Data Base System
Week 6th Topics

- Logical Design
- Entity-Relationship Modelling

Data Base System
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Objectives

- How to use Entity–Relationship (ER) modelling in database design?
- Basic concepts associated with ER model.
- Diagrammatic technique for displaying ER model using Unified Modelling Language (UML)
- How to build an ER model from a requirements specification?

Concepts of the ER Model

- Entity types
- Relationship types
- Attributes types

Entity

A single event or real world object about which an organization wants to record information i.e. to which values will be assigned

Entity Class \ Set

Group of objects with same properties, identified by enterprise as having an independent existence

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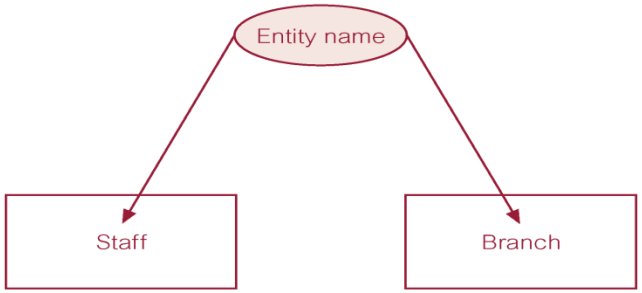
Examples of Entity Types

Physical existence	
Staff	Part
Property	Supplier
Customer	Product
Conceptual existence	
Viewing	Sale
Inspection	Work experience

ER Diagram of Staff and Branch Entity Types



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Attributes

Property of an entity or a relationship type

Attributes Domain

Set of allowable values for one or more attributes

Simple Attribute \ Atomic

Attribute composed of a single component with an independent existence e.g. customer id, RNO

Composite Attribute

Attribute composed of multiple components, each with an independent existence i.e. that can be broken down into sub components e.g. address

Derived Attribute

Attribute that represents a value that is derivable from value of a related attribute, or set of attributes, not necessarily in the same entity type e.g. age i.e. not stored in the DB

Multivalued Attribute

Attribute that holds multiple values for each occurrence of an entity type.
e.g. skills (it's a problem should be removed)

Stored Attributes

An attribute stored in the DB

Identifier

An attribute that identifies an entity instance among other instances in entity class e.g. Rno or registration number in student

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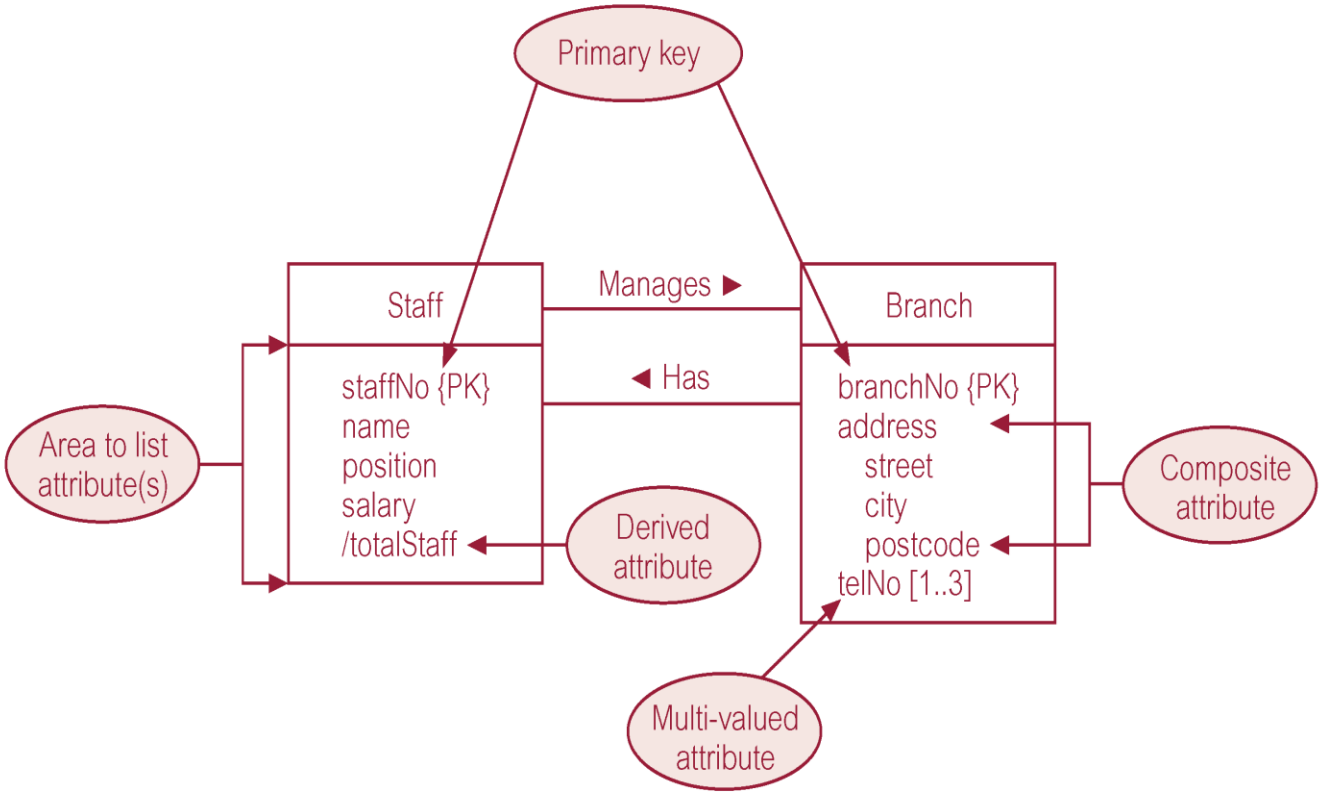

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Entity Type

Strong Entity Type

Entity type that is *not* existence-dependent on some other entity type.

Weak Entity Type

Entity type that is existence-dependent on some other entity type.

Strong Entity Type called *Client* and Weak Entity Type called *Preference*

Associative Entity

Associates the instances of one or more entity types with one another e.g. a scholar gets an award on his research.

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Relationship

A logical connection between entities. The entities that participate in the relationship are called participants. The relationship may be between different entities or between an entity or itself.

Degree of a Relationship

Number of participating entities in relationship.

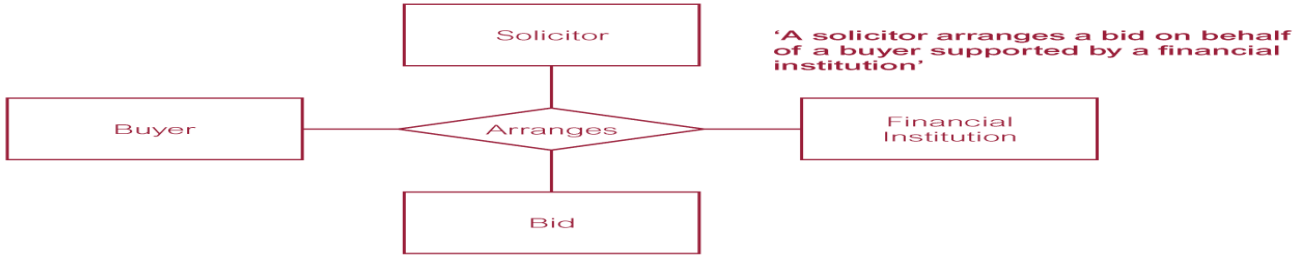
Relationship of degree:

Unary: between the instances of same entity type also called recursive relationship

two is binary;

three is ternary;

four is quaternary.



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Structural Constraints

▪Main type of constraint on relationships is called multiplicity.

▪**Multiplicity -** number (or range) of possible occurrences of an entity type that may relate to a single occurrence of an associated entity type through a particular relationship.

▪Represents policies (called *business rules*) established by user or company.

Cardinality Constraint

▪The maximum number of relationships are called cardinality

▪This constraint specify the number of instances of one entity that can be associated with each instance of the other entity.

▪There are three (3) symbols used to show degree

-A Circle means zero. Indicates that relationship is *optional*

- a Line \ stroke (|) means one. Indicates that relationship is *mandatory*

- Crow's foot symbol means *many*

▪The most common degree for relationships is binary.

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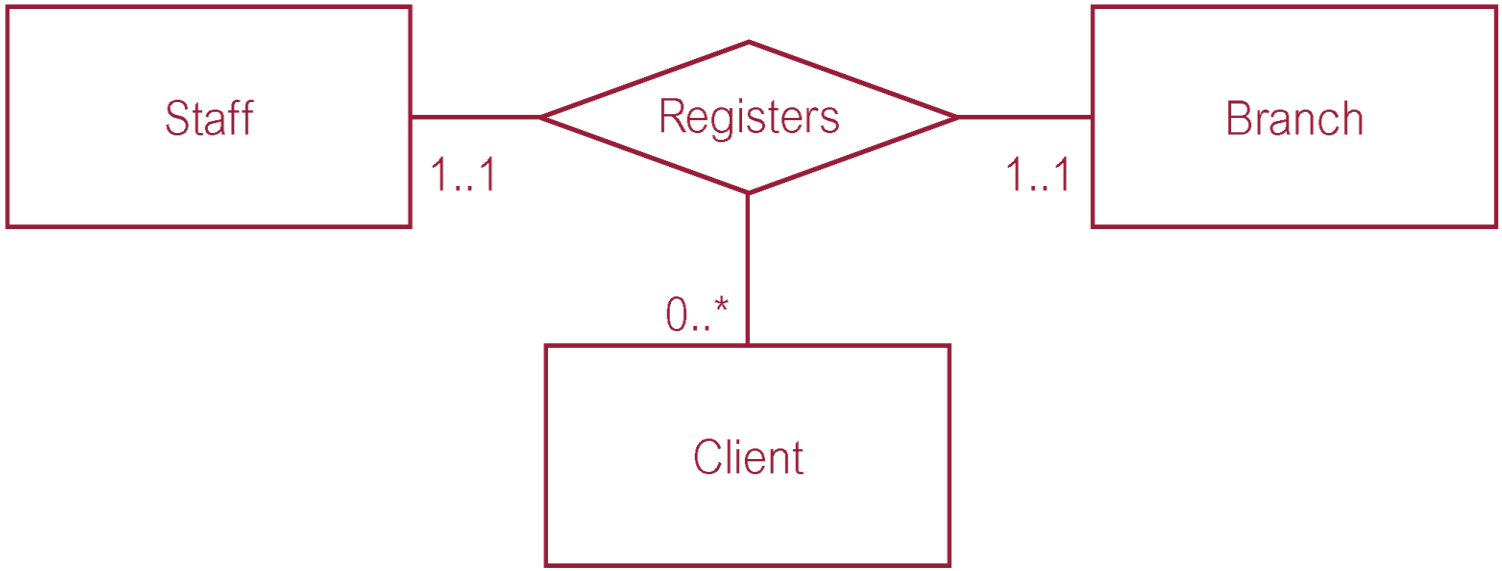
Structural Constraints

Binary relationships are generally referred to as being:

- one-to-one (1:1)
- one-to-many (1:*) ---(Optional)
- many-to-many (*:*) ---(Optional)
- Many-to-one (Mandatory)



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Structural Constraints

Examples