Ch1 : MODELING DATA IN THE ORGANIZATION

Q1 : Define each of the following Terms :

1- Entity Type :

- A collection of entities that share common properties or characteristics.

2- Entity-Relationship Model :

- A logical representation of the data for an organization or for a business area.

3- Entity Instance :

- A single occurrence of an entity type.

4- Attribute :

- A property or characteristic of an entity type that is of interest to the organization.

5- Relationship Type :

- A meaningful association between (or among) entity types.

6- Identifier :

- An attribute (or combination of attributes) that uniquely identifies individual instances of an entity type.

7- Multivalued Attribute :

- An attribute that may take on more than one value for a given entity instance.

8- Associative Entity :

- An entity type that associates the instances of one or more entity types and contains attributes that are peculiar to the relationship between those entity instances.

9- Cardinality Constraint :

- Specifies the number of instances of one entity that can (or must) be associated with each instance of another entity.

10- Weak Entity :

- An entity type whose existence depends on some other entity type.

11- Identifying Relationships :

- The relationship between a weak entity type and its owner.

12- Derived Attribute :

- An attribute whose values can be calculated from related attribute values.

13- Business Rule :

- A statement that defines or constrains some aspect of the business.

Q2 : Match the following terms and definitions :

A	B
1- Composite Attribute	a. uniquely identifies entity instances. (10)
2- Associative Entity	b. relates instances of a single entity type. (3)
3- Unary Relationship	c. specifies maximum and minimum number of instances. (8)
4- Weak entity	d. relationship modeled as an entity type. (2)
5- Attribute	e. association between entity types. (7)
6- Entity	f. collection of similar entities. (11)
7- Relationship Type	g. number of participating entity types in relationship. (9)
8- Cardinality Constraint	h. property of an entity. (5)
9- Degree	i. can be broken into component parts. (1)
10- Identifier	j. depends on the existence of another entity type. (4)
11- Entity Type	k. relationship of degree 3. (12)
12- Ternary	l. many-to-many unary relationship. (13)
13- Bill-of-materials	m. person, place, object, concept, event. (6)

Q3 : Contrast the following terms :

1- Stored Attribute, Derived Attribute :

- Stored Attribute : is one whose values are stored in the database.
- Derived Attribute : is one whose values can be calculated or derived from related stored attributes.

2- Simple Attribute, Composite Attribute :

- Simple Attribute : is an attribute that cannot be broken down into smaller components.
- Composite Attribute : can be broken down into component parts.

3- Entity Type, Relationship Type :

- Entity Type : is a collection of entities that share common properties.
- Relationship Type : is a meaningful association between entity types.

4- Strong Entity Type, Weak Entity Type :

- Strong Entity type : is an entity that exists independently of other entity types.
- Weak Entity Type : is an entity type whose existence depends on some other entity type.

5- Degree, Cardinality :

- Degree (of a relationship) : is the number of entity types that participate in that relationship.
- Cardinality : is a constraint on the number of instances of one entity that can (or must) be associated with each instance of another entity.

6- Entity Type, Entity Instance :

- Entity Type : is a collection of entities that share common properties or instances.
- Entity Instance : is a single occurrence of an entity type.

7- Required Attribute, Optional Attribute :

- Required Attribute : An attribute that must have a value for every entity instance.
- Optional Attribute : An attribute that may not have a value for every entity instance.

8- Composite Attribute, Multivalued Attribute :

- Composite Attribute : An attribute can be broken into component parts.
- Multivalued Attribute : An attribute that may take on more than one value for a given entity instance.

9- Ternary Relationship, Three Binary Relationships :

- Ternary Relationship : is a simultaneous relationship among the instances of three entity types.
- Three Binary Relationships : when an attribute of a relationship cannot be properly associated with any one of the three possible binary relationships among the three entity types.

Q4 : State three criteria for selecting identifiers for entities.

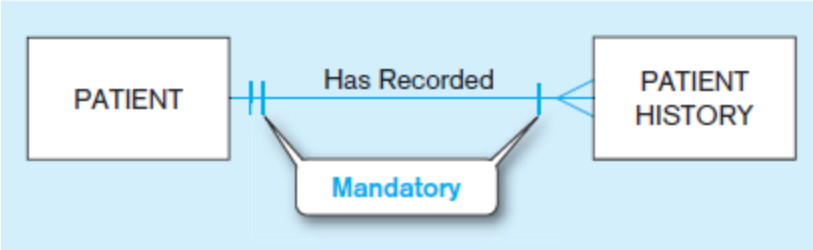
1- Choose an identifier that will not change its value over the life of each instance of the entity type.

2- Choose an identifier that have a valid values and not be null (or unknown).

3- Avoid the use of intelligent identifiers, whose structure indicates classifications, locations, and so on.

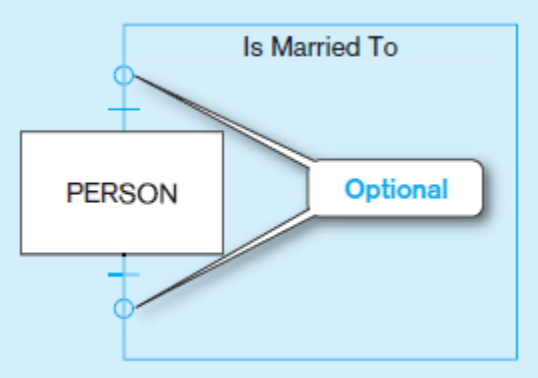
Q5 : List the types of cardinality constraints, and draw an example of each.

1- Mandatory Cardinalities.



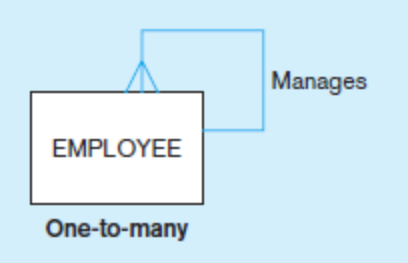
2- One Optional, One Mandatory.

3- Optional Cardinalities.



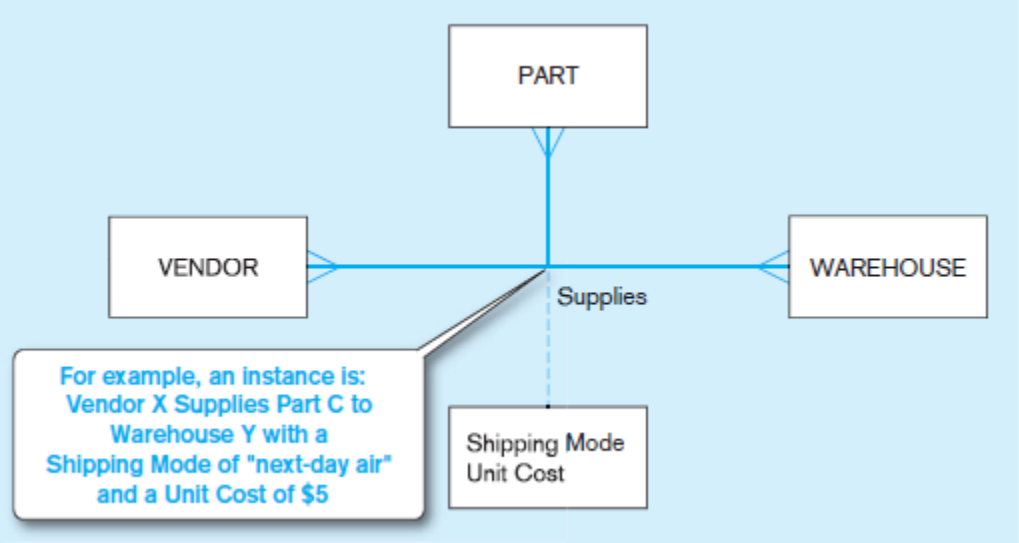
Q6 : What is the degree of a relationship ? List the three types of relationship degrees and give an example of each.

- **The degree of a relationship is the number of entity types that participate in the relationship.**
- **The three types of relationship degrees :**
  - **1- Unary Relationships (one entity type) :**



2- Binary Relationships (two entity types) :

3- Ternary Relationships (three entity types) :



Q7 : Contrast the terms "term" and "fact" as they supply to business rules and give an example of each term.

- **Term : is a word or phrase that has a specific meaning for business.**
  Example : Course – Section.
- **Fact : is an association between two or more terms.**
  Example : A course is a module of instruction in a particular subject area.