Data and Its Applications (CS4.301)

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Taught by Prof. Kamal Karlapalem

Entity-Relationship (ER) Data Model

n-ary Relationship Types (contd.)

When an n-ary relationship has to be converted to n binary relations, the relationship is represented as a weak entity with n identifying entity types.

For example, if (a, b, c) is an instance of a ternary relationship T, then $(s, a) \in B_1, (s, b) \in B_2, (s, c) \in B_3$, where B_i are the binary relationships that model T.

Enhanced ER Model

Specialisation

Specialisation is a property of enhanced ER models that supports *is-a* relationships. An entity type can be divided into disjoint (d) or overlapping (o) classes.

Further, the entity type may have *partial* or *total* participation in the division into subclasses.

Generalisation

Generalisation allows us to suppress the differences of different entity types, identify their common attributes, and generalise them to a superclass. It is in a way the inverse of specialisation.

Aggregation

Aggregation is a form of abstraction, for building composite objects from their components. It supports the *is-part-of* relationship.

Relational Data Model

The relational data model is a bottom-up approach to a database.

A relation is a collection of tuples, which are ordered sets of values. A tuple t of $R(A_1, A_2, \ldots, A_n)$ is an ordered set $\langle v_1, v_2, \ldots, v_n \rangle$, where $v_i \in \text{dom}(A_i)$.

Relations are represented in a tabular form, where each column represents an entity type and a row represents a tuple. All values in a tuple are considered atomic.