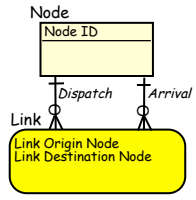
SOME COMMON MODELING PATTERNS (4)

Data Configuration — Modeling Notation

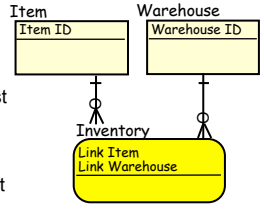
Node Link Node (Network)

Model a link as a specific association between two nodes. Specify the direction of each participating node (e.g. *Origin, Destination; Dispatch, Arrival; Upstream, Downstream*; etc.)



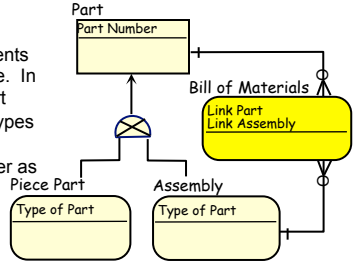
Generic Inventory

Model generic inventory, either stored or installed, as an association between an inventory item type and a location of some kind. It will almost always be treated as an associative entity as illustrated by *Inventory*. Inventory should be identified by the combination of what it is and where it is located.



Bill of Materials

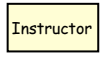
A bill of materials represents a recursive data structure. In the illustration, Piece Part and Assembly are both types of Part and they would probably use Part Number as identifier.



INFORMATION MODELING HEURISTICS

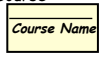
Source- Natural Language Description

1. **Noun Becomes an Entity**
   If the natural language description contains a noun, model the noun as the name of an entity.

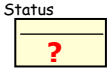


2. **Verb Becomes an Association**
   If the natural language description contains a verb, model it as an association.

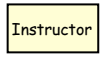
3. **Noun May Be an Attribute**
   If a noun takes on a value (text or numeric), model it as an attribute.



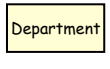
4. **Entity Has No Attributes**
   If a noun (entity) has no other attributes, then it is probably itself an attribute.



5. **Keep Track of an Entity**
   If you want to keep track of information about something, it is probably an entity.



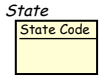
6. **Pretend It's an Entity**
   If you aren't sure what something is, pretend it's an entity for the time being.



INFORMATION MODELING HEURISTICS (5)

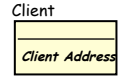
Source- Other Models and Dictionaries

7. **Identifiers Identify Entities**
   If a data element name ends in -id, -code, -type, -name, -number; it may be the identifier for an entity.

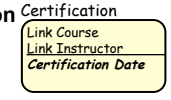


8. **Closeness Implies Associations**
   If an attribute of one entity is physically close to an attribute of another entity on a view (report, screen, etc.) look for a relationship between the entities.

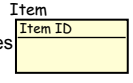
9. **Attribute Definition Names Entity**
   If a data element definition exists, it probably names the entity that it belongs to. (… *the mailing address of a Client*)



10. **Attribute Definition Surrounds Association**
    If a data element definition names more than one entity, it is probably an attribute of an association between or among the named entities. (… *the date an Instructor received Certification.*)

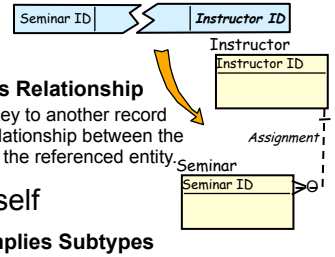


11. **Identifier Definition Defines Entity**
    If a definition exists for an identifier, it probably provides a definition of the entity that it identifies.



Source- Current Files

12. **Foreign Key Implements Relationship**
    If a field in one record is the key to another record (foreign key), model it as a relationship between the entity containing the field and the referenced entity.



Source- The Model Itself

13. **Limited Participation Implies Subtypes**
    If only a subset of occurrences of a given entity can participate in a given association, try breaking out subtypes to specify the subset.

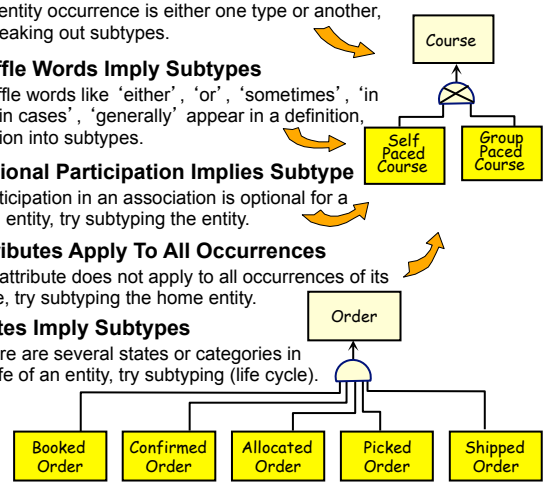
14. **Either/Or Implies Subtypes**
    If an entity occurrence is either one type or another, try breaking out subtypes.

15. **Waffle Words Imply Subtypes**
    If waffle words like 'either', 'or', 'sometimes', 'in certain cases', 'generally' appear in a definition, partition into subtypes.

16. **Optional Participation Implies Subtype**
    If participation in an association is optional for a given entity, try subtyping the entity.

17. **Attributes Apply To All Occurrences**
    If an attribute does not apply to all occurrences of its home, try subtyping the home entity.

18. **States Imply Subtypes**
    If there are several states or categories in the life of an entity, try subtyping (life cycle).

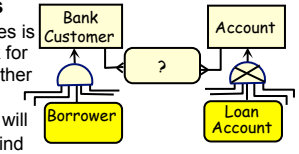


INFORMATION MODELING HEURISTICS (6)

Source- The E-R Diagram

19. **Unconnected Entity Seeks Relationship**
    If there is a free floating entity on the diagram, look for relationships with other entities.

20. **Symmetry of Subtypes**
    If an entity with many subtypes is related to another entity, look for symmetric subtypes for the other entity. (For example, a Bank Customer who is a Borrower will probably relate to a special kind of Account such as a Loan Account.)

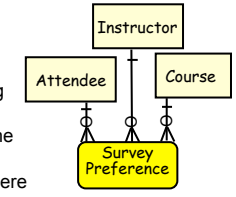


RESOLVING COMPLEX ASSOCIATIONS

Data Configuration — Modeling Notation

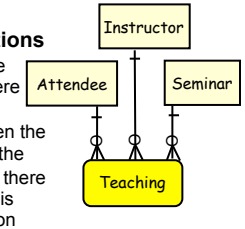
Legal N-ary Associations

N-ary associations only make sense when from the point of view of each of the participating entities there can be many occurrences of the others via the association. (From the point of view of the associative entity there can be only one of each of the participating entities.)



Complex N-ary Associations

If from the point of view of one of the participating entities there can only be one of any of the other participating entities, then the association is redundant. In the example, for a given Seminar there can be only one Instructor. It is redundant to repeat information about the Instructor with each combination of Attendee and Seminar.



(Part of definition for ***Teaching***)

Associations:
- For each occurrence of Attendee there can be many Seminars and many Instructors.
- For each occurrence of Instructor there can be many Seminars and many Attendees.
- ***For each occurrence of Seminar there can be many Attendees and one Instructor.***

Resolution

You can simplify a redundant association by dividing it into two or more associations. This also helps to clarify business policy. In this example, the business rules for assigning an Instructor to teach a Seminar are different from and should be separate from the rules for enrolling an Attendee in a Seminar.