(15 points) Milestone 1: Project Proposal & DB design

Due: 11:59pm, Sunday, Oct 05, 2025
No late submissions will be accepted.

Purpose:

- Propose a unique project idea related to a database system.
- Develop a high-level design of your database using the Entity-Relationship (E-R) model.
- Convert the E-R model into relational tables.
- Apply business logic and domain-specific knowledge of your project to determine the cardinality of relationships and indicate any mandatory relationships.
- Understand and apply normalization principles to improve the design of your database.
- Evaluate your project milestone for compliance with database design best practices.
- Work as a team, collaborate professionally, and contribute fairly.

Submission instructions:

- You should submit this deliverable on Gradescope.
- For this deliverable you should turn in 1 PDF file (as a team submission):
  - *Milestone1.pdf*
  - *Peer evaluation form*

- Only **one** submission per team. Make sure to **link** your teammates to the submission.

Requirement:

In this milestone, you are tasked with **proposing a database project idea** by writing a formal **database requirement specification**. This specification should detail the purpose, entities, and relationships in your system, as well as the business rules that will guide the design.

You should include the following in your specification:

- **Overview** of your project idea, describing its functionality and objectives.
- **Key Entities**: Identify the main entities of your system (e.g., Users, Orders, Products, etc.) and their attributes (e.g., name, email, product ID, etc.).
- **Relationships**: Describe how these entities interact with each other. For example, a "User" can place "Orders," or a "Product" belongs to a "Category."
- **Business Rules**: Any domain-specific rules that affect the design. For example, "An order must contain at least one product," or "A user can have multiple orders but can only place one order at a time."

After outlining your specification, you will need to:

1. **Create an Entity-Relationship Diagram (ERD)**:
    - Map out all entities and their relationships.
    - Indicate the cardinality (one-to-many, many-to-many) and mandatory relationships.
    - Identify attributes, including primary keys, foreign keys, and any composite or multi-valued attributes.
2. **Convert the ERD to Relational Model (Schema Statements)**:
    - Translate the ERD into relational tables.
    - Define attributes, primary keys, foreign keys, and apply normalization to eliminate redundancy and ensure data integrity.
3. **Assumptions and Justifications**:
    - Include any assumptions made during the design process and justify your decisions (e.g., why you defined certain attributes as composite or multi-valued).

You are required to create a **digital illustration of your E-R Diagrams**. You may use any software to draw your diagrams. — **No hand-drawing on paper**. No digital hand-drawing. No hand-drawing through any software. There are several easy-to-use web-based software (some are free, some offer a free trial) that you can use to draw an E-R Diagram:

- **Draw.io (Recommended)**
- Excalidraw
- Lucidchart
- yEd
- Dia
- Visual Paradiagm

What to submit:

1) **Milestone1.pdf**:
   - **Database Requirement Specification**: A detailed specification that includes an overview, entities, relationships, and business rules.
   - **Entity-Relationship Diagram (ERD)**: A high-level diagram showing all entities and relationships.
   - **Schema Statements**: Convert your ERD into a set of relational tables with appropriate primary and foreign keys.
   - **Assumptions** and justifications.
2) **Peer evaluation (due when this milestone is due)**
   - This is an individual task.
   - The teaching team will consider this peer evaluation (along with the other peer evaluations and other deliverables) when assigning the project final grade to an individual team member. Each team member's grade may be adjusted by 0%-100% deduction, based on his/her contribution.
   - Submit your peer evaluation:
     https://docs.google.com/forms/d/e/1FAIpQLSfYSxIUOWoWsGDKaeEqZ1DlcIrZF0ED0jPYyRzJf7WSnmc1cQ/viewform?usp=sf_link
     - **Everyone is required to submit the peer evaluation**
   - You are required to enter the names and NetIDs of all team members
   - Once this form is closed, the form will not be reopened and we have to assign a zero grade to this section of the rubric.

Grading Rubric (15 points total)

Category	Points	Criteria
Database Requirement Specification	5 points	- **(2 pts)** Clear and concise project overview, explaining its purpose and objectives. - **(1 pt)** Key entities are identified with appropriate attributes. - **(1 pt)** Relationships between entities are clearly defined. - **(1 pt)** Business rules are well-documented and logically consistent.
(ERD)	5 points	- **(2 pts)** ERD includes all required entities and relationships, properly labeled. - **(1 pt)** Correct cardinality and mandatory relationships are indicated. - **(1 pt)** Attributes are well-defined, including primary and foreign keys. - **(1 pt)** Diagram is neatly drawn using appropriate tools (no hand-drawing).
Relational Model	3 points	- **(1 pt)** Schema accurately converts the ERD into relational tables. - **(1 pt)** Primary keys and foreign keys are correctly assigned. - **(1 pt)** Normalization principles are applied to avoid redundancy.
Submission & Formatting	2 point	- **(2 pt)** The submission follows all guidelines, is properly formatted, and submitted on time.

Deductions:

- **Late Submission: 0 points** (No late work accepted).
- **Incomplete or Missing Peer Evaluation:** Up to **100% deduction** for an individual team member.
- **Incorrect or Missing Elements:** Partial credit will be given based on the rubric above.