

1 ER modelling (6 points)

Create an ER model according to the following specification. Use Chen notation and give meaningful names to entity and relationship types. If necessary, introduce artificial keys and underline each key attribute.

Hint: You may use Draw.io to create your ER model.

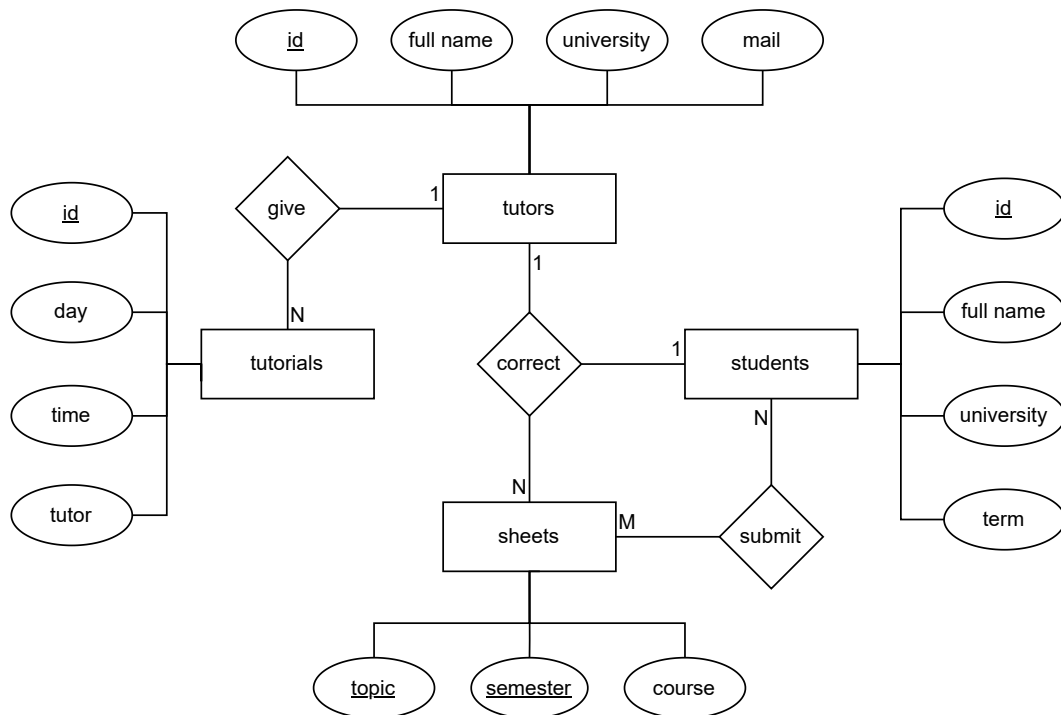
- Players have a username and a level.
- Villages have a unique identifier and a name.
- Buildings have a type and a level.
- Troops have a type, a size and a level.
- Clans have a unique name, a level and a counter for the number of players in the clan.
- A player owns at most one village, while a village has at most one player as owner.
- Buildings are built in a specific village.
- Villages can be attacked by players using troops to obtain experience points. Each player uses at most one troop for each village that he attacks.
- Players can join a single clan.
- Clans compete against each other in clan battles.

Assume there are different types of buildings, e.g., town hall and tower, with different characteristics each, e.g., a town hall has a storage capacity and a tower has a height. One possibility to integrate this into the ER model would be to add an attribute for the type to the building entity. Additionally, one attribute for each characteristic has to be added and only the corresponding attributes are specified. Is this a reasonable modelling? If not, state a better solution. Justify your answer.

2 Design errors in ER modelling (4 points)

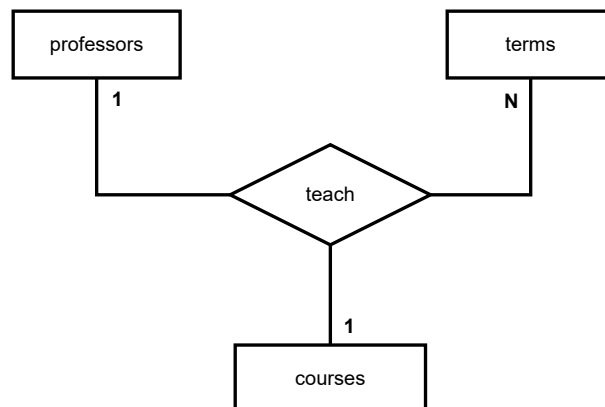
The following ER model tries to model the process of a university. Unfortunately, it has problems that are at odds with the **design philosophies** presented in the lecture. Provide an updated ER model that corrects 4 of these mistakes. Please note that flawed modelling caused by other modelling errors is counted as one error.

Hint: You do not need to justify your changes, your ER model is sufficient.



3 Ternary relationship (5 points)

Consider the following ternary relationship that models the teaching in a university.



For each of the following statements, decide whether they are correct and justify your decision.

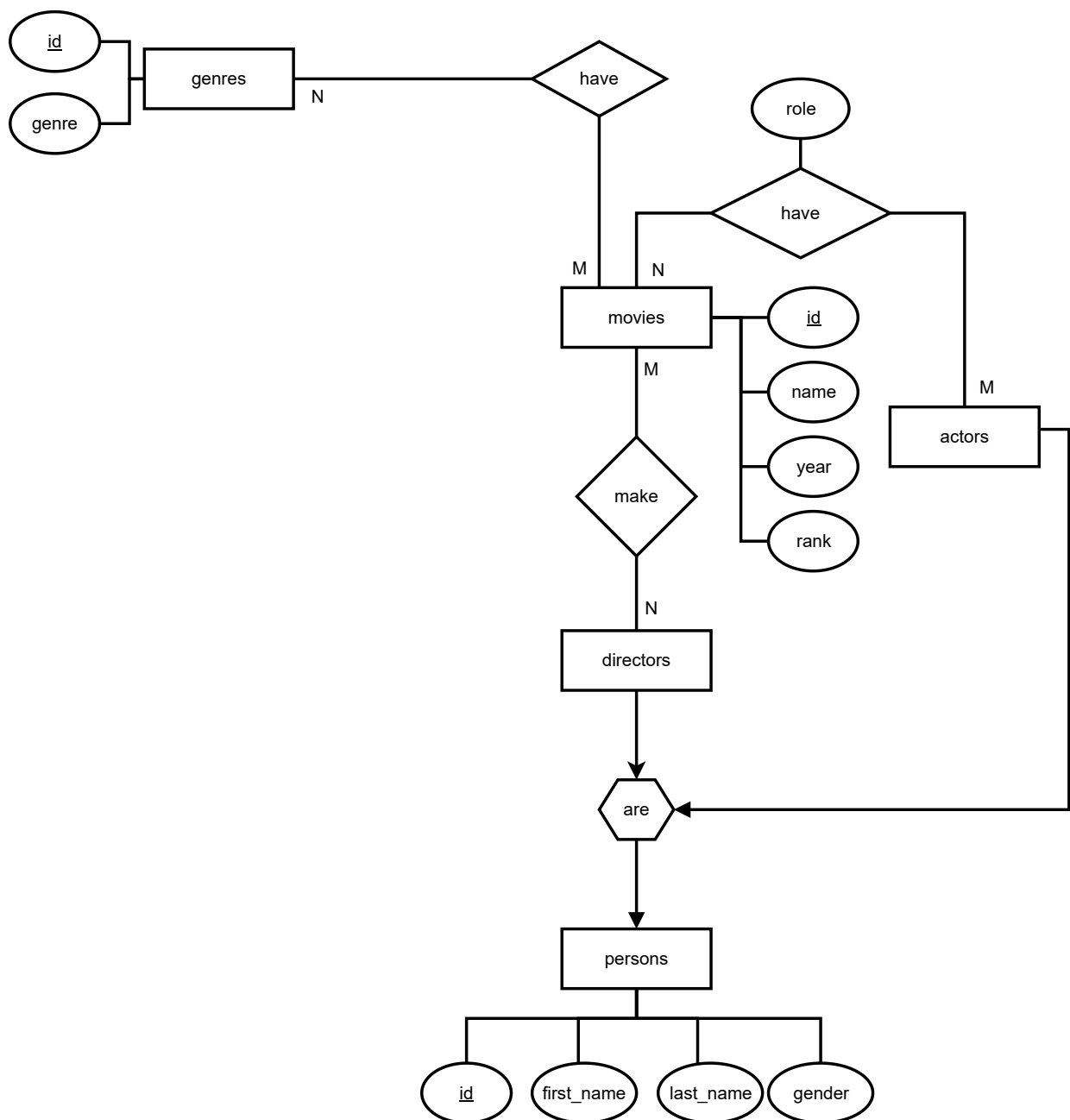
1. A professor can teach multiple courses.
2. For a specific term, multiple professors can teach the same course together.
3. A professor can teach only one course per term.
4. A professor must teach the same course every term.
5. A course is only taught once by a specific professor.

4 IMDb singers (5 points)

We would like to extend the IMDb ER model already known from the lecture to include singers.

- Singers are persons and have a vocal range.
- Singers sing in movies of possibly different genres.
- In each genre, a singer works with a different director.

Use Chen notation and give meaningful names to entity and relationship types. If necessary, introduce artificial keys and underline each key attribute. You don't have to redraw the whole model, but make it clear where your additions connect to the given model.



Submission

Solutions must be submitted in teams of 3 to 4 students by May 02 2024, 10:00am via your personal status page in the CMS using the Team Groupings functionality. Late submissions will not be graded! The submission must be a PDF containing your solutions to exercises 1, 2, 3 and 4.