CS275 – Intro to Databases

Intro to ER Modeling
Chap. 2.1 – 2.3

DBMS Architecture

• Levels of Abstraction

  External Schema 1  External Schema 2

   Conceptual Schema

   Physical Schema

MySQL

Web Forms  App Front Ends  SQL Interface

SQL Commands

DBMS

Database/Physical
Database Design

- What is database design?
- What is involved in the process?
- What is ER modeling?
- How do we do ER modeling effectively?

What Is Database Design?

1. Requirement analysis
2. Conceptual database design
3. Logical database design
4. Schema refinement
5. Physical database design
6. Application and security design
Requirement Analysis

- Need to decide
  - What data is to be stored
  - What applications will make use of the data
  - What operations are most needed
- An informal process

Conceptual Database Design

- Use information from requirement analysis
- Develop high-level description of the data
  - ER modeling

Logical Database Design

- Pick a DBMS (Oracle, MySQL, etc)
- Convert the conceptual database design into a database schema
Schema Refinement

- Identify potential problems and fix them
  - What if we want to add a industry 6 with an employee?
  - What if we want to rename industry 5?

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Physical Database Design

- Fast retrieval and update
- May require building indexes and clustering tables

Application and Security Design

- Software design and development cycle
- Design user roles and relationship to data
ER Modeling

• Entities
• Relationships
• ER = Entity-Relationship

Entities

• Entity
• Entity sets
• Attributes
• Domains

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Keys

- Set of attributes which uniquely identify entity
  - Candidate key
  - Primary key
ER Diagrams

- Attribute
- Entity
- Relationship

Relationship

- An association b/w at least two entities
  - Uses keys to match entities
  - May have attributes

  ![Relationship Diagram](image)

Relationships

- Ternary Relationship Set

  ![Relationships Diagram](image)
Relationships

• Need not be between different entity sets