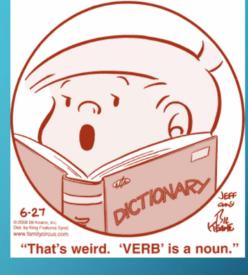


STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
 - Given a description of a mini-world, identify which nouns should be Entities and which nouns should be Attributes
 - Define the following terms: Entity, Key, Attribute, Multi-valued Attribute, Composite Attribute and Derived Attribute and select the correct shape to represent these in an ER Diagram
 - Determine if an attribute is allowed to have null values and if so, decide if the null value is not applicable OR not known
 - Distinguish between an attribute and an attribute's value (its domain)

WHEN DESIGNING A DATABASE -> NOUNS ARE KING!



- Look at your requirements, your specs, your forms, your reports and identify the nouns.
- Usually the nouns turn into:
 - Entities
 - Attributes

Let's look at our case study and identify some nouns

CASE STUDY - CREATING AN ER DIAGRAM

- Suppose we plan to model a company which is organized into departments.
- Each department has a unique name, number and employee who manages it we want to keep track of when the employee started managing the department)
- A department may have severa locations
- A department controls a bunch of projects, each project has a unique number, name and a single location
- Each employee has a name, ssnumber, address, salary, sex and birthdate
- An employee is assigned to only one department but may work on several projects which are not necessarily from the same department
- Keep track of the number of hours each employee works on each project.
- Keep track of the direct supervisor of each employee
- Keep track of the dependents of each employee (name, sex, birthdate and relation)

WHAT'S WHAT?

- What is different about the noun employee vs. the noun salary?
- If you can see the different between them, you understand what an ENTITY is compared to an ATTRIBUTE!

E-R MODEL CONCEPTS AND KEY TERMS

- Entities and Attributes:
 - $^{\circ}$ Entity A single "THING" that exists, has independent existence \rightarrow Employee
 - Attribute describes a "thing" → Age, SSN, Sex, Name
 - $^{\circ}$ Value taken on by an attribute \rightarrow 25, 456-876-788, Female, Bart Simpson
 - Composite Attributes vs. Atomic or Simple Attributes → Bart Simpson vs. 45
 - Single-Valued Attributes vs. Multivalued Attributes → Age vs. CollegeDegrees
 - Derived Attributes vs. Stored Attributes → Age vs. Birthdate
- ENTITY

 any object in our mini-world that we want to model and store information about.
 E.g. Student, Professor, Classroom
- ◆ ATTRIBUTE → defines the information about the entity that needs to be stored. An entity will have 0 or more attributes. An attribute has a DOMAIN. E.g. student number
- ullet **DOMAIN** \rightarrow the type of values that an attribute can take. E.g. String, integer, real, date

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- Null Values Why and when would we use this?
 - Apartment Number
 - Phone Number

QUESTION: What is the difference between attributes with null values that are not applicable vs. not known?

MORE TERMINOLOGY

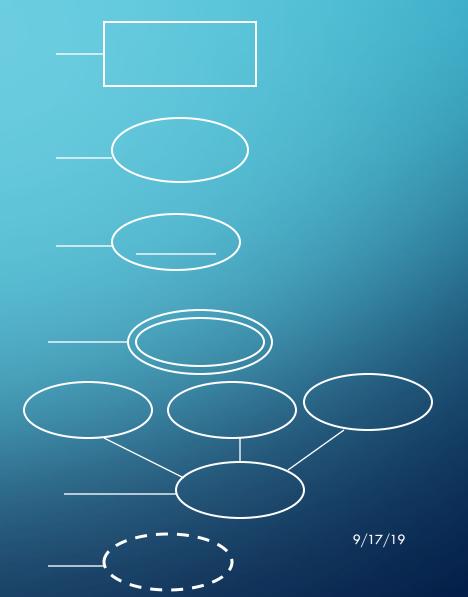
- Entity Types, Value Sets (DOMAIN) and Key Attributes
 - Entity Type defines a set of entities that have the same set of attributes
 - Entity an instance of an entity type
 - Entity Set, Collections group of Entities
 - Key, Uniqueness
 - Combination to create key
 - Value Sets (Domains)

QUESTION: What is Age's domain, what is Name's domain, what is Cost's domain?

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E-R DIAGRAM NOTATION SO FAR:

- Entity Type
- Attribute
- Key Attribute
- Multi-valued Attribute
- Composite Attribute
- Derived Attribute



OUESTION: WHAT ARE THE ENTITIES FROM OUR EXAMPLE?

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CASE STUDY – CREATING AN ER DIAGRAM

- Suppose we plan to model a company which is organized into departments.
- Each department has a unique name, number and employee who manages it (we want to keep track of when the employee started managing the department)
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- Keep track of the dependents of each employee (name, sex, birthdate and relation)

QUESTION: WHAT IS OUR DIAGRAM SO FAR? (IT IS STARTED BELOW)

Let's use <u>draw.io</u> to finish the diagram.

