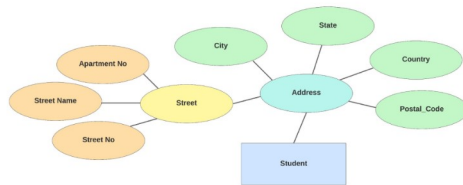


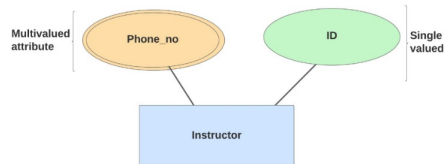
Types of attributes

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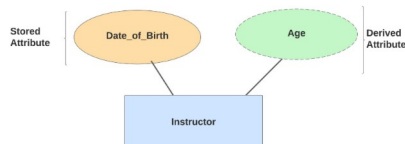
- An attribute used in E-R model, can be characterized as:
 - Simple / Composite attribute
 - Single-valued / Multivalued attributes
 - Derived attributes
- Formally saying the attributes that cannot be further subdivided into components is a **simple attribute**
 - Ex: The ID of the student or Instructor, Roll number of the student, phone number, email id, etc.
- On the contrary those attributes that can be split into components are called a **composite attribute**
 - Ex: The address can be further split into house number, street number, city, state, country, and pin code,
 - The name can also be split into first name middle name, and last name.
- Composite attributes may appear as a hierarchy.
- In the composite attribute address, its component attribute street can be further divided into street number, street name, and apartment number.



- The attribute which takes up only a single value for each entity instance is a **single-valued attribute**.
 - Example: The name of the instructor, age of the student, etc.
- The attribute which takes up more than a single value for each entity instance is a **multi-valued attribute**.
 - Example: Phone number of the instructor, Mail id, etc.
- The multivalued attribute is represented in the E-R diagram as shown below:
- Considering the instructor's Phone_no as a multivalued attribute and ID as an single-valued attribute:



- The **stored attribute** are those attributes that are actually stored in the database.
 - Example: Date_of_Birth is a stored attribute
- An attribute that can be derived from other attributes is **derived attributes**.
 - Example: the Age attribute of the instructor is a derived attribute
- Considering the above example of the instructor relation, Date_of_Birth is a stored attribute and Age is an derived attribute
- The E-R representation would be:



Complex Attributes

- Those attributes, which can be formed by the nesting of composite and multi-valued attributes, are called **"Complex Attributes"**.
- These attributes are rarely used in DBMS.
- Let us take an example of the same.
 - Let us consider that the student relation contains an attribute called PreviousDegrees that stores all the previous education qualifications of the students
 - PreviousDegrees of a STUDENT is a composite multi-valued attribute denoted by {PreviousDegrees (College, Year, Degree, Field)}
 - Multiple PreviousDegrees values can exist. Each has four subcomponent attributes: College, Year, Degree, Field

- Therefore it is a complex attribute

- The Null value may indicate “**not applicable**”—that is, the value does not exist for the entity.
- Null can also designate that an attribute value is **unknown**. An unknown value may be either:
 - **missing** (the value does exist, but we do not have that information)
 - **not known** (we do not know whether or not the value actually exists).