CS 5356 Advanced Database Management System

[Assignment 2]

[October 28th 11:59pm]

Problem Statement

You are tasked with designing a detailed Entity-Relationship (ER) model for an **International Research Conference Management System**. This system will handle various aspects of conference management, including research paper submissions, participant roles, sessions, reviews, and publications.

The conference takes place annually, with multiple research tracks and sessions. Participants can serve multiple roles (author, reviewer, session chair), and the system must accommodate both in-person and virtual attendees.

In this assignment, you are provided with **entity descriptions**. Your task is to:

1. Define attributes based on the entity descriptions.
2. Identify relationships, cardinalities, participation constraints, and any weak entities.
3. Build a comprehensive ER diagram using the information provided.

Entities and Descriptions

1. Conference

The conference is held annually, and each instance of the conference needs to be tracked by the system. Each conference has a specific *year*, a *location*, and consists of multiple *tracks*. Each conference also publishes *proceedings* containing the accepted research papers.

2. Track

A track is a thematic area under which research papers are submitted. Each track is associated with a particular conference and can have multiple *research topics*. A track consists of multiple *sessions*, each scheduled for a specific date and time.

3. Session

A session is a part of a track and features the presentation of research papers. Each session has a *session chair* responsible for managing it. Sessions are scheduled with a specific *date, time*, and *location* (physical or virtual). Each session may host multiple paper presentations.

4. Participant

Participants include researchers, reviewers, and session chairs. A participant can serve in multiple roles, such as *authoring papers*, *reviewing papers*, or *chairing sessions*. Some participants attend virtually, while others are physically present at the conference.

5. Research Paper

Research papers are submitted by participants to specific tracks. Each paper may go through multiple *revisions* before it is accepted. Papers are reviewed by reviewers who provide *feedback* and *ratings*. Accepted papers are included in the conference *proceedings*.

6. Paper Review

A paper is reviewed by multiple reviewers. Each review contains a *rating*, comments, and a *review date*. The same paper can be reviewed multiple times if it goes through revisions.

7. Proceeding

Once papers are accepted, they are published in the conference proceedings. A proceeding contains multiple papers from different tracks. Each paper published in the proceedings can later be *cited* by participants.

8. Citation

A citation records the instances where participants cite papers published in previous conference proceedings. A participant may cite multiple papers, and a paper can be cited by multiple participants.

Your Tasks

Step 1: Define Attributes

[20 points]

Using the descriptions provided above, you are responsible for **defining attributes** for each entity. Here are a few examples to guide you:

- For *Participant*, relevant attributes might include their *name*, *email*, *affiliation*, and whether they are a *virtual attendee*.
- For *Research Paper*, you might need attributes like *title*, *submission date*, *version*, and *status*.

Your job is to clearly identify the essential attributes for each entity. Think about unique identifiers (primary keys) for each entity.

Step 2: Identify Relationships

[20 points]

After defining attributes, you must determine the relationships between entities. Some relationships are already implied:

- *Conference* organizes *Tracks*.
- *Participants* author *Research Papers*.
- *Reviewers* review *Research Papers*.
- *Sessions* include *Research Papers* and are chaired by *Participants*.

For each relationship, specify:

- **Cardinality ratios** (e.g., 1:1, 1:N, M:N).
- **Participation constraints** (total or partial).
- Any **weak entities** that depend on other entities.

Step 3: Draw the ER Diagram

[40 points]

Using the entities, attributes, and relationships you've identified, create the **ER diagram**. You may use any of the following tools:

- **draw.io** (`https://app.diagrams.net/`)
- **Lucidchart** (`https://www.lucidchart.com/`)
- **ERDPlus** (`https://erdplus.com/`)

Ensure that your diagram:

- Uses the correct notation for entities, relationships, and attributes (rectangles for entities, diamonds for relationships, ovals for attributes).
- Shows all **cardinalities** and **constraints**.
- Includes any **generalization** or **specialization** hierarchies, if applicable.
- Indicates **weak entities** using double rectangles and relationships with double diamonds if needed.

Step 4: Write an Explanation

[20 points]

Write a brief explanation (300-500 words) detailing:

- How you determined the attributes and relationships.
- Any challenges you faced while defining cardinalities and participation constraints.
- Any design decisions related to handling *virtual attendees* or *session chairs*.
- How you ensured the system supports multiple roles for participants (e.g., a participant can be both an author and a reviewer).

Step 5: Submission

- Submit your **ER diagram** in a digital format (PDF not a screenshot).
- Include the **written explanation** included in the same pdf
- Indicate the **tool** you used to create the ER diagram (e.g., draw.io, Lucidchart, ERDPlus).

Additional Notes

- The system should be designed in such a way that it can be extended if the conference structure changes in future years.
- Think carefully about the **many-to-many** relationships (e.g., Participants and Papers, Papers and Reviews), and make sure to model them appropriately with associative entities.
- Virtual attendees should be handled as a key feature without violating any other system constraints.

Resources

- **Draw.io**: A free, web-based diagramming tool that allows you to create and export ER diagrams.
- **Lucidchart**: Another powerful tool for creating professional diagrams. Lucidchart offers free trials for students.
- **ERDPlus**: A simple tool specifically designed for ER diagrams, ideal for those new to diagramming.

Take time to familiarize yourself with these tools. If you encounter difficulties using them, feel free to ask for guidance.