Entity-Relationship Model and ER Model

By

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Agenda

- Entity Relational Model
- Purpose of E/R Model
- Advantage and Disadvantage
- Entity
- Entity Sets
- Attribute
- Component of ER Diagram

Entity Relationship Model

- Peter Chen's Landmark Paper in 1976
  - "The Relationship Model: Toward a Unified View of Data"
  - Graphical representation of entities and their relationships
  - Entity Relationship (ER) Model

  - Based on Entity, Attributes & Relationships
    - Entity is a thing about which data are to be collected and stored
      - e.g. EMPLOYEE
    - Attributes are characteristics of the entity
      - e.g. SSN, last name, first name
    - Relationships describe an associations between entities
      - i.e. 1:M, M:N, 1:1

  - Complements the relational data model concepts
    - Helps to visualize structure and content of data groups
      - entity is mapped to a relational table
    - Tool for conceptual data modeling (higher level representation)

  - Represented in an Entity Relationship Diagram (ERD)
- Entity relational model is a model for identify entities to be represented in the database and representation of how those entities are related
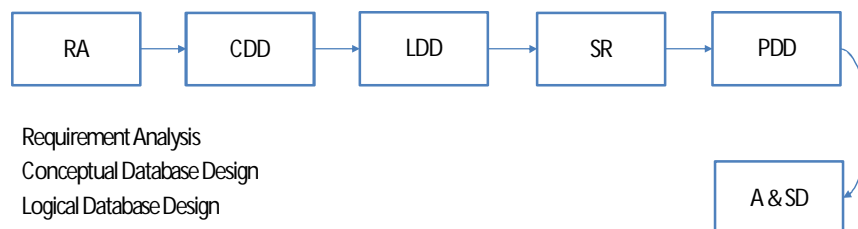

Database Design Process

- The ER –model is most relevant to first three step

- Requirement Analysis
- Conceptual Database Design
- Logical Database Design
- Schema Refinement
- Physical Database Design
- Application and Security Design

E-R Model: Pros & Cons

- Advantages
  - Exceptional conceptual simplicity
    - easily viewed and understood representation of database
    - facilitates database design and management
  - Integration with the relational database model
    - enables better database design via conceptual modeling

- Disadvantages
  - Incomplete model on its own
    - Limited representational power
      - cannot model data constraints not tied to entity relationships
        » e.g. attribute constraints
      - cannot represent relationships between attributes within entities
    - No data manipulation language (e.g. SQL)
  - Loss of information content
    - Hard to include attributes in ERD

ER Model

Purpose of E/R Model

- The E/R model allows us to sketch database schema designs.
  - Includes some constraints, but not operations.
- Designs are pictures called *entity-relationship diagrams*.
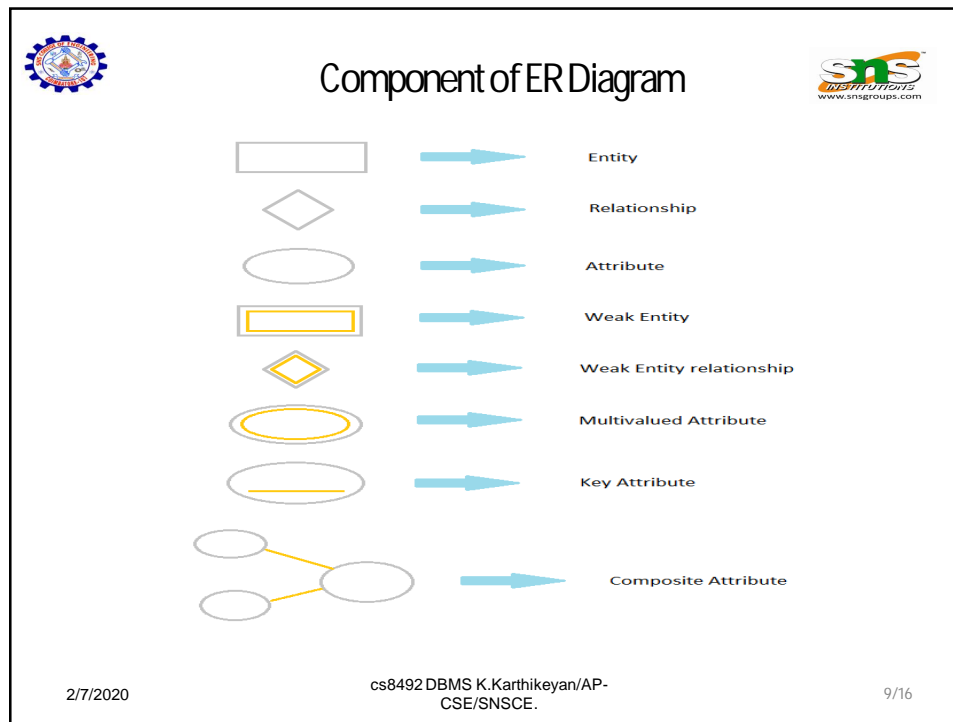- Later: convert E/R designs to relational DB designs.

Entity Sets

- *Entity* = "thing" or object.
- *Entity set* = collection of similar entities.
  - Similar to a class in object-oriented languages.
- *Attribute* = property of (the entities of) an entity set.
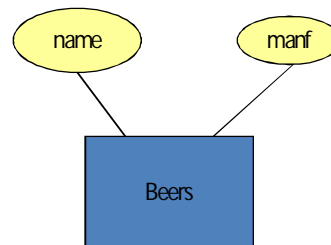 - Attributes are simple values, e.g. integers or character strings, not structs, sets, etc.

Component of ER Diagram

Symbol	Component
(rectangle)	Entity
(diamond)	Relationship
(ellipse)	Attribute
(double rectangle)	Weak Entity
(double diamond)	Weak Entity relationship
(double ellipse)	Multivalued Attribute
(ellipse with underline)	Key Attribute
(ellipses connected)	Composite Attribute

Example:

name   manf

Beers

- Entity set Beers has two attributes, name and manf (manufacturer).
- Each Beers entity has values for these two attributes, e.g. (Bud, Anheuser-Busch)

Relationships

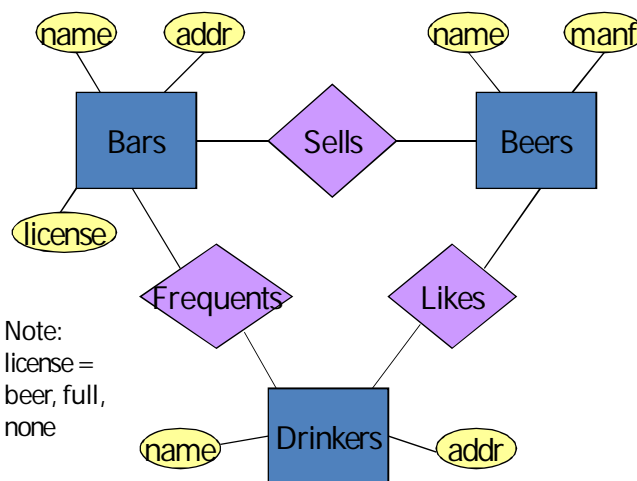- A relationship connects two or more entity sets.
- It is represented by a diamond, with lines to each of the entity sets involved.

Example: Relationships

Bars sell some beers.

Drinkers like some beers.

Drinkers frequent some bars.

Note:
license =
beer, full,

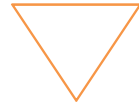2/7/2020

EXAMPLE REAL TIME APPLICATION

- Draw the ER diagram for Banking Systems (AU Dec-17, May 14 and Dec 14)

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ACTIVITY

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E- MODEL

- ANS:_____

Thank You