

Database Management System – 11 (Entity Types, Entity Sets, Keys, and Value Sets)

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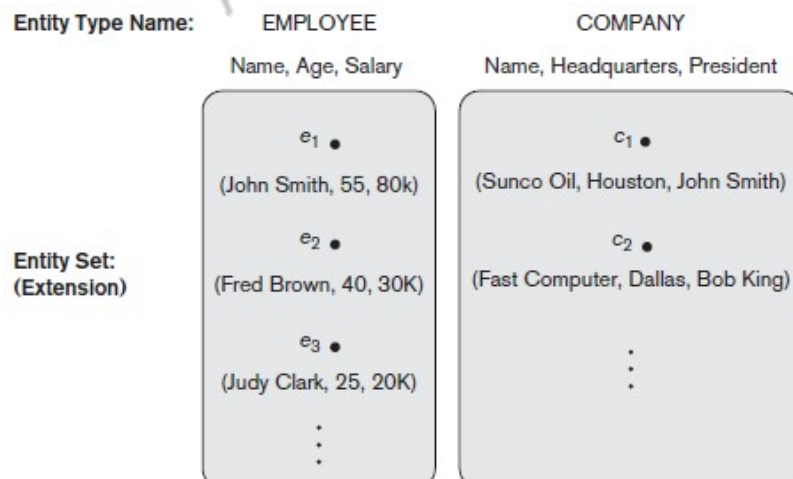
Outline

- Entity
- Entity Type
- Entity Set
- Key Attributes
- Initial conceptual design of Company database
- ER Notations with examples

Entity, Entity Types and Entity Sets

- **Entity**
 - A thing or object in the real world with an independent existence
 - a person, car, house, or employee, a company, a job, or a university
- **Entity Types (schema) (intention)**
 - A collection (or set) of entities that have the same attributes
 - Example - a company employing hundreds of employees
 - Each entity has its own value(s) for each attribute
 - Described by its name and attributes
- **Entity Set (or entity collection) (extension)**
 - All entities of a particular entity type in the database at any point in time

Entity, Entity Types and Entity Sets



Key Attributes of an Entity Type

- An attribute of an entity type for which each entity must have a **unique value** is called a **key attribute** of the entity type
 - Example, *SSN* of *EMPLOYEE*
- Key attribute may be **composite**
 - Example, *VehicleTagNumber* is a key of the *CAR* entity type with components (Number, State)
- An entity type may have **more than one key**
 - *CAR* entity type may have two keys:
 - *VehicleIdentificationNumber*
 - *VehicleTagNumber* (Number, State)

Key attributes

Registration (Number, State), Vehicle_id, Make, Model, Year, (Color)

CAR ₁
((ABC 123, TEXAS), TK629, Ford Mustang, convertible, 2004 {red, black})
CAR ₂
((ABC 123, NEW YORK), WP9872, Nissan Maxima, 4-door, 2005, {blue})
CAR ₃
((VSY 720, TEXAS), TD729, Chrysler LeBaron, 4-door, 2002, {white, blue})
⋮

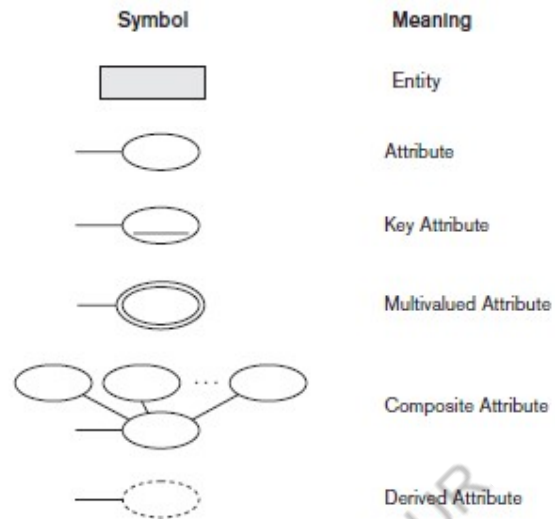
Value Sets (Domains) of Attributes

- **Specifies the set of values** that may be assigned to that attribute for each individual entity
- Example
 - Age of employees is between 18 and 60
 - Value set for the *Name* attribute

Initial Conceptual Design of the COMPANY Database

- An entity type DEPARTMENT with attributes *Name*, *Number*, *Locations*, *Manager*, and *Manager_start_date*. *Locations* is the only multivalued attribute. Both *Name* and *Number* are (separate) key attributes
- An entity type PROJECT with attributes *Name*, *Number*, *Location*, and *Controlling_department*. Both *Name* and *Number* are (separate) key attributes.
- An entity type EMPLOYEE with attributes *Name*, *Ssn*, *Sex*, *Address*, *Salary*, *Birth_date*, *Department*, and *Supervisor*. Both *Name* and *Address* may be composite attributes. *Name*—*First_name*, *Middle_initial*, *Last_name*
- An entity type DEPENDENT with attributes *Employee*, *Dependent_name*, *Sex*, *Birth_date*, and *Relationship* (to the employee)

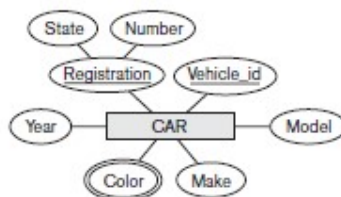
ER Diagram



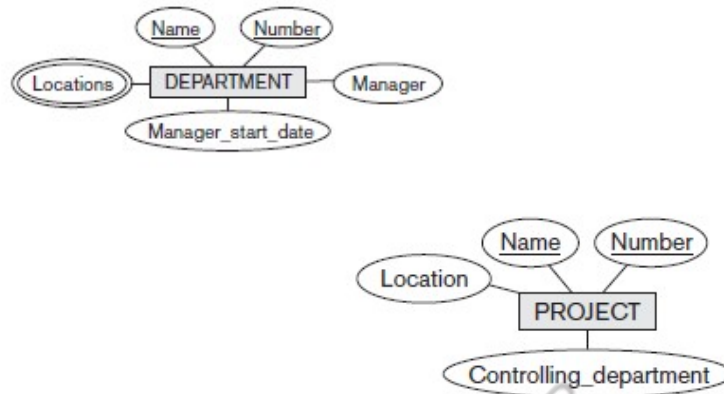
Example

Registration (Number, State), Vehicle_id, Make, Model, Year, (Color)

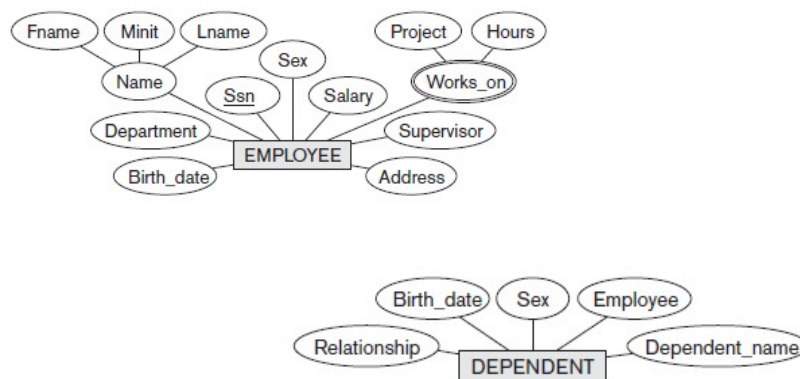
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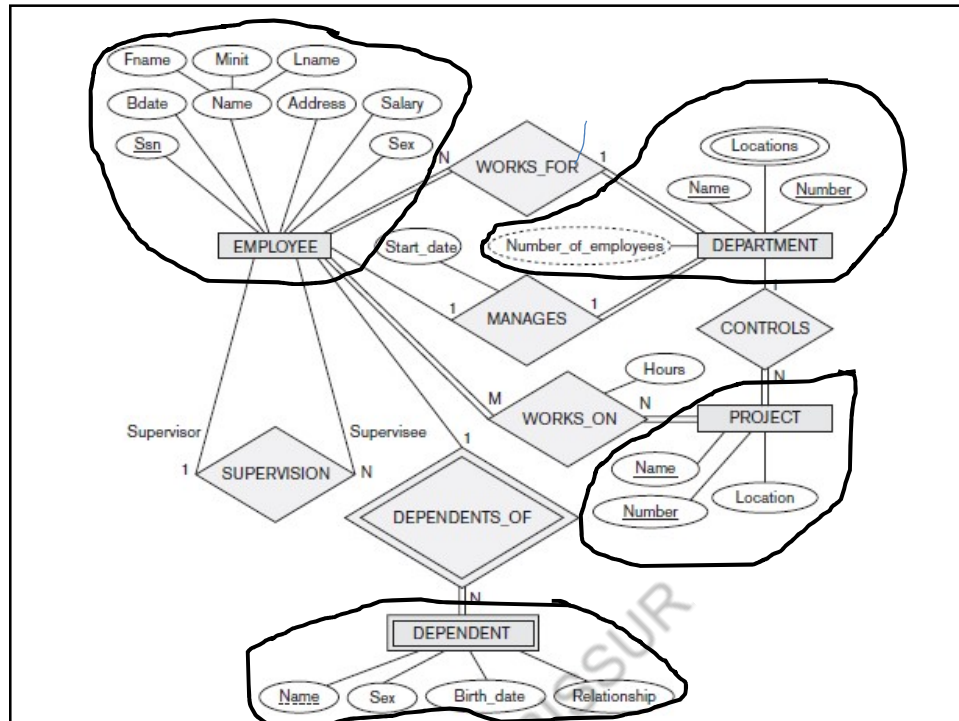


Example - COMPANY



Example - COMPANY





Reference

- Elmasri R. and S. Navathe, Database Systems: Models, Languages, Design and Application Programming, Pearson Education 6th edition and 7th edition

Thank you

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