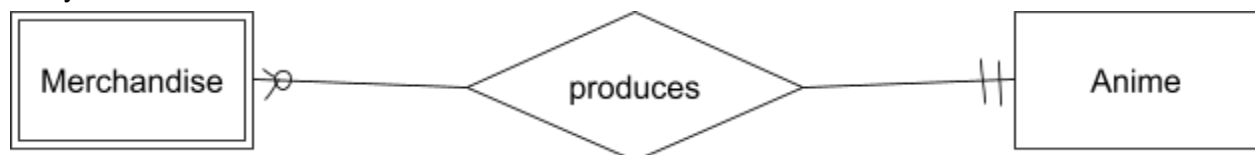
Merchandise can be produced from one and only one anime.
Anime may produce zero merchandise or many merchandise.