Homework 1

MLLO 20210302

Homework 1 submission

- Deadline: 3/16 Tue. 14:00
- File name: hw1_{student_id}.pdf, ex. hw1_r09123001.pdf
- Submission: Ceiba
- Delay

    – One day: original score * 0.8

    – Two days: original score * (0.8)^2

    – More than three days: get no points

- TA hour: Thu. 14:00-15:00 at BL603（博理 603)

- TA mail: ntu2021sql@gmail.com

- FB group: NTU Database 2021 Spring

Homework 1 preparation

- You can use TerraER, or other ER or graphic software tools (including PPT) to draw your ER diagram
- If you want to use TerraER
  - Download ER diagram tool: TerraER (http://www.terraer.com.br/)
  - Install and run
  - Learn how to draw ER diagram with it
- If you discover new (free) ER drawing software, please share with the class

Homework 1A (20%)

- A movie studio is trying to build a database to manage its movie data. Please build the correct ER diagram for the movie studio's requirements:
  - The application must has three entities (5%)
    - Movie: with two attributes, title and length, with title being the key attribute
    - Director: with two attributes, name and age, with name being the key attribute
    - Actor: with two attributes, name and age, with name being the key attribute
  - Relationships
    - A director directs movies. All movies must be directed by directors. A director can direct one or more movies. There can be directors who have not directed any movie in this database yet. (5%)
    - An actor acts in movies. An actor can act in zero or more movies. A movie can have zero or more actors. There can also be actors who have not acted in any movie in this database yet. (5%)
    - Reminding: Remember to write down the cardinality ratio and participation constraints. (5%)

Homework 1B (10%)

- Continue from 1A:
  - Suppose now some actors also want to become directors, and some directors occasionally also want to act in movies (i.e. some directors also work as actors.) For each director, we want to record the "movies directed" by the director. For each actor, we want to record the "movies act in" by the actor.
  - Modify the ER diagram you build in 1A and describe this new situation using EER diagram constructs. (5%) (Hint: overlapping specialization)
  - Some movies are "remake of" some previous, classic movies. Some movie is a "sequel" of a previous movie.
  - Add these two types of relationships into this new ER diagram (5%)
- Note: you need to submit 1B in a separate ER diagram from 1A.

Homework 1C (70%)

Design a database model using ER model techniques and ER diagram

Basic Please use subject based on your hobbies, research, part-time working experiences, or anything you are interested in to design a database model using the entity relationship model.

Basic Do not use generic company or classroom as the subject of your design, as most textbooks already use these as examples.

Basic Your design must logically makes sense

- Your database model should contain
  - At least 5 entity types (you are welcomed to have more entity types to make your DB model interesting) **size**

  - At least three attributes for each entity type
  - At least 5 relationships (you are encouraged to have more)
- In addition, your design must contain the following
  - Regarding attributes **Attrib**
    - At least one composite-valued attribute
    - At least one multi-value attribute
  - Regarding entity types
    - At least one weak entity type **Weak entity**
    - All strong entity type must have a key attribute **Key**
    - All weak entity type must have a partial key attribute **Weak entity**
  - Regarding relationship
    - At least one recursive relationship **Recursive**
    - Cardinality ratios must be clearly labeled for each relationship **Card ratio**
    - Participation constraints must be clearly labeled for each relationship **Participate**

Homework 1C

- In addition, your design must also contain the following:
  - A total, disjoint specialization
  - An overlapping specialization
  - A union

Total, disjoint specialization

Overlapping specialization

Union

Homework 1C

Submission must include:

Basic
Basic A unique name for your database
Names for your entity types, relationships, and attributes, of course.

Descrip Written description of your "data analysis" about all relationships. For example:
- ○ "All employee must work for some department."
- ○ "Each employee cannot work for more than one department"
- ○ "Each employee must work on some project, but can work on more than one project."
- ER diagram of your database design

Hint:

- What you create in this homework may continue to be used by yourself in the future homeworks.

Other rules:

- Due in two weeks before class
- Late submission, 80% discount for each day late.
- Maximum two day delay (No acceptance on the third day counting from the submission date.)

Homework 1C Grading Guidelines

- 10% Basic
- 10% size
- 5% Description
- 5% Key
- 5% Attrib
- 5% Weak entity
- 5% Recursive
- 5% Card ratio
- 5% Participate
- 5% Total, disjoint specialization
- 5% Overlapping specialization
- 5% Union
- Total 70%