

teacher: no gaming in class
that one kid in the back of the
classroom



Databases - Tutorial 3

Conceptual Data Modeling - Enhanced ERD

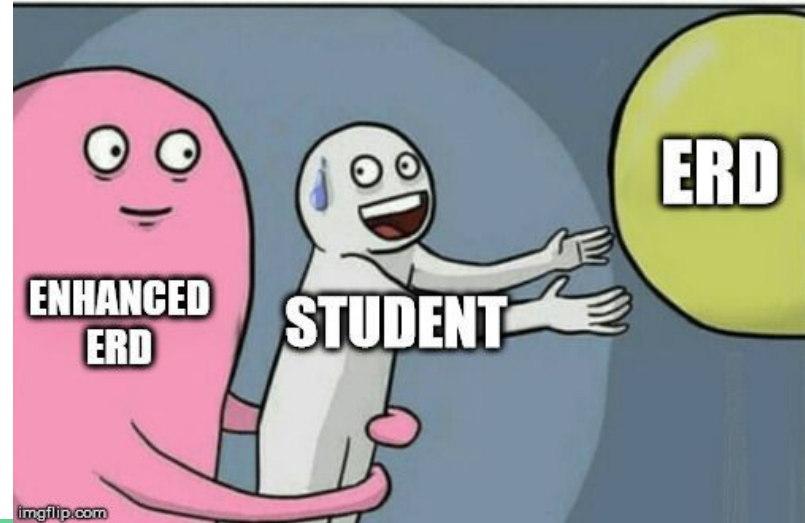
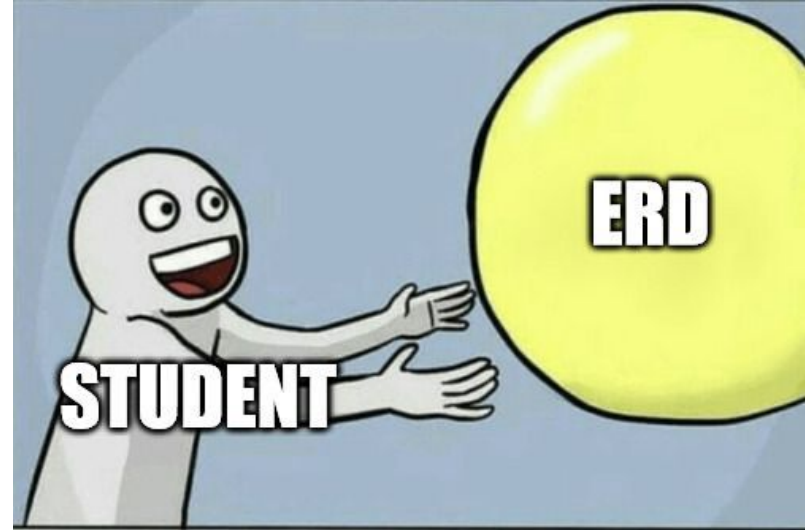
Hamza Salem - Innopolis University

MY REACTION WHEN I

**READ RELATIONSHIP
NAME IN STUDENT WORK**

Contents

- Enhanced ERD



Enhanced ERD

Enhanced entity-relationship (EER) diagrams are basically a more expansive version of ER diagrams.

An EER diagram provides you with all the elements of an ER diagram while adding:

- Attribute or relationship inheritances
- **Specialization and generalization**
- **Subclasses and superclasses**



Subclasses, Superclasses , and Inheritance

Subclass and Superclass relationship leads the concept of inheritance.

The relationship between subclass and super class is denoted with the symbol.

When we implement a superclass/subclass relationship in the database system, **we may represent a member of the subclass as a distinct database object a distinct record that is related via the key attribute to its superclass entity.**

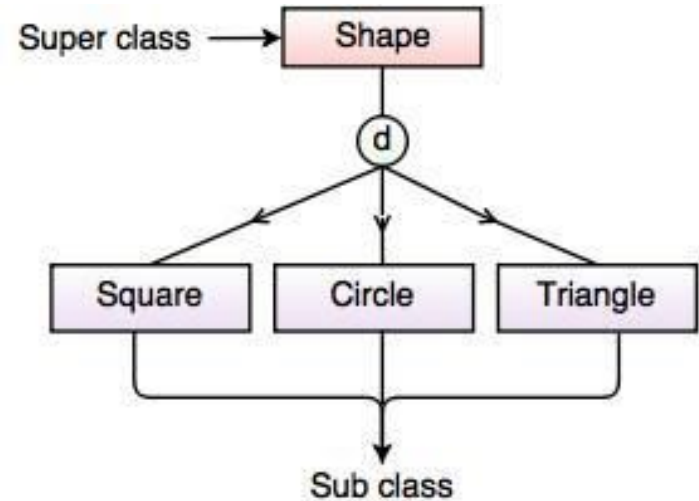
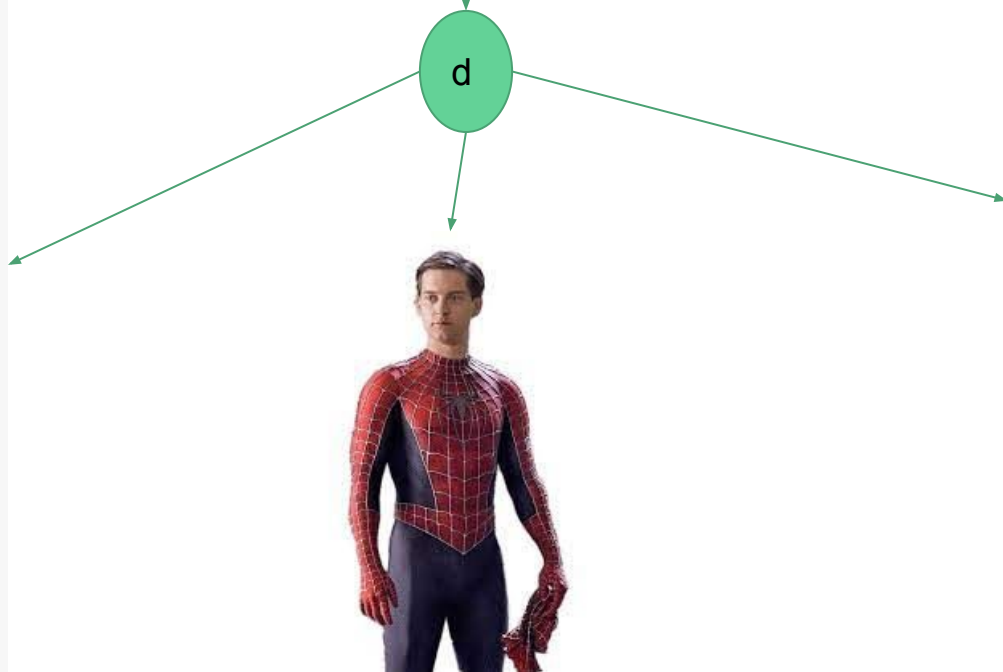


Fig. Super class/Sub class Relationship



Generalization

- Generalization is the process of generalizing the entities which contain the properties of all the generalized entities.
- It is a bottom approach, in which two lower level entities combine to form a higher level entity.
- Generalization is the reverse process of Specialization.
- It defines a general entity type from a set of specialized entity type.
- It minimizes the difference between the entities by identifying the common features.
- Every ---- is a ----- but not every ---- is a -----

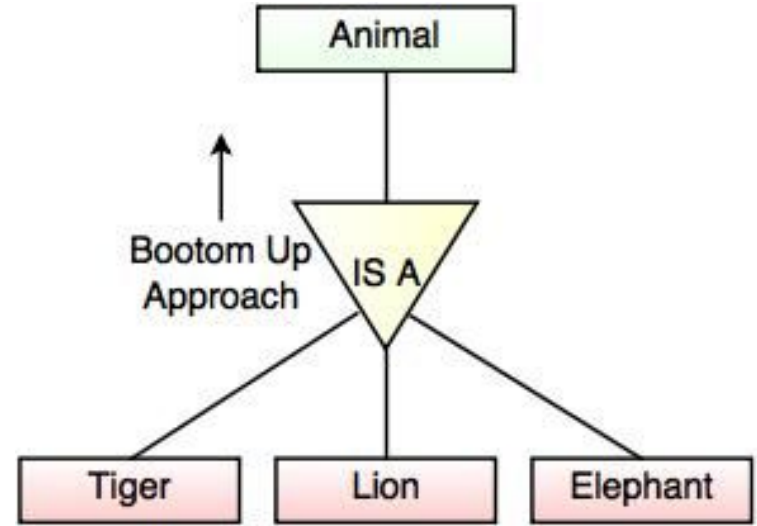


Fig. Generalization

Squid Game?

Player

Winner

Loser



Specialization

- Specialization is a process that defines a group entities which is divided into subgroups based on their characteristic.
- It is a top down approach, in which one higher entity can be broken down into two lower level entity.
- It maximizes the difference between the members of an entity by **identifying the unique characteristic or attributes of each member**.
- It defines one or more sub class for the super class and also forms the **superclass/subclass relationship**.

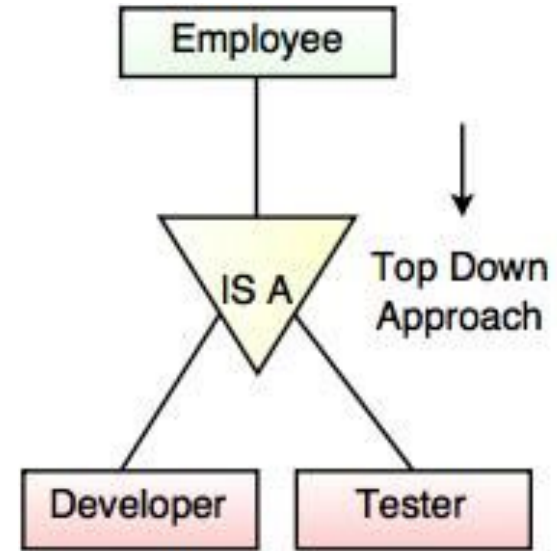


Fig. Specialization

Category or Union

- Category represents a **single superclass or subclass relationship with more than one superclass**.
- It can be a total or partial participation.
For example Car booking, Car owner can be a person, a bank (holds a possession on a Car) or a company.
- Category (sub class) → Owner is a subset of the union of the three superclasses → Company, Bank, and Person. A **Category member must exist in at least one of its super classes**.

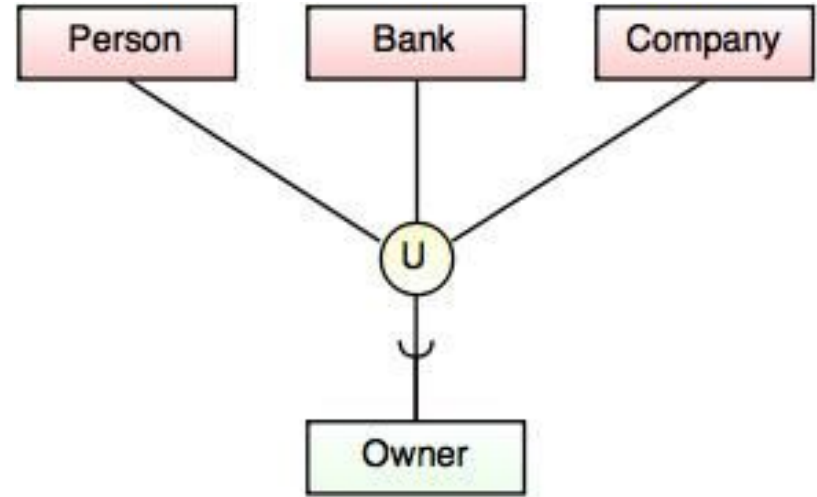


Fig. Categories (Union Type)

Aggregation

- Aggregation is a process that represent a relationship between a whole object and its component parts.
- It abstracts a relationship between objects and viewing the relationship as an object.
- It is a process when **two entity is treated as a single entity**.

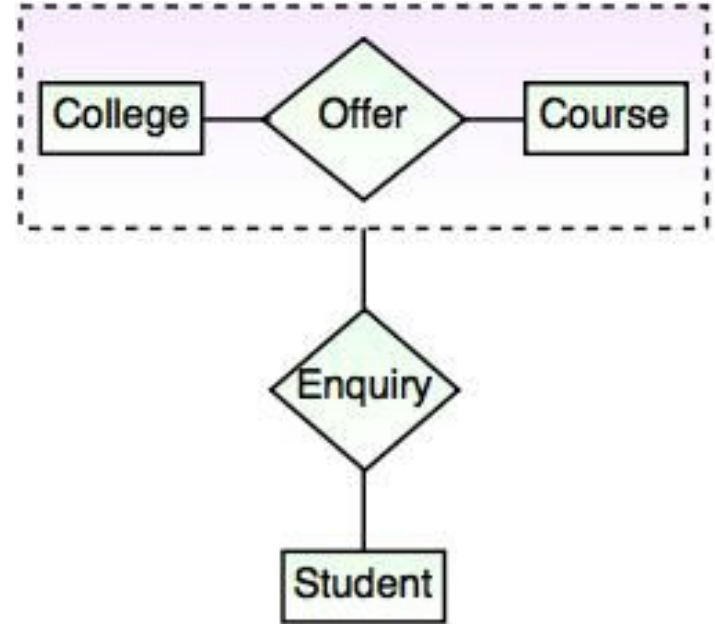
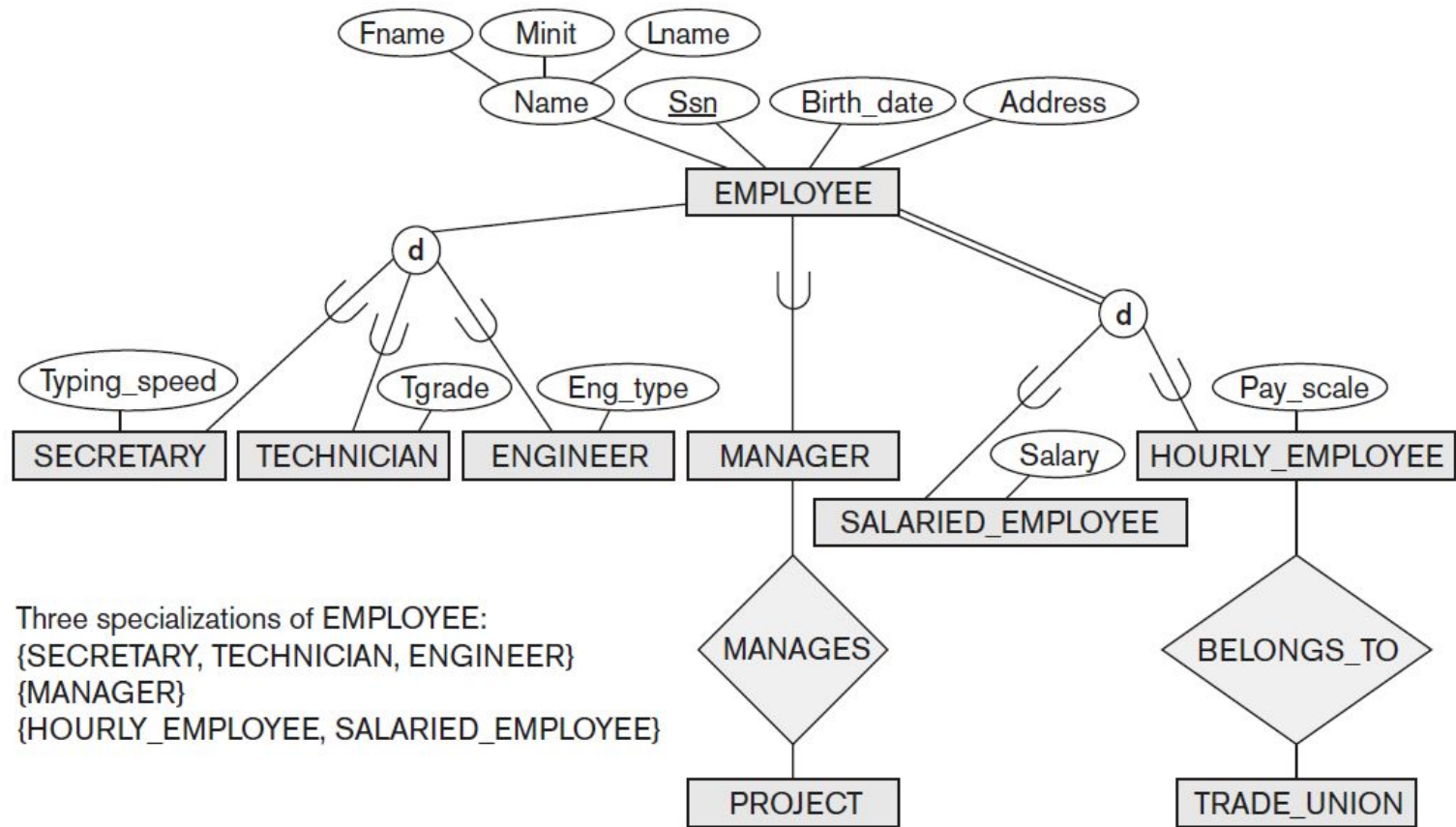


Fig. Aggregation



³A class/subclass relationship is often called an **IS-A** (or **IS-AN**) **relationship** because of the way we refer to the concept. We say a SECRETARY *is an* EMPLOYEE, a TECHNICIAN *is an* EMPLOYEE, and so on.

Constraints on Specialization

Two basic constraints can apply to a specialization/generalization:

- **Disjointness Constraint**
- **Completeness Constraint**

Specialization **Disjointness** Constraint

Specifies that the subclasses of the specialization must be **disjoint**: **an entity can be a member of at most one of the subclasses of the specialization**

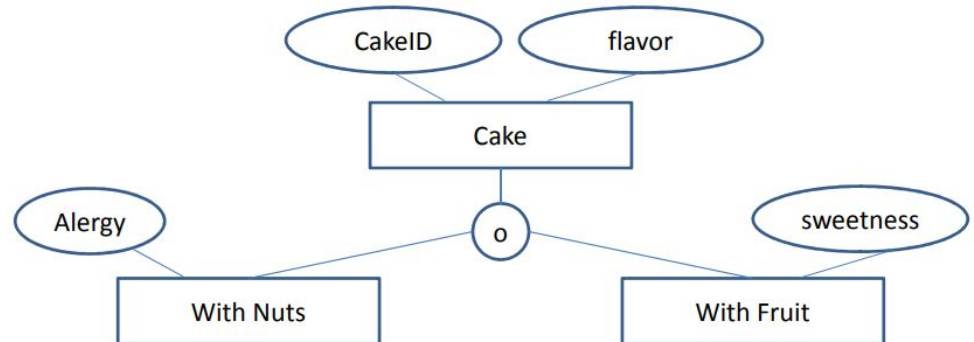
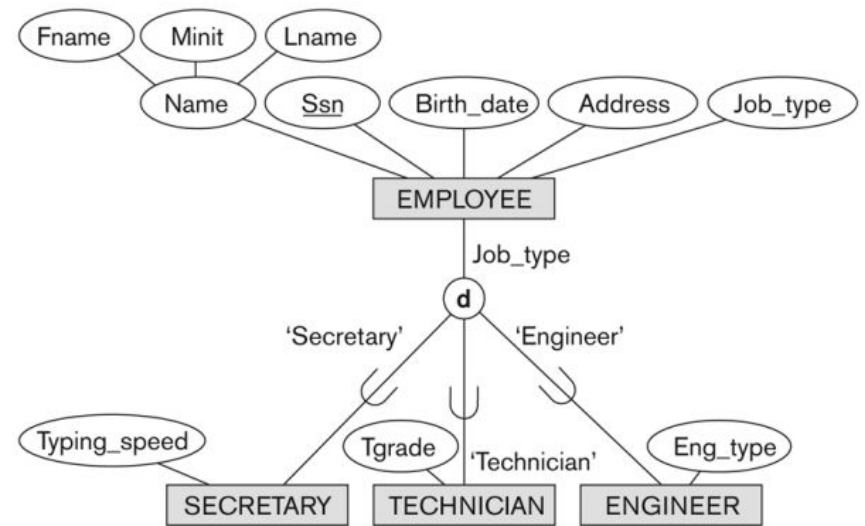
1 or 0

Specified by d in EER diagram

If not disjoint, specialization is **overlapping**: **that is the same entity may be a member of more than one subclass of the specialization**

>1 or 0

Specified by o in EER diagram



Specialization **Completeness** Constraint

Total specifies that **every entity in the superclass must be a member of some subclass in the specialization**

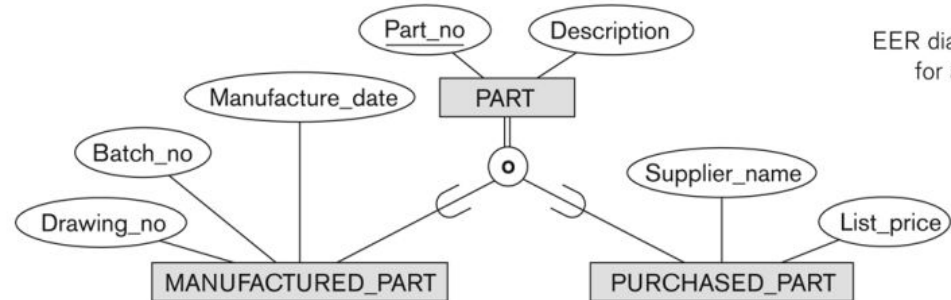
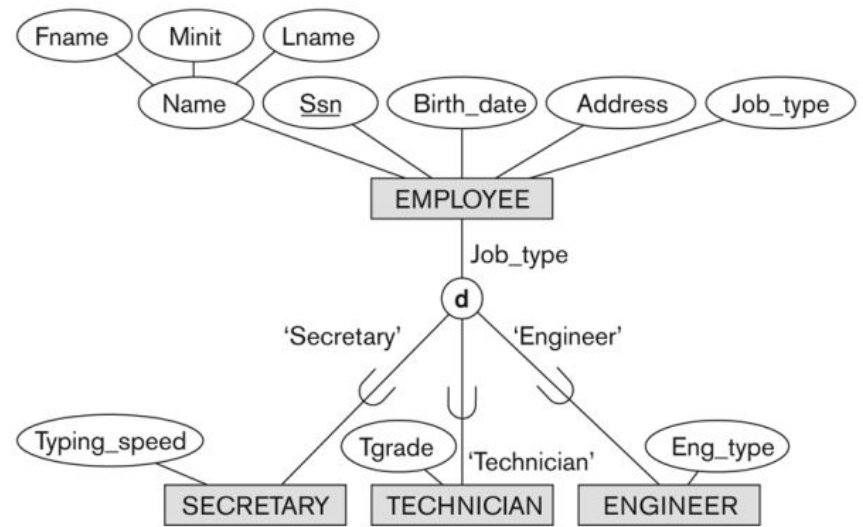
1 and only 1

Shown in EER diagrams by a double line.

Partial allows **an entity not to belong to any of the subclasses**

Can be 0

Shown in EER diagrams by a single line.



EER diagram
for an
(
sp

four types of specialization

Hence, we have four types of specialization/generalization:

- Disjoint, total
- Disjoint, partial
- Overlapping, total
- Overlapping, partial

