



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore - 641 107

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE NAME : 23ITB204 - MODERN DATABASE
MANAGEMENT SYSTEMS

II YEAR / III SEMESTER

Unit 2- Database Design

Topic 2 : Extended E-R Model



Extended E-R Diagram



The E-R Model that is supported with the additional semantic concepts is called extended entity relationship model or EER model. The EER model includes concepts of the original E-R model together with the following additional concepts.

- Specialization
- Generalization
- Aggregation



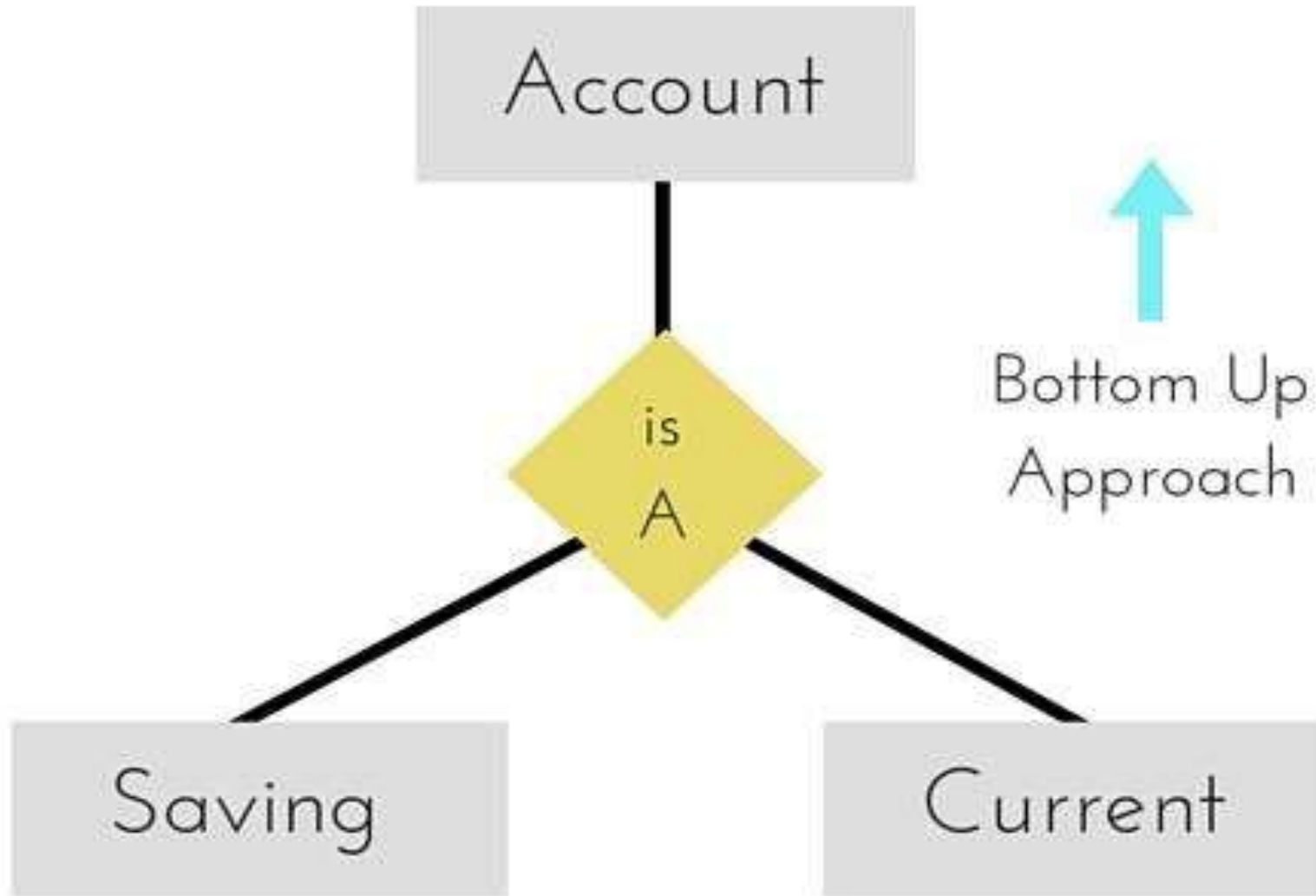
Generalization



- Generalization is the process of defining a more general entity type from a set more specialized entity types.
- Generalization is a bottom-up approach. This approach results in the identification of a generalization superclass from the original subclasses.

OR

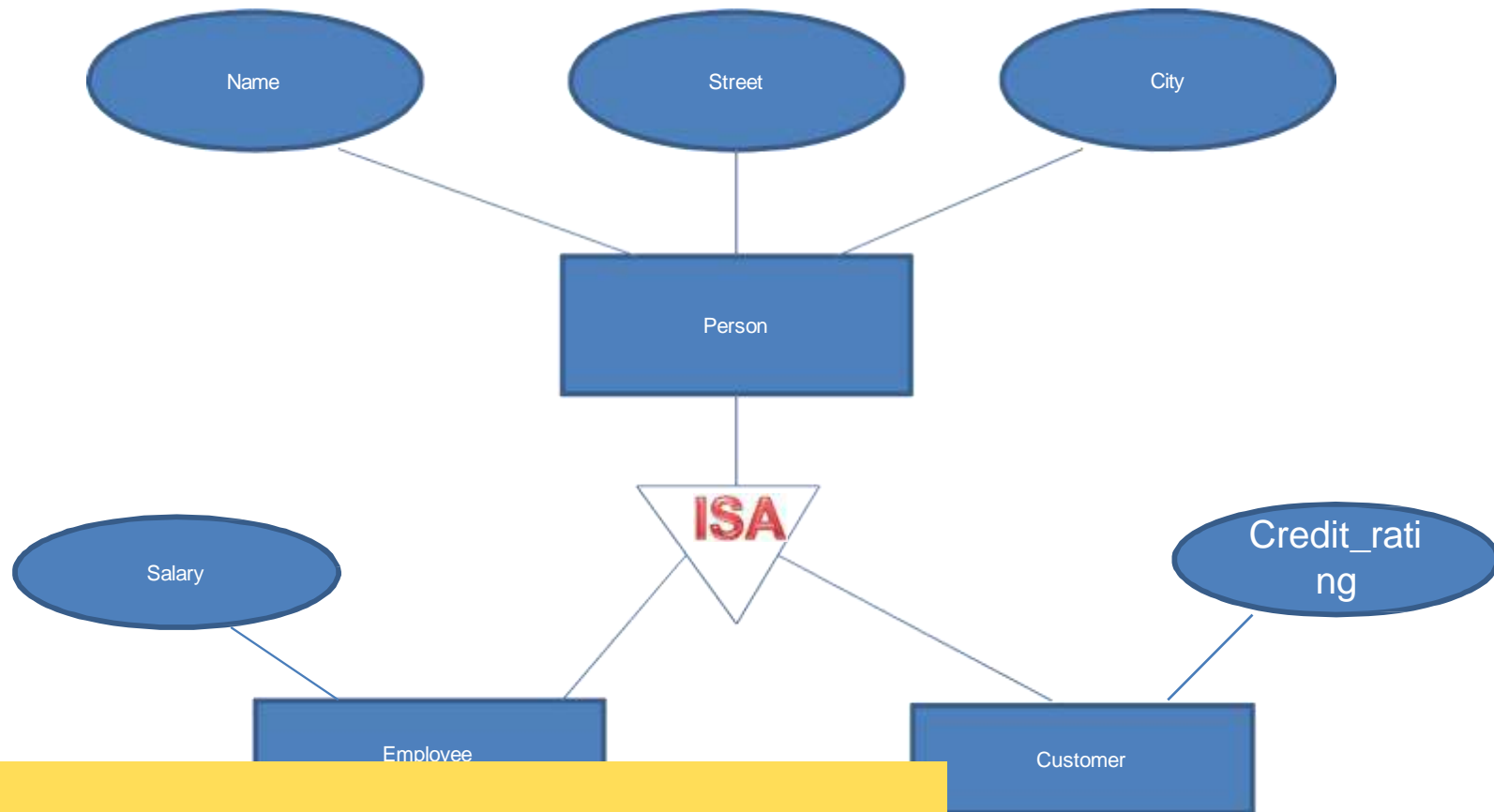
- **Generalization** is a bottom-up approach in which two lower level entities combine to form a higher level entity. In generalization, the higher level entity can also combine with other lower level entity to make further higher level entity.





Generalization Entity Relationship

Person is Superclass if customer and Employee are subclass. Person as Higher Entity Level and Customer and Employee as Lower Entity Level.





Generalization:

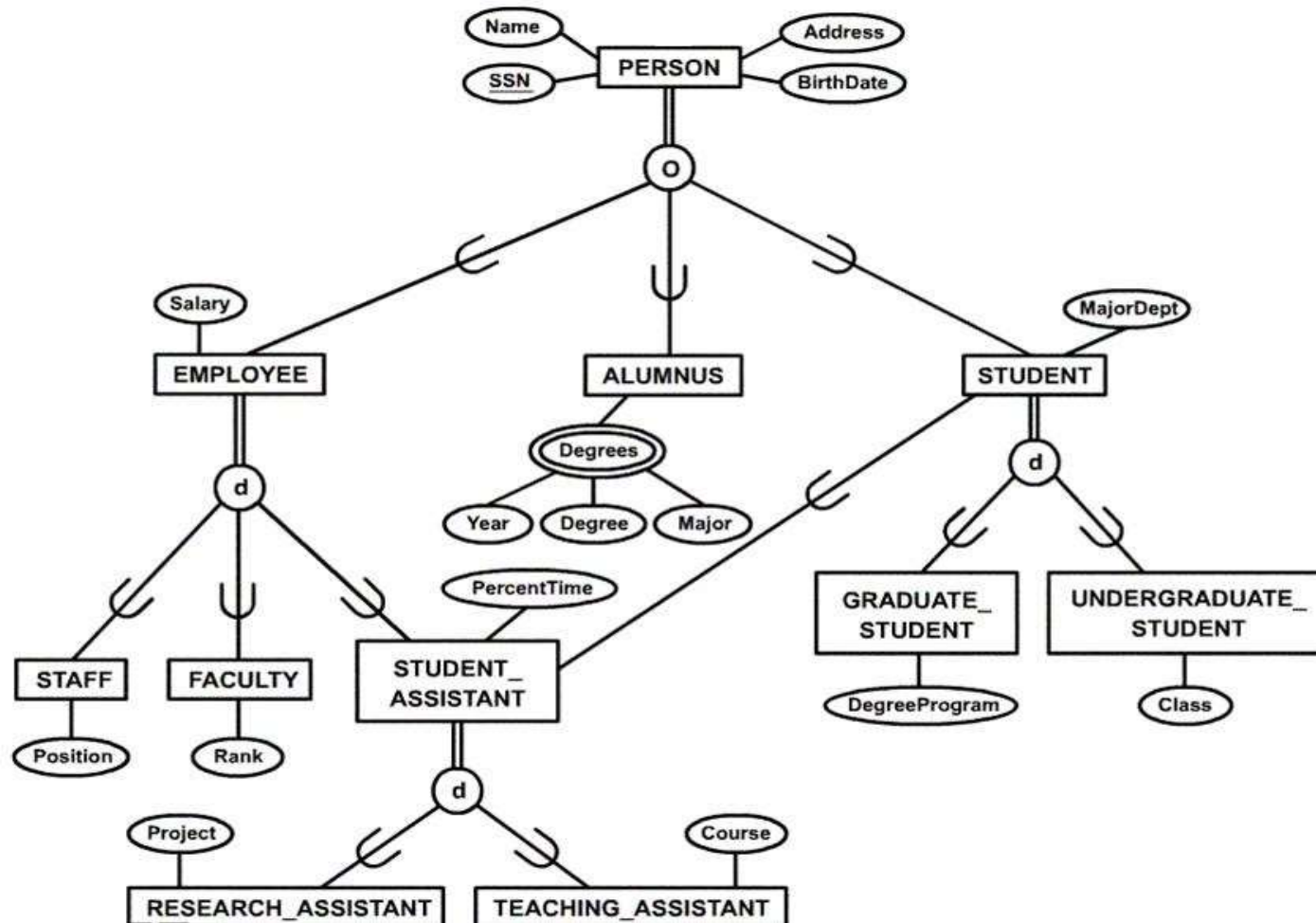
- The reverse of the specialization process
- Several classes with common features are generalized into a superclass; original classes become its subclasses
- Example: CAR, TRUCK generalized into VEHICLE; both CAR, TRUCK become subclasses of the superclass VEHICLE.
 - We can view {CAR, TRUCK} as a specialization of VEHICLE
 - Alternatively, we can view VEHICLE as a generalization of CAR and TRUCK



- Two other Condition apply to generalization:
- **Disjoint Constraint:**
 - Specifies that the subclasses of the specialization must be disjointed (an entity can be a member of at most one of the subclasses of the specialization)
 - Specified by d in EER diagram
 - If not disjointed, overlap; that is the same entity may be a member of more than one subclass of the specialization
 - Specified by o in EER diagram
- **Completeness Constraint:**
 - Total specifies that every entity in the superclass must be a member of some subclass in the specialization/ generalization
 - Shown in EER diagrams by a double line
 - Partial allows an entity not to belong to any of the subclasses
 - Shown in EER diagrams by a single line

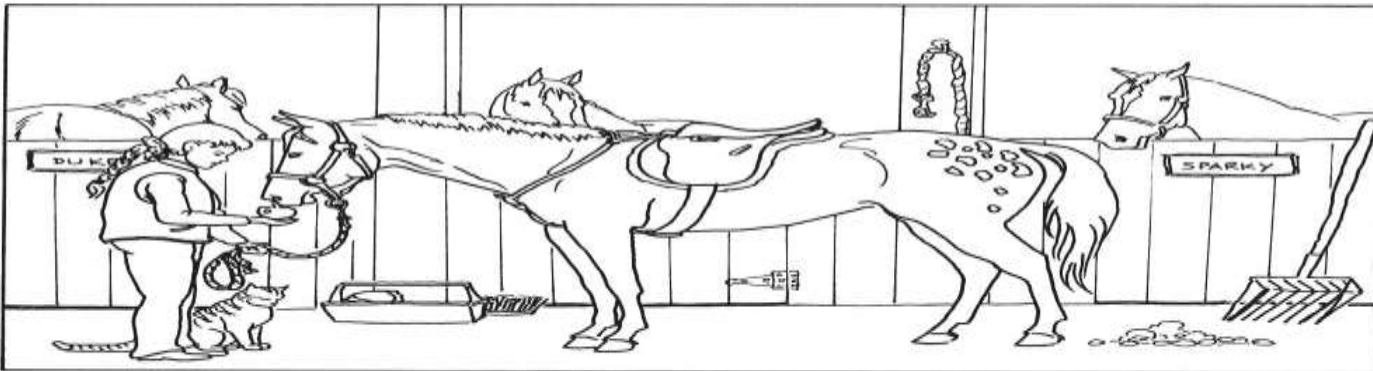
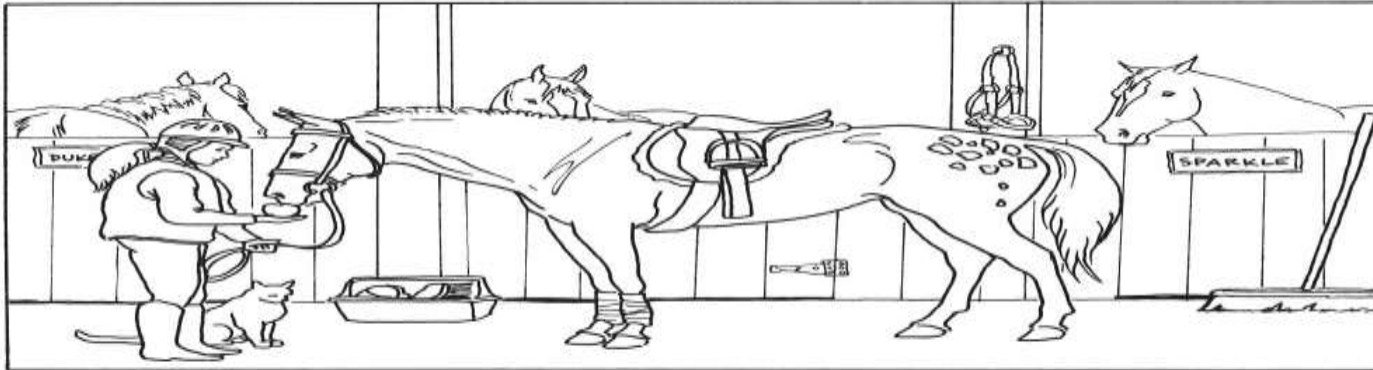


Generalization University Example



BREAK

Can you spot 15 things that are different in these 2 pictures



Answers: 1. Horse's bridle, 2. Missing stirrup, 3. Hanging halter, 4. Brush out of box, 5. cat stripes, 6. girl's hair, 7. girl's helmet, 8. stall name sign, 9. horse in stall wearing halter, 10. polo wraps on horse's legs, 11. pitchfork, 12. broom, 13. manure, 14. breakfast plate on horse, 14. horse's mane, 15. girl's boots

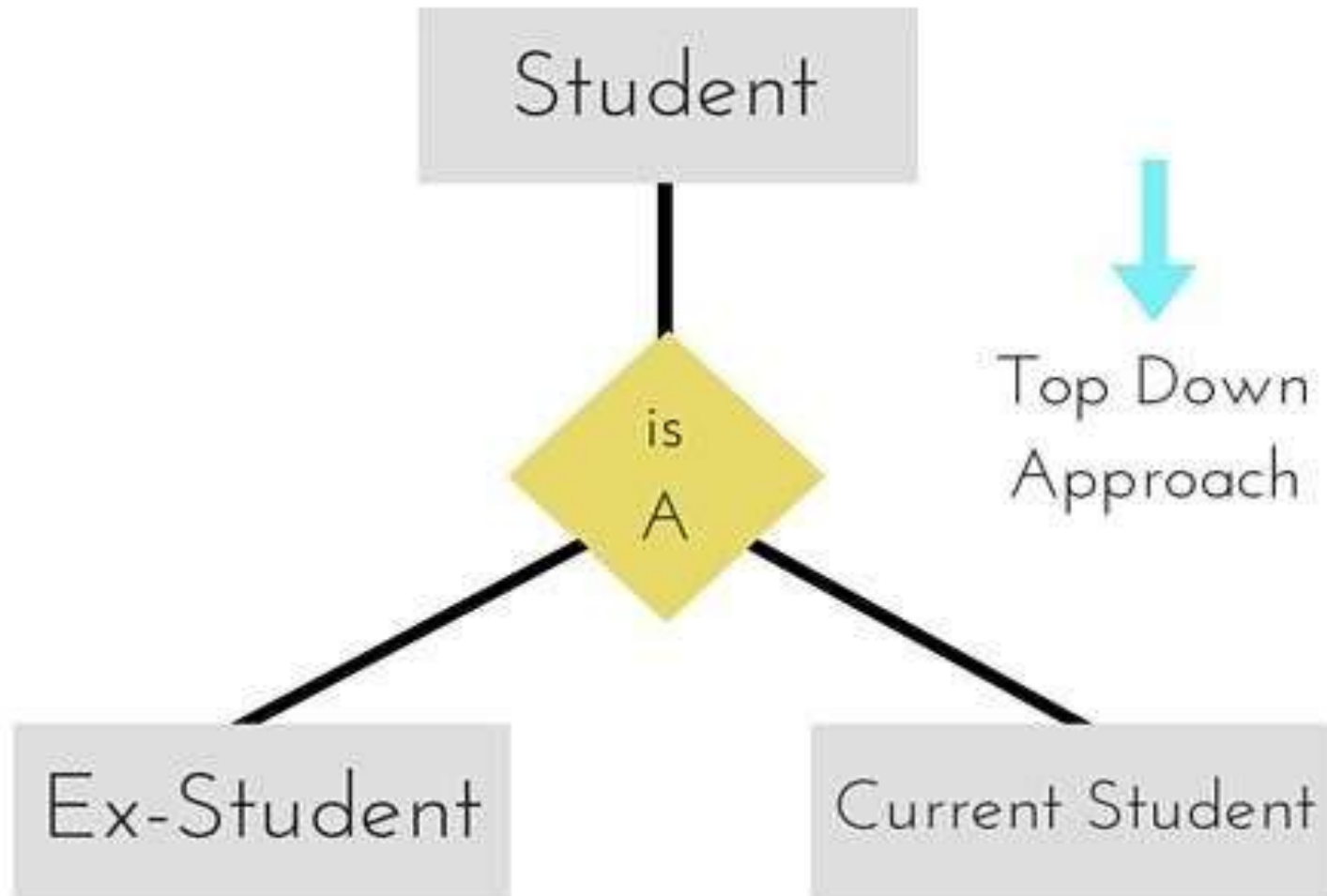


Specialization

- Specialization is the process of designing, subgrouping within an entity set.
- Specialization is a top-down process. Consider an entity set. Person, with attributes Name, Street, and City. A person may be further classified as one of the following.
 - Customer
 - Employee

OR

- **Specialization** is opposite to Generalization. It is a top-down approach in which one higher level entity can be broken down into two lower level entity. In specialization, some higher level entities may not have lower-level entity sets at all.

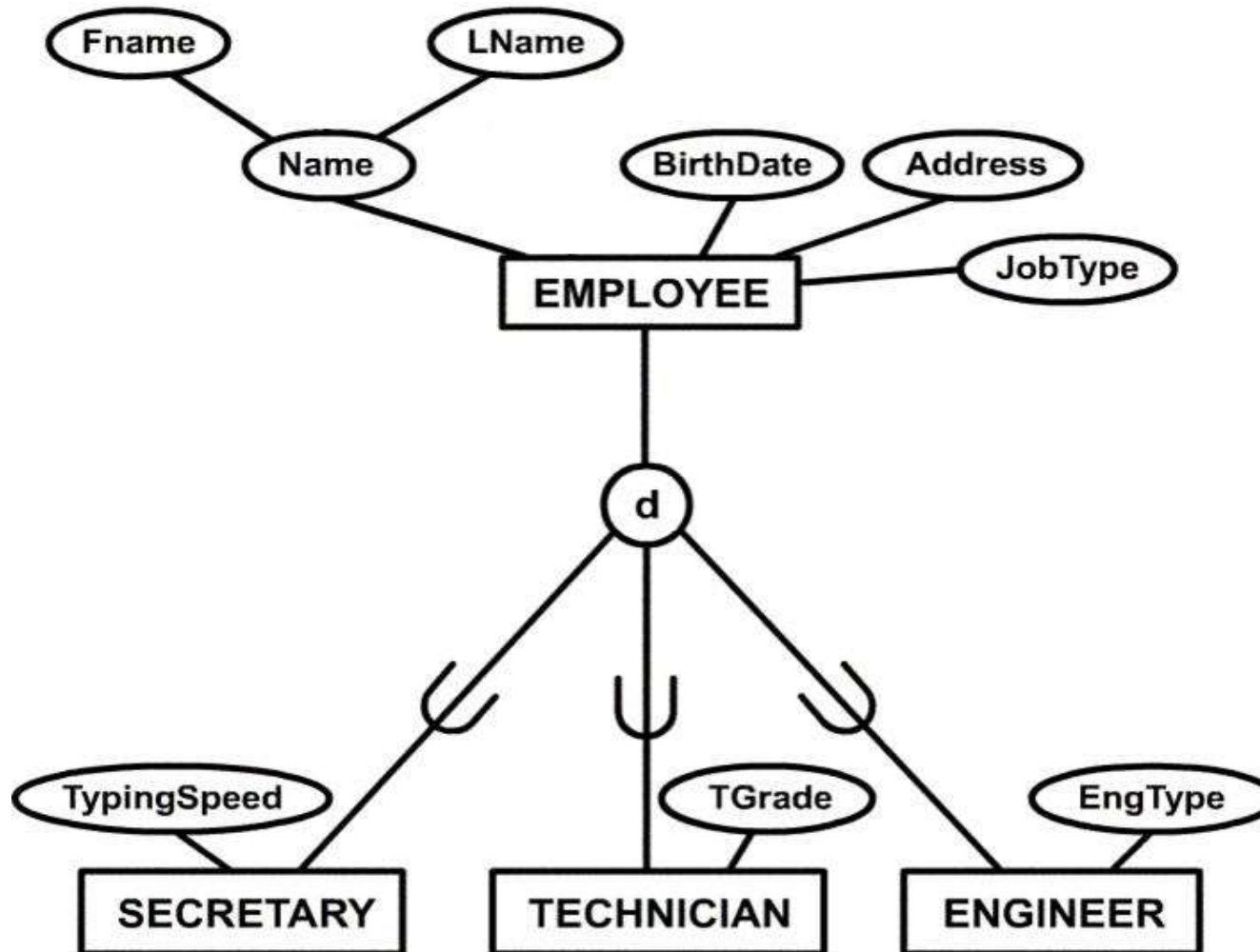




Specialization and Example

- The set of subclasses is based upon some distinguishing characteristics of the entities in the superclass
- Example: {SECRETARY, ENGINEER, TECHNICIAN} is a specialization of EMPLOYEE based upon *job type*.
 - May have several specializations of the same superclass
- Example: Another specialization of EMPLOYEE based in *method of pay* is {SALARIED_EMPLOYEE, HOURLY_EMPLOYEE}.
 - Superclass/subclass relationships and specialization can be diagrammatically represented in EER diagrams
 - Attributes of a subclass are called specific attributes. For example, Typing Speed of SECRETARY
 - The subclass can participate in specific relationship types. For example, BELONGS_TO of HOURLY_EMPLOYEE

Example of Specialization

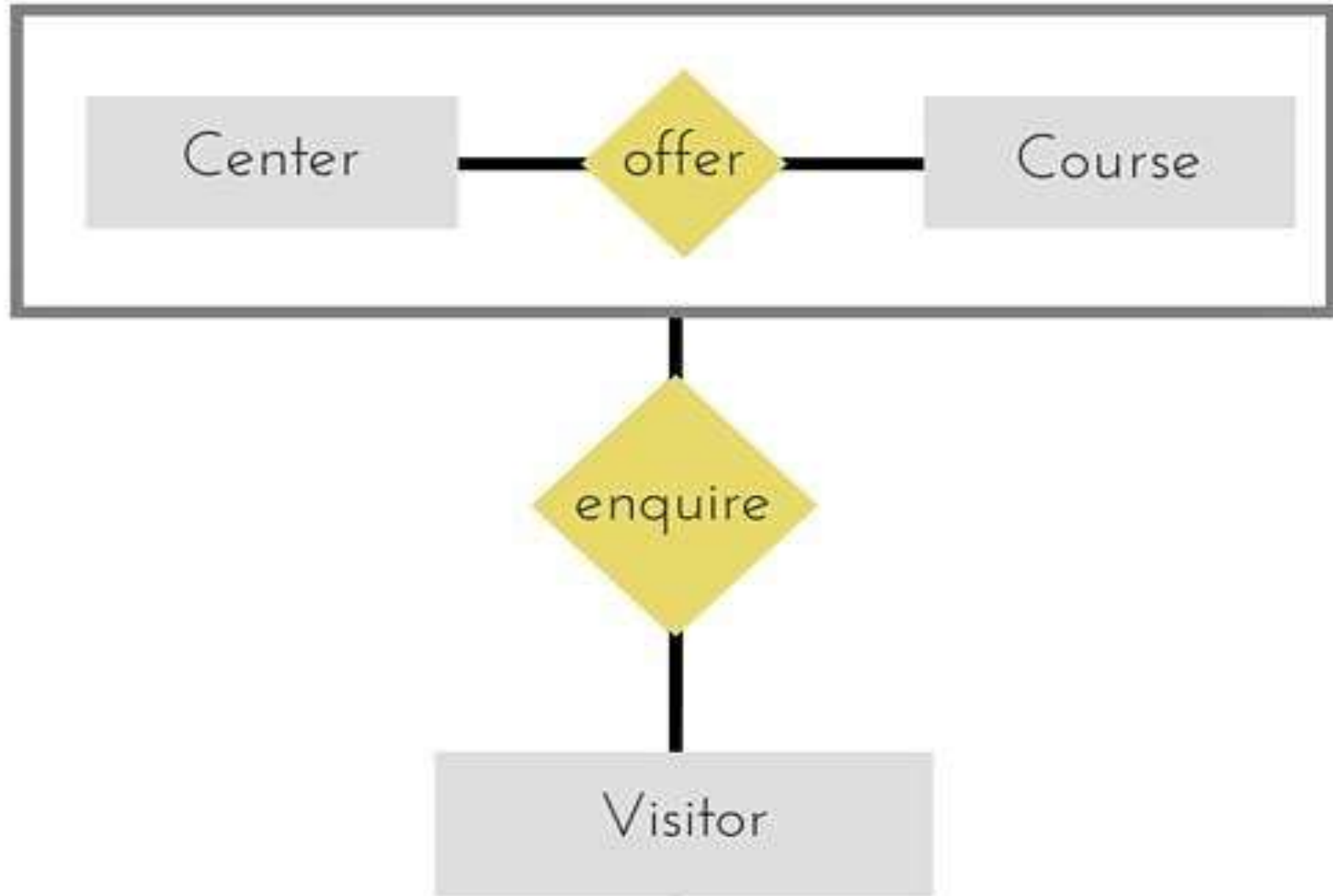




Aggregation

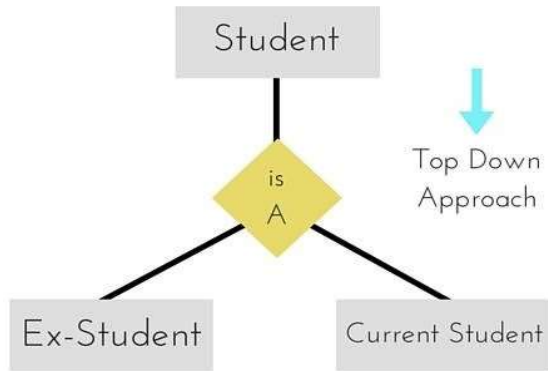


- Aggregation is a process when relation between two entity is treated as a single entity. Here the relation between Center and Course, is acting as an Entity in relation with Visitor.

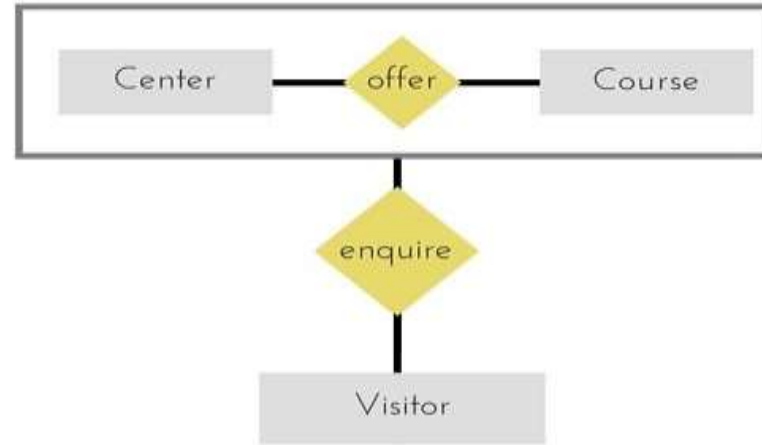




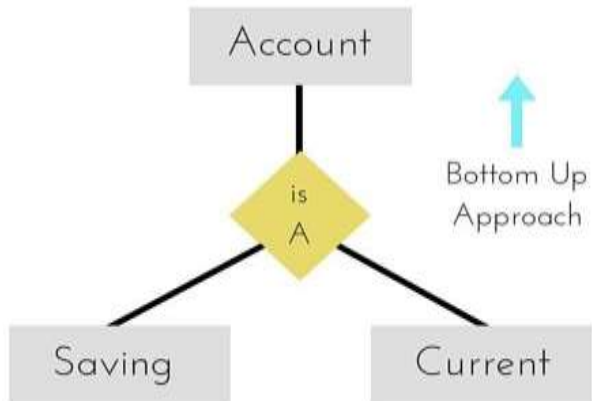
EVALUATION



Specialization



Aggregation



Generalization



Thank You