



# DATAMORPHOSIS DATACARD Information Modeling Configurations

Using ER/Studio IE (Crow's Feet) Notational Conventions

## Model Component

### Entity

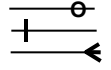
Something that is of enough concern to the organization that we need to keep information about it. An entity is modeled as a rectangle. It may be linked to itself or other entities via Business Associations or dependencies.



### Cardinality

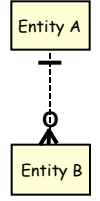
Illustrate cardinality on the solid or dashed line connecting two entities:

- A 0 across the line means zero.
- A bar across the line means one.
- A crow's foot means many.



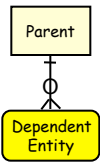
Cardinality applies to the entity at the other end of the line. For one occurrence of Entity A there are zero or more occurrences of Entity B.

For one occurrence of Entity B there is always one occurrence of Entity A.



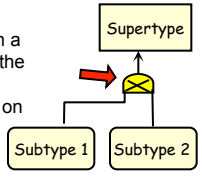
### Dependent Entity

A kind of entity that is dependent on another entity for its existence and its identification. A dependent entity is modeled as a rounded rectangle that is connected to its parent via a solid line showing cardinality or via a solid line connected to a multityping indicator.



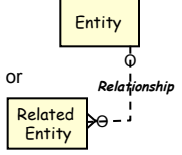
### Multityping Indicator

Some entities are linked to other entities as subtypes and supertypes. This is shown with a semi-circle. The line with an arrow points to the supertype entity; the other lines connect the dependent subtypes. There is no cardinality on lines around the multityping indicator.



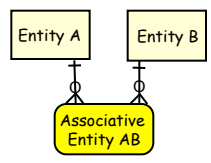
### Business Association

A Business Association is modeled as a Relationship or as an Associative Entity. It is a business based association between or among occurrences of one or more entities.



### Relationship

A Business Association between occurrences of one or two entities. Use a dashed line with cardinality to illustrate a one to many association between the entities.



### Associative Entity

A Business Association linking occurrences of two or more entities. This notation is used when there is a many to many association between or among the participating entities.

## STANDARD MODELING CONFIGURATIONS

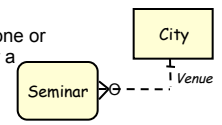
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### Data Configuration

### Modeling Notation

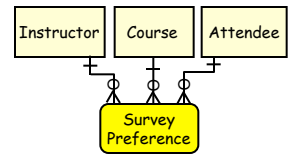
#### Binary Association

A binary association links occurrences of one or two participating entities. It may be either a dependency or a relationship.



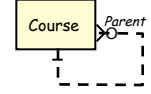
#### N-ary Association

An N-ary association links more than two participating entities. It is always modeled as an associative entity.



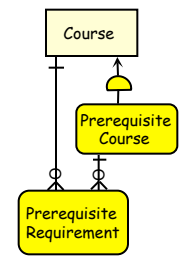
#### Recursive Association

A Recursive Association links an occurrence of an entity with one or more other occurrences of the same entity.



#### Indirect Recursion

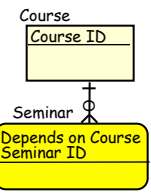
Indirect Recursion is a recursive link that traverses one or more subtypes. (See *Multityping* for a more comprehensive explanation of the subtyping notation.)



### Extended Notation

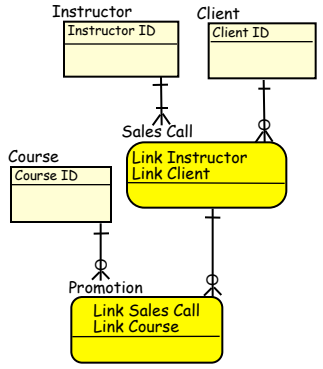
#### Depends on Role

In this case, Seminar is dependent on Course for its existence. Other names for this configuration are 'characteristic entity' and 'hierarchical entity'. By using the role name 'Depends on' you can flag the structure and avoid design-oriented key generation in tools such as ER/Studio.



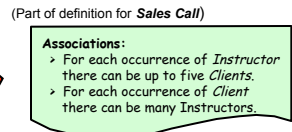
#### Associates Role

An Associative Entity is defined as a business association that behaves as an entity. Model it as a dependent entity whose identifiers consist of the word 'Link' followed by the name of the each entity that participates in the association.



Once an Associative Entity is declared, it can participate in associations including those involving other Associative Entities. In the illustration, Sales Call is one of the parents of 'Promotion' which associates it with Course.

Specify the cardinality for the association as part of the associative entity definition.



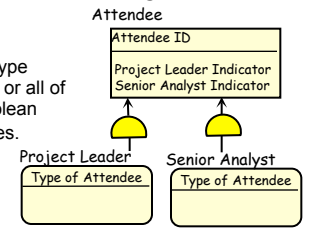
## ENTITY MULTITYPING & GENERALIZED ROLES

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### Multityping

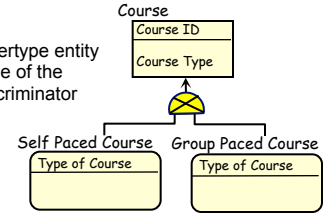
#### Inclusive Multityping

One occurrence of the supertype entity can play the role of any or all of the subtype entities. Use boolean indicators to keep track of roles.



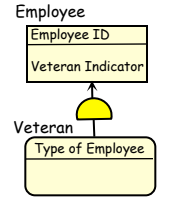
#### Exclusive Multityping

One occurrence of the supertype entity can play the role of only one of the subtype entities. Use a discriminator to specify the type.



#### Optional Multityping

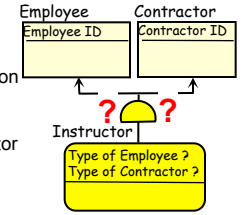
One occurrence of the supertype entity may or may not play the role of the subtype entity. Use a boolean indicator to manage the subtype entity.



### Generalized Role

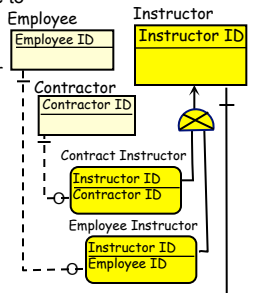
#### (Multiple Inheritance)

Sometimes completely different entities seem to have a lot in common yet they do not fit the standard multityping pattern. In the example illustrated at the right, both Contractor and Employee can play the role of Instructor. But Instructor can't be a subtype of both Contractor and Employee. To do so, it would have to inherit contradictory keys.



Likewise, it would not make sense to model Employee and Contractor as subtypes of Instructor. Neither all Employees nor all Contractors are Instructors.

It works better to model Instructor as a role that either Contractor or Employee can play. Instructor must have its own independent identifier and may be linked to an occurrence of either Employee or Contractor but not to both.



This configuration provides a useful model for linking roles where there is only a partial overlap among entities. This happens a lot when you are integrating data from different systems and/ or building data warehouses.

