IT420: Database Management and Organization

Data Modeling with the Entity-Relationship Model

ER Model
- Entities, attributes, identifiers
- HAS-A Relationships
  - Degree: binary, ternary
  - Maximum cardinality
  - Minimum cardinality
- Weak entities
  - ID-dependent entities; identifying relationships
- IS-A Relationships
  - Inclusive, Exclusive

Goals of This Lecture
- Create ER model from user requirements

ERwin Symbol Summary

Forms, Reports and ER Model
- User input:
  - Forms
  - Reports
  - Discussions
- DB modeler: Entity-Relationship model
  - Same entities, relationships under the surface
1:1 Strong Entity Relationships

1:N Strong Entity Relationships

N:M Strong Entity Relationships
N:M Strong Entity Relationships

The Association Pattern

Association Class

Entity vs. Attribute

Multi-valued Attribute → Entity

Recursive Relationships

- **Recursive relationship:** an entity has a relationship to itself
1:N Recursive Relationship

N:M Recursive Relationship

1:1 Recursive Relationship

Class Exercise

- Draw ER diagram for a database used to manage IT420 class (at least 3 entities)
  - Specify entities, attributes, identifiers
  - Specify relationships
  - Specify cardinalities for relationships

Class Exercise

- Drugwarehouse.com has offered you a free life-time supply of prescription drugs (no questions asked) if you design its database schema. Given the rising cost of health care, you agree. Here is the information that you gathered:
  - Patients are identified by their SSN, and we also store their names and age
  - Doctors are identified by their SSN, and we also store their names and specialty
  - Each patient has one primary care physician
  - Each doctor has at least one patient
  - Doctors prescribe drugs for patients.