Database Management System 5

ER Modeling

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Overview of the Database Design Process

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- The initial phase of database design is to characterize fully the data needs of the prospective database users. It usually involves in textual description
- Next, the designer chooses a data model and, by applying the concepts of the chosen data model, translates these requirements into a conceptual schema of the database. The ER model is typically used to represent the conceptual design
- The designer reviews the schema to confirm that all data requirements are satisfied and are not in conflict with one another
- At this stage of conceptual design, the designer can review the schema to ensure it meets all the functional requirements

Overview of the Database Design Process...

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- The process of moving from an abstract data model to the implementation of the database proceeds in two final design phases:
  - In the logical design phase, the designer maps the high-level conceptual schema onto the implementation data model of the database system that will be used. The implementation data model is typically the Relational data model
  - Finally, the designer uses the resulting system-specific database schema in the subsequent physical-design phase, in which the physical features of the database are specified

Entity-Relationship(ER) Model

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The ER model was developed to facilitate the database design by allowing specification of an enterprise schema that represents the overall logical structure of a database. The ER model is very much useful in mapping the meaning and interactions of real-world enterprises onto a conceptual schema

Entities

An entity is a thing or object in the real world that is distinguishable from all other objects, i.e. an entity is an object of interest to the end user. The set of similar types of entities is called entity set; which is represented by a rectangle containing the entity set's name. The entity set name, a noun, is usually written in all capital letters

Entity-Relationship(ER) Model...

Attributes

Attributes are characteristics of entities. Attributes are represented by ovals and are connected to the respective entity set with lines. In the conceptual modeling, the value of an attribute comes from a domain of possible values

Relationships

In modeling, the association between entities are referred to as relationship. The relationship name is a verb. A relationship set is a set of relationships of the same type. Relationship sets are represented by diamonds and are connected to the participant entity sets

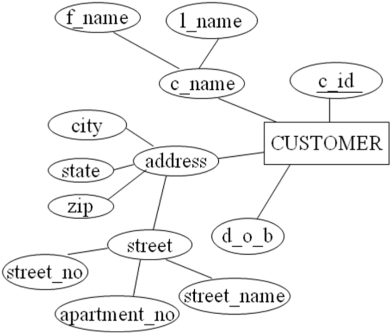
NULL Values

An attribute takes a NULL value when an entity doesn't have a value for it. The NULL values may indicate not applicable, i.e. the value doesn't exist for the entity. NULL can also designate that an attribute value is unknown. An unknown value may be either missing or not known. NULL value is an entry in all the domains

Attribute Types

Simple and Composite attributes

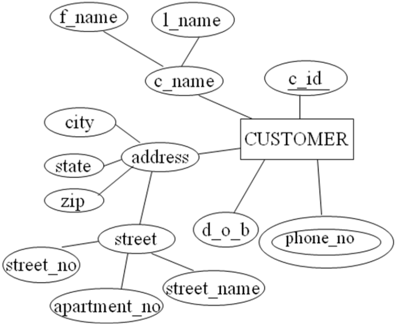
An attribute that has a discrete factual value and cannot be meaningfully subdivided is called an atomic or simple attribute.On the other hand, a composite attribute can be meaningfully subdivided into smaller subparts (i.e. simple attributes) with independent meaning



Attribute Types...

Single-valued and Multi-valued attributes

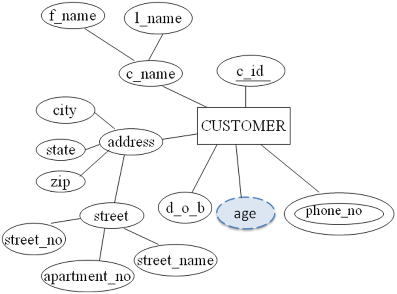
Most attributes have a single value for a particular entity and are referred to as single-valued attribute. However, attributes that can have more than one value are known as multi-valued attributes. It is represented by double oval



Attribute Types...

Stored and Derived attributes

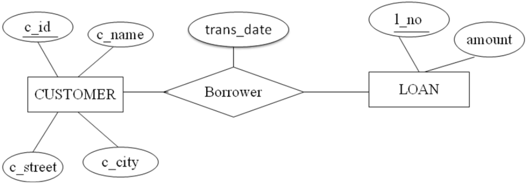
The attribute with independent existence is called as stored attribute where as the attribute, whose value is depending on other stored attribute, is called as derived attribute. The derived attribute is represented by the dotted oval



Attribute Types...

Descriptive attributes

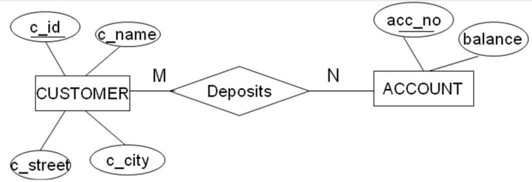
A relationship may also have attributes called descriptive attributes for representing the description about the association



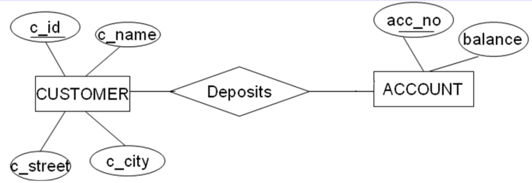
Mapping Cardinality Representation

M:N relationship (Chen Notation)

An entity in A is associated with any number (zero or more) of entities in B and vice versa



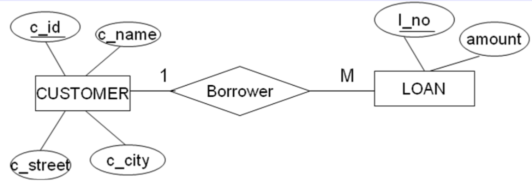
M:N relationship (Bechman Notation)



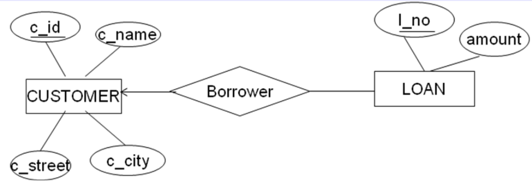
Mapping Cardinality Representation...

1:M relationship (Chen Notation)

An entity in A is associated with any number (zero or more) of entities in B; an entity in B, however, is associated with no more than 1 entity set of A



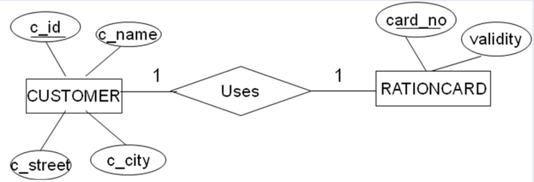
1:M relationship (Bechman Notation)



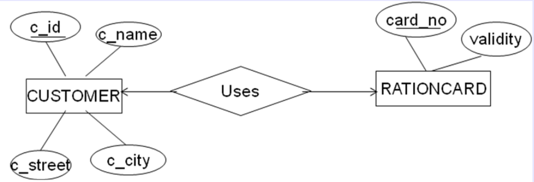
Mapping Cardinality Representation...

1:1 relationship (Chen Notation)

An entity in A is associated with no more than 1 entity of B; and an entity in B is associated with no more than 1 entity of A



1:1 relationship (Bechman Notation)


c_id
c_name
card_no
validity
CUSTOMER
Uses
RATIONCARD
c_street
c_city