

A decorative graphic on the left side of the slide, consisting of a network of white lines and circles on a blue gradient background, resembling a circuit board or a neural network.

WEEK 1

ENTITY RELATIONSHIP DIAGRAMS – PART 2

CS3319

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 several locations
- A department controls a bunch of projects, each project has a unique number, name and a single location
- Each employee has a name, ssnnumber, 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:**

- **Entity** - A single “THING” that exists, has independent existence → *Employee*
- **Attribute** – describes a “thing” → *Age, SSN, Sex, Name*
- **Value** - taken on by an attribute → *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
- **DOMAIN** → the type of values that an attribute can take. E.g. String, integer, real, date

- **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?

E-R DIAGRAM NOTATION SO FAR:

- Entity Type



- Attribute



- Key Attribute



- Multi-valued Attribute



- Composite Attribute



- Derived Attribute



QUESTION: WHAT ARE THE ENTITIES FROM OUR EXAMPLE?

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

Let's use draw.io to finish the diagram.

