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Database Design - CS 6360.002 - Fall 2022 - HW1B

8.2. Define the following terms: superclass of a subclass, superclass/subclass relationship, IS-A relationship, specialization, generalization, category, specific (local) attributes, and specific relationships.

Superclass of a subclass

- A meaningful subset of items of a specific type.
- A superclass is the 'parent' entity type to which a subclass belongs.

Superclass/subclass relationship

- Subclass entities inherit the superclass's attribute(s) and relationships.
- A subclass member entity represents the same real-world entity as a member of the superclass, but in a different specialized capacity.
- An entity cannot exist in the database only by belonging to a subclass; it must also belong to a superclass.

IS-A relationship

- Because of the way we refer to the concept, a class/subclass relationship is frequently referred to as an IS-A (or IS-AN) relationship.
- A SECRETARY is an EMPLOYEE, and a TECHNICIAN is also an EMPLOYEE.

Specialization

- Specialization is the definition of a group of subclasses of an entity type; this entity type is referred to as the specialization's superclass.
- The set of subclasses that comprise a specialization is determined by some distinguishing feature of the entities in the superclass.

The collection of subclasses SECRETARY, ENGINEER, TECHNICIAN, for example, is a specialization of the superclass EMPLOYEE that differentiates between employee entities based on the job type of each employee entity.

Generalization

- It is the total opposite of specialization.
- The procedure for creating a generic entity type from the specified entity types.
- A reverse abstraction procedure in which we suppress distinctions between numerous entity types, determine their standard properties, and generalize them into a single superclass ["generalized superclass"] of which the original entity types are specific subclasses.

Category
A subclass that represents a group of entities that are a subset of the UNION of entities from different entity types.

Specific attributes

- Attributes that apply solely to entities of a specific subclass, such as SECRETARY's TypingSpeed, are attached to the rectangle representing that subclass.

Specific relationships
Relationships are unique to a subclass of a superclass.

8.3. Discuss the mechanism of attribute/relationship inheritance. Why is it useful?

- The set of attributes and relationship types establish the type of each entity.
- Members of the subclass entity inherit the superclass entity's properties and relationships. This approach is beneficial since the properties in the subclass have superclass features.

8.5. Discuss user-defined and attribute-defined specializations, and identify the differences between the two.

USER-DEFINED SPECIALIZATION	ATTRIBUTE DEFINED SPECIALIZATION
The user is responsible for identifying the proper subclass.	The value of the same attribute is used in defining predicate for all subclasses.
The user-specified defined specialty cannot be automatically selected for membership.	It is possible to automatically determine who belongs to the attribute-defined specialty.

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8.19

Entity Types:

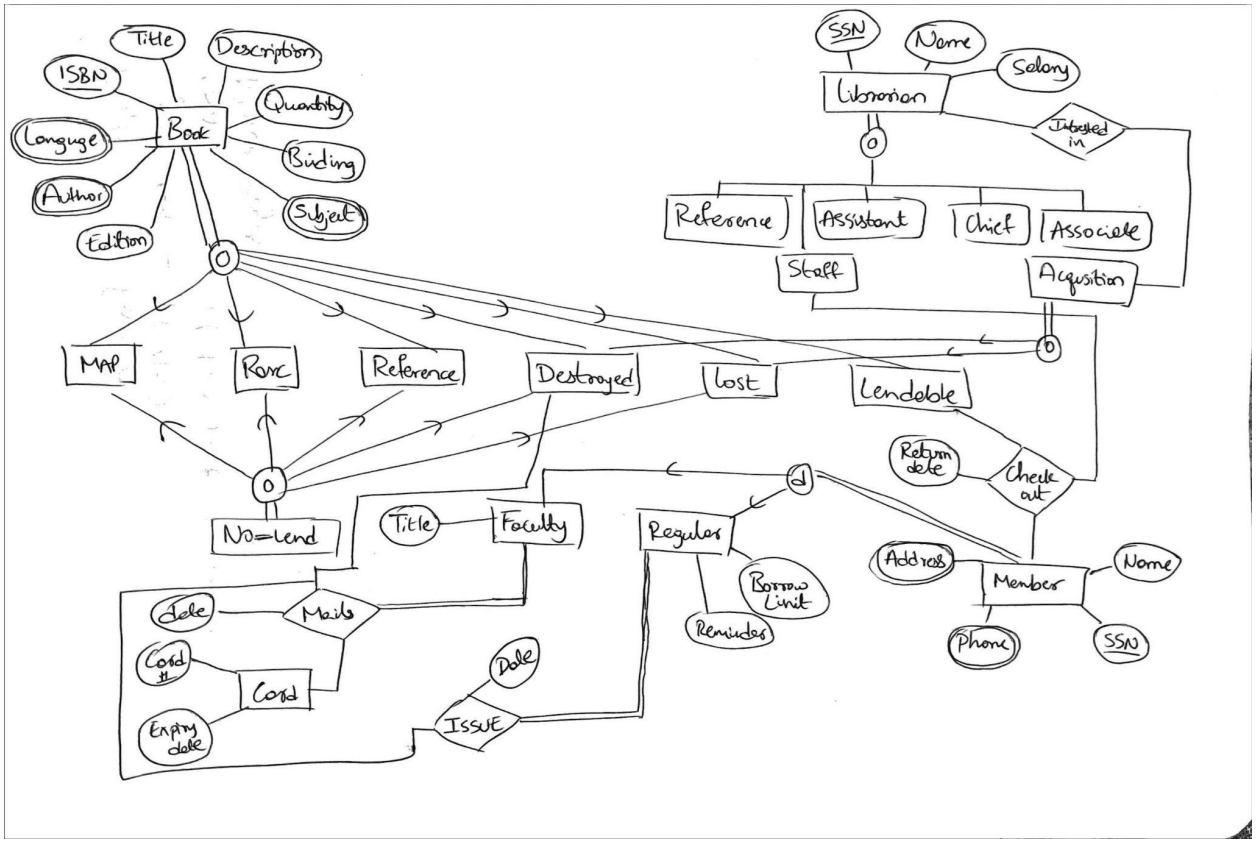
Book(ISBN, Tile, Author(s), Language(s), Subject(s), Binding, Description, Quantity, Edition)
Librarian(SSN, Name, Salary)
Member(SSN, Name, Phone number(s), Address(es))
Card(Card number, Expiry)

Relationships:

ISSUES - Staff issues a card to a regular member
MAILS - Staff mails a card to faculty
CHECK OUT - Staff checks out Lendable books for Members
INTERESTED IN - Librarian is interested in acquiring Acquisition Books (Lost, Destroyed, Rare)

Specialization/Generalization:

Book (Overlap) - Map, Rare, Reference, Destroyed, Lost, Lendable
Member (disjoint) - regular, Faculty
Librarian (disjoint) - Reference, Assistant, Staff, Chief, Associate
Acquisition (overlap) - Destroyed, Lost, Rare
No Lend (overlap) - Reference, Map, Destroyed, Rare



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8.26. Which of the following EER diagrams is/are incorrect and why? State clearly any assumptions you make.

Only c is incorrect
It is clear from the image that there are only two subclass entities joined by an o in a circle.