

Computer Engineering Department

King Mongkut's University of Technology Thonburi

CPE 241 Database

Problem Session #04 ER Diagram Exercise and Modify Existing Database

Date: Check PS04 assessment activities on LEB2

Introduction

In this fourth problem session, you will practice creating more complex relational data models including weak entities and partial keys. This will conclude our ERD topics we need to know in this class. Then you move on to design a selected database you would like to implement for your final project. Create ERD for the data.

Task List

- 1. ER Diagram Exercise**
- 2. Final Project ERD**

Task 1: ER Diagram Exercise

In this task, you will extend your knowledge of Entity-Relationship (ER) diagrams by incorporating weak entities. Weak entities do not have sufficient attributes to be uniquely identified on their own and rely on a related strong entity. You will create Chen ERD incorporating weak entities and their identifying relationships. Then you can explore partial keys, generalization, and specialization.

Objectives of Task 1

1. Understand and apply the concept of weak entities and their relationships with strong entities.
2. Create comprehensive ER diagrams using Chen Diagram.
3. Identify and represent primary keys (PK), foreign keys (FK), and weak entity dependencies.

Instructions

STEP 1: Identify Weak Entities

Review your previous database schema and determine cases where weak entities are necessary. Examples include:

- Orders and Order Items (where Order Items depend on Orders for identification).
- Students and Guardians (where Guardians exist only in reference to a specific Student).

STEP 2: Create the ER Diagrams

Use Chen notation to depict weak entities as rectangles with double borders and identifying relationships using double diamonds.

Deliverables

You are required to submit the following:

1. The list of databases having at least one weak entity is necessary. Also, give a brief explanation.
2. Chen ER Diagram of all databases in 1: a conceptual or logical-level diagram showing all entities, attributes, relationships, and cardinalities.

Submission Format

- Compile all written explanations and diagrams into a single PDF report.
- Organize the report with clear sections.
- Include captions for each diagram explaining PK, FK constraints, and weak entity dependencies.

Task 2: Final Project ERD

You are going to pick a domain for your project from the choice of (a) online shopping database, (b) ticket booking database, and (c) streaming service database i.e. YouTube, etc. You are going to think/find out requirements and business rules. Then you can create ERD for conceptual and logical level with Chen and Crow's foot notation. The ERD of this task can be a draft version for further improvement. In the final state, you will be appointed to receive feedback for improvements before final implementation. This ensures your project is well-structured before implementation.

Objectives of Task 2

1. Identify requirements and business rules of your selected domain.
2. Design a structured ERD for your final project database.
3. Apply best practices for defining entities, relationships, and constraints.

Instructions

STEP 1: Define Your Project Scope

- Choose a domain.
- List the requirements and business rules of the selected domain.
 - Review the initial requirements in the file **“DBMS Project Requirements Brief V0”**
 - Expand them into a more detailed requirements list.
As a tip, you may visit similar websites related to your project to identify additional requirements that should be included.
- Outline the core entities and relationships required for your final project database.

STEP 2: Design ER Diagrams

- Construct a **Chen ER Diagram** to represent the conceptual structure.
- Convert it into a **Crow's Foot ER Diagram** for a more detailed logical representation.

STEP 3: Write a Short Justification

- Explain your entity choices, relationships, and key constraints.
- Identify potential improvements or missing elements.

Deliverables

You are required to submit the following:

1. The list of requirements and business rules of the selected domain.
2. Draft ERD (Chen & Crow's Foot diagrams)
3. Justification document (300-500 words)

Submission Format

- Compile all written explanations and diagrams into a single report. It must include requirement list, draft ERDs, and the justification document.
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Final Submission

- Combine results from Task 1 and Task 2 in a PDF file and ensure it is named appropriately (e.g., **PS04_YourGroupName.pdf**) then submit the report on LEB2 before the deadline.
- Upload the PDF report to the Assessment Activities section for PS04 on LEB2.