COS 425:
Database and Information
Management Systems

Final concept in Entity-relationship (ER) model

Richness of ER model

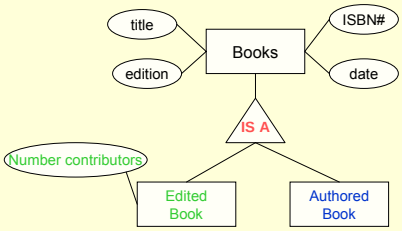
SEEN 1. Tuples can be composed of tuples – hierarchy:

- Relationship tuples composed of entity tuples
- By aggregation, relationship tuples can contain relationship tuples

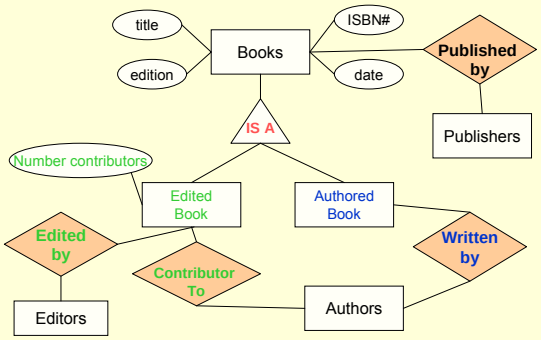
NEW 2. Inheritance for entities:

- An entity type can be further refined

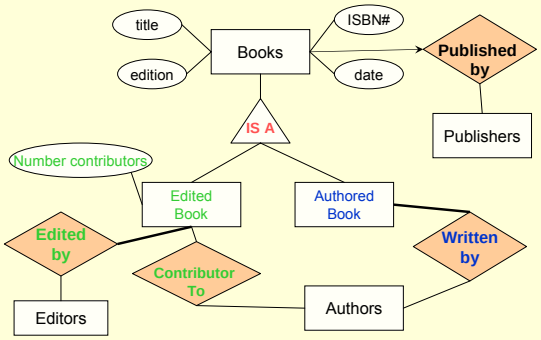
Inheritance hierarchy for entities



Using hierarchy with relationships



Key and total participation constraints possible

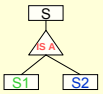


We just declared constraints:

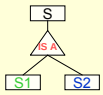
1. A book is published by at most one publisher (key constraint)
2. Every authored book is written by some author (total participation constraint)
3. Every edited book is edited by some editor (total participation constraint)

Constraints on "is a" decomposition

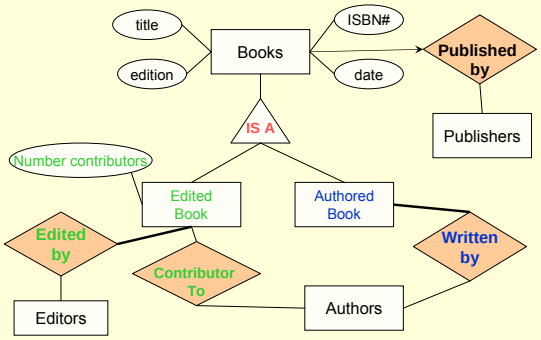
- Covering
  If union of subclasses = superclass
  S= S1 U S2



- Overlapping
  If subclasses can overlap
  S1 ∩ S2 may ≠ Ø

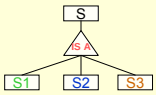


Overlapping? Covering?

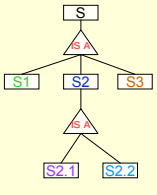


GENERAL "IS A"

- Can have > 2 subclasses
  for one "IS A"

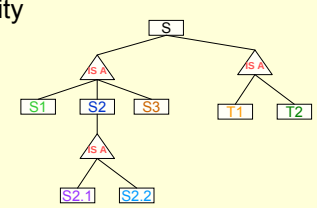


- Subclasses can be further
  refined with "IS A"
  – Deep hierarchy possible

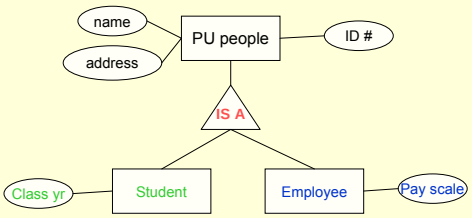


GENERAL "IS A"

- Can have more that one "IS A" refinement for an entity



Another example



Summary

- ER model is rich model for describing objects and their relationships
- Can capture:
  - constraints
  - Aggregations of objects into more complex objects
  - Different decompositions of entity types
  - Deep hierarchy of decomposition
- Model used as first effort to organize information and make precise what is needed