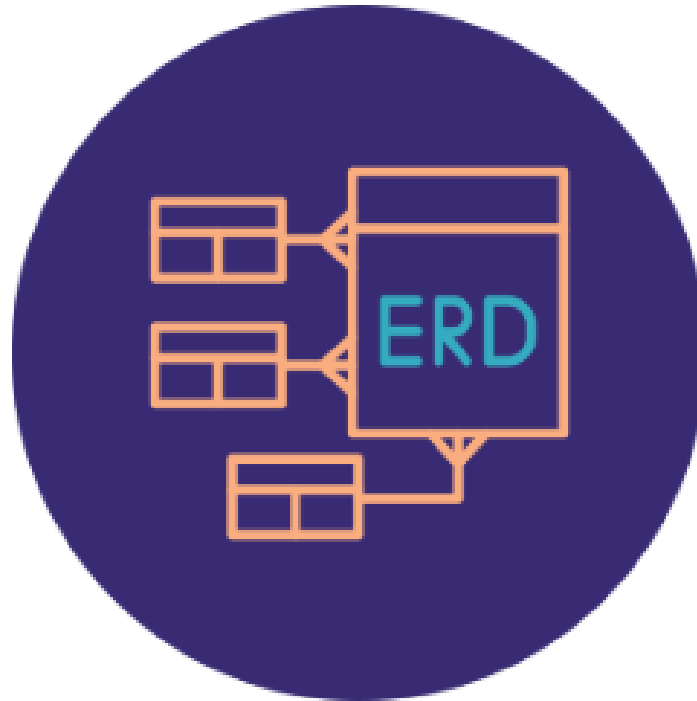


Entities & Attributes



Objectives

- Define and give an example of an entity
- Name and describe attributes for a given entity
- Distinguish between an attribute and its value
- Distinguish between mandatory and optional attributes, and between volatile and nonvolatile attributes
- Select and justify a unique identifier (UID) for an entity





Entity

- “Something” of significance to the business about which data must be known
- A name for a set of similar things that you can list
- Usually a noun
- Entities can be:
 - **Tangible**, like PERSON or PRODUCT
 - **Intangible**, like SKILL LEVEL
 - **An event**, like CONCERT





Instance

- An instance is a single occurrence of an entity.
- Some entities have many instances and some have only a few
- A Dalmatian, a Siamese cat, a cow and a pig are instances of ANIMAL



Entities and Instances

Entities	Instances
PERSON	Mahatma Gandhi, George Washington
PRODUCT	Nike Air Jordan, Gibson Les Paul Custom
PRODUCT TYPE	Shoe, Video Game
JOB	Electrician, IT Technician
SKILL LEVEL	Beginner, Expert
CONCERT	U2 at the Palladium, Beyoncé at the Greek Theatre L.A.
ANIMAL	Dog, Cat
CAR	Volkswagen Beetle, Toyota Corolla





Is **CAT** an instance or an entity?



Purpose of Entities

- Knowing how to organize and classify data makes it possible to draw useful conclusions about seemingly random facts.
- Our technology-rich world produces vast quantities of facts in need of structure and order.
- It is important to learn about entities because they are the things about which we store data.



- For example:
 - A school needs to store data about (as a minimum): STUDENTs, TEACHERs, COURSEs, ROOMs, GRADEs.



Attribute?

- An entity is described using a set of attributes.
- An attribute represents something of significance to the business.
- An attribute has a single value
 - An attribute is a specific piece of information that helps:
 - Describe an entity
 - Quantify an entity
 - Qualify an entity
 - Classify an entity
 - Specify an entity





Attribute?

- Attributes have values.
- Attributes are single-valued.
- An attribute value can be a number, a character string, a date, an image, a sound, etc.
- These are called "data types" or "formats." Every attribute stores one piece of data of one specific data type.
- Each attribute can have only one value (at any point in time) for each instance of the entity.





Attribute?

- **Volatile attributes** : attributes 's values that constantly change.
- **Nonvolatile attributes** : attributes which rarely change





Attribute?

- **Mandatory attributes** : must contain a value
- **Optional attributes** : may contain a value or be left null





Attribute?

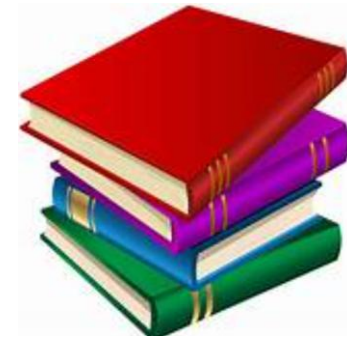


CUSTOMER

CONCERT



BOOK



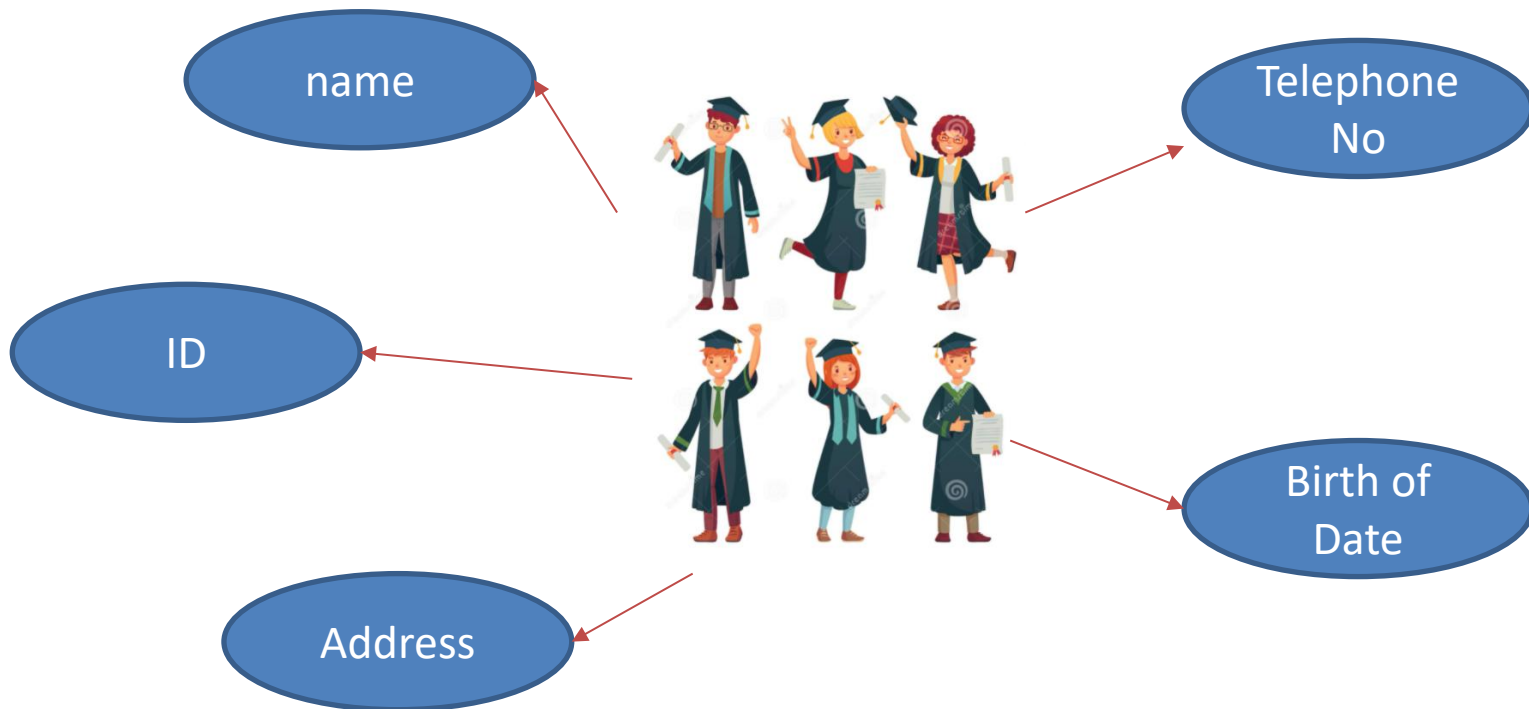
STUDENT



JOB



- What is the data type of each attribute in STUDENT?





Attribute?

- Example: Email address could be a mandatory attribute for EMPLOYEE in an email application, but an optional attribute for CUSTOMER in an online catalog.



- If we were to model a Human Resource system, we would have an entity to store data for each worker called EMPLOYEE.



- What attributes does EMPLOYEE have?
- Give one or two examples of the values that each EMPLOYEE attribute might contain.





Purpose of Attributes

- Provide more specific information about an entity.
- Distinguish between one instance and another by providing greater detail for the entity.
- **For example:**
 - In a restaurant, you need to list the individual items on a customer's order so that you can calculate the bill.
 - When building several sales reports, you must be able to identify a specific report from the list of reports.





Unique Identifiers

- Distinguish one instance of an entity from another.
 - In a classroom, you need to distinguish between one student and another.
 - When classifying your CD collection, you need to distinguish between one CD and another.
 - When listing transactions on a financial statement, you need to distinguish between one transaction and another.



Identifiers

- An EMPLOYEE has a unique identifier (UID).
- A UID is either a single attribute or a combination of multiple attributes that distinguishes one employee from another.
- How do you find a specific employee that works for the company?
- What information uniquely identifies one EMPLOYEE?



Identifiers

- Think about all the students in the classroom.
- Each student is described by several traits or attributes.
- Which attribute or attributes allow you to pick a single student from the rest of the class?
- That is the student's UID.





Unique Identifiers

Super UID

Candidate UID

Primary UID

Composite UID

