MODI ING ENTITIES AND ATTRIBUTES

An <u>Entity</u>: is a person, a place, an object, an event, or a concept in the user environment about which the organization wishes to maintain data.

- <u>Entity type</u> vs <u>entity instance</u>: entity type is a collection of entities that share common properties or characteristics while an entity instance is a singular occurrence of an entity type.
 - o Example: entity type: EMPLOYEE, entity instance: would be two employees
- "a true data entity will have many possible instances, each with a distinguishing characteristic, as well as one or more other descriptive pieces of data."

Strong vs Weak entity types:

- <u>Strong entity type</u>: is one that exists independently of other entity types. (Some data modeling software, in fact, use the term independent entity.) Examples include STUDENT, EMPLOYEE, AUTOMOBILE, and COURSE.
- <u>Weak entity type</u>: is an entity type whose existence depends on some other entity type. (Some data modeling software, in fact, use the term dependent entity).
 - o The entity type on which the weak entity type depends is called the <u>identifying owner</u> (or simply owner for short).
 - o Generally, on an E-R diagram, a weak entity type has an attribute that serves as a partial identifier.
 - During a later design stage, a full identifier will be formed for the weak entity by combining the partial identifier with the identifier of its owner or by representing the weak entity as a strong entity with a surrogate, nonintelligent identifier attribute and the partial identifier as a regular attribute of this entity.
 - o In an E-R model an <u>identifying relationship</u> weak entity type to owner is shown by using double lines instead of singular lines b/w the two entities.

Naming and defining entity types:

Naming:

- o Is a singular noun
- Should be specific to the organisation
- o Should be consise
- Short name
- All the same entities should have the same name

Defining:

- Usually starts with "An X is..."
- o Statement about what the unique characteristics is
- Make clear what entity instances are included and not included
 - "A customer is a person or organization that has placed an order for a product from us or one that we have contacted to advertise or promote our products. A customer does not include persons or organizations that buy our products only through our customers, distributors, or agents."
- o includes a description of when an instance of the entity type is created and deleted.
 - "A customer ceases to be a customer if it has not placed an order for more than three years."
- Specify when an instance might change into an instance of another entity type
 - "A bid is a legal offer by our organization to do work for a customer. A bid is created when an officer of our company signs the bid document; a bid becomes an instance of contract when we receive a copy of the bid signed by an officer of the customer."
- Specify what history is to be kept about instances of the entity type

Attributes: is a property or characteristic of an entity type that is of interest to the organization.

- Some relationships also have attributes
- In naming attributes, we use an initial capital letter followed by lowercase letters. If an attribute name consists of more than one word, we use a space between the words and we start each word with a capital letter.
- In E-R diagrams, we represent an attribute by placing its name in the entity it describes
- REQUIRED VERSUS OPTIONAL ATTRIBUTES:
 - o <u>required attribute</u>: An attribute that must be present for each entity instance
 - o Optional attribute: whereas an attribute that may not have a value

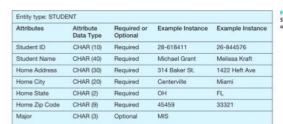


FIGURE 2-6 Entity type STUDENT with required an

- SIMPLE VERSUS COMPOSITE ATTRIBUTES:

- <u>Composite attribute:</u> is an attribute, such as Address, that has meaningful component parts, which are more detailed attributes.
 - Example: address is made up of multiple things like city, postal code, state, etc which are themselves attributes
- <u>A simple (or atomic) attribute</u>: is an attribute that cannot be broken down into smaller components that are meaningful for the organization.
 - Example: for a vehicle entity: Vehicle ID, Color, and Weight are all simple attr. As they cannot be broken down
- SINGLE-VALUED VERSUS MULTIVALUED ATTRIBUTES
 - <u>Multivalued attribute</u>: is an attribute that may take on more than one value for a given entity (or relationship) instance.
 - For example, for the entity EMPLOYEE you might have an attribute called Skills which can be one or more things like c++, powerpoint, c#, agile dev., etc..
 - Typically showcased by squiggly bracket around attribute name
 - Single valued attribute: an attribute that takes only one single value like First Name

- STORED VERSUS DERIVED ATTRIBUTES

- o <u>Derived attribute</u>: is an attribute whose values can be calculated from related attribute values (plus possibly data not in the database, such as today's date, the current time, or a security code provided by a system user).
 - Example, If users need to know how many years a person has been employed, that value can be calculated using Date Employed and today's date.
 - It is essentially an attribute who depends on another piece of data to calculate itself
- Stored attribute: is an attribute that is simply received and required no extra calculations or other attributes to create itself, its simply stored in the database as is

- IDENTIFIER ATTRIBUTE

- o <u>Identifier</u>: is an attribute (or combination of attributes) whose value distinguishes individual instances of an entity type.
 - Ex. Student ID, Social Security Number
 - Name would not be good since there could be potentially multiple people with the same name
- o composite identifier: is an identifier that con sists of a composite attribute.
 - Ex. the entity FLIGHT with the composite identifier Flight ID. Flight ID in turn has component attributes Flight Number and Date.
 - □ It is made up of two or more attributes who together give validity to the composite identifier
- There are protocols or things you should consider when picking an identifier attribute