

Entity Relationship (ER) Model (Part 1)

Outline

- ❑ Introduction to ER model

- ❑ Entity set

Introduction

- ❑ Database design is to decide the set of tables that are needed to
 - store all data in the underlying applications.
 - capture the relationships among data.

- ❑ Identify and understand the rules *that govern data*
 - One lab session has at most 45 students.
 - The percentage of 'A' grades must be between 10%-20%.

Data Modeling

- ❑ Need a tool to represent these rules in a *concise* but *accurate* manner, so that they can be unambiguously understood by information system developers and users.

- ❑ **Entity-Relationship (ER) Model, also known as ER Diagram,** is such a tool that
 - Represents rules in terms of entities and their relationships.
 - Is mainly used for conceptual design.

Entity

□ An **entity** is a real-world object that is distinguishable from other objects.

- A person
- a pet
- a CD
- ...

□ An entity has **attributes**.

- A person has a name and an address ...
- A pet has a nickname...
- A CD has an author...

Entity Set

□ An **entity set** is a set of entities that shares the same attributes.

Name	HKID	Address
Alice	R133428(6)	Kowloon
Bob	P625228(4)	Hong Kong
Candy	A252242(7)	New Territories

Person

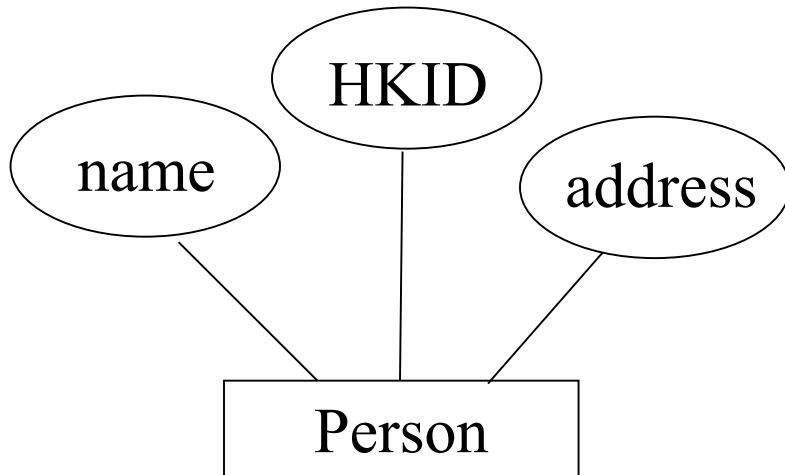
ID	Name
1	Sam
2	Lady
3	Bear

Pet

Representation of an Entity Set

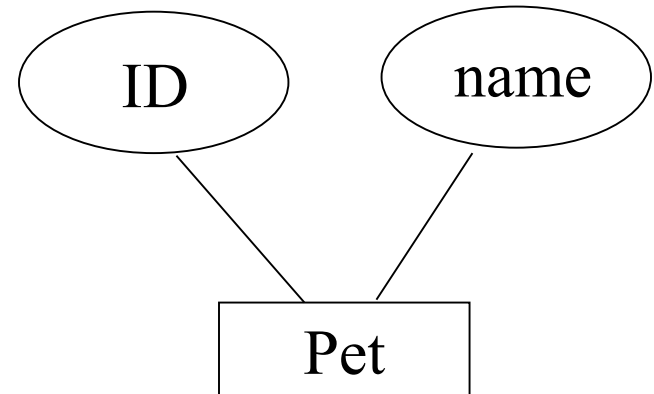
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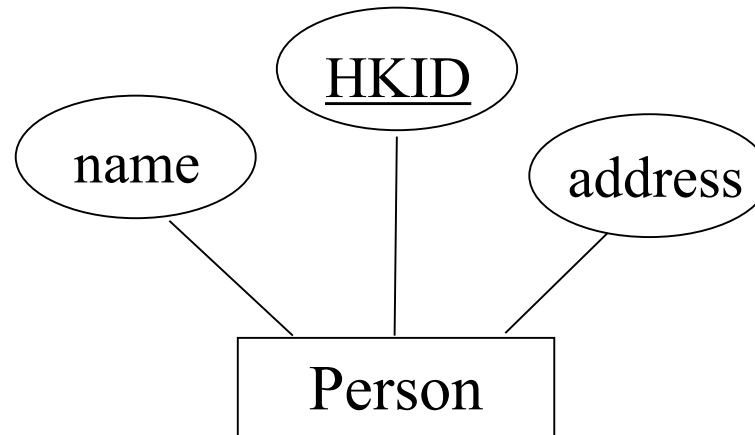
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Pet



Key

- Each entity set has a **key** — **minimal set** of attributes whose value uniquely identifies an entity.

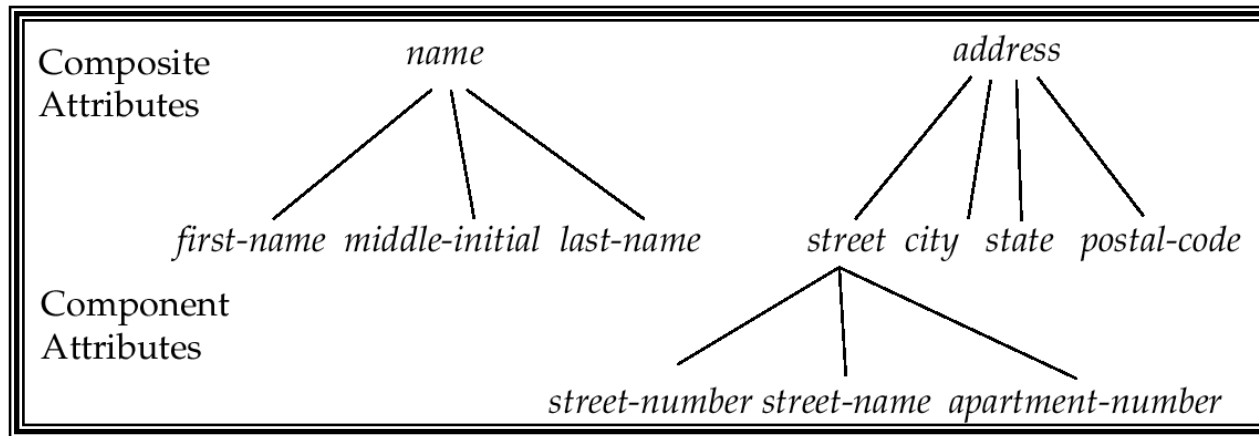


Is (HKID, name)
also a key?

- There could be more than one keys. They are called as **candidate keys**. One of them is designated as the **primary key**.

Attribute Types

❑ Simple vs. composite



❑ Single-valued vs. multi-valued

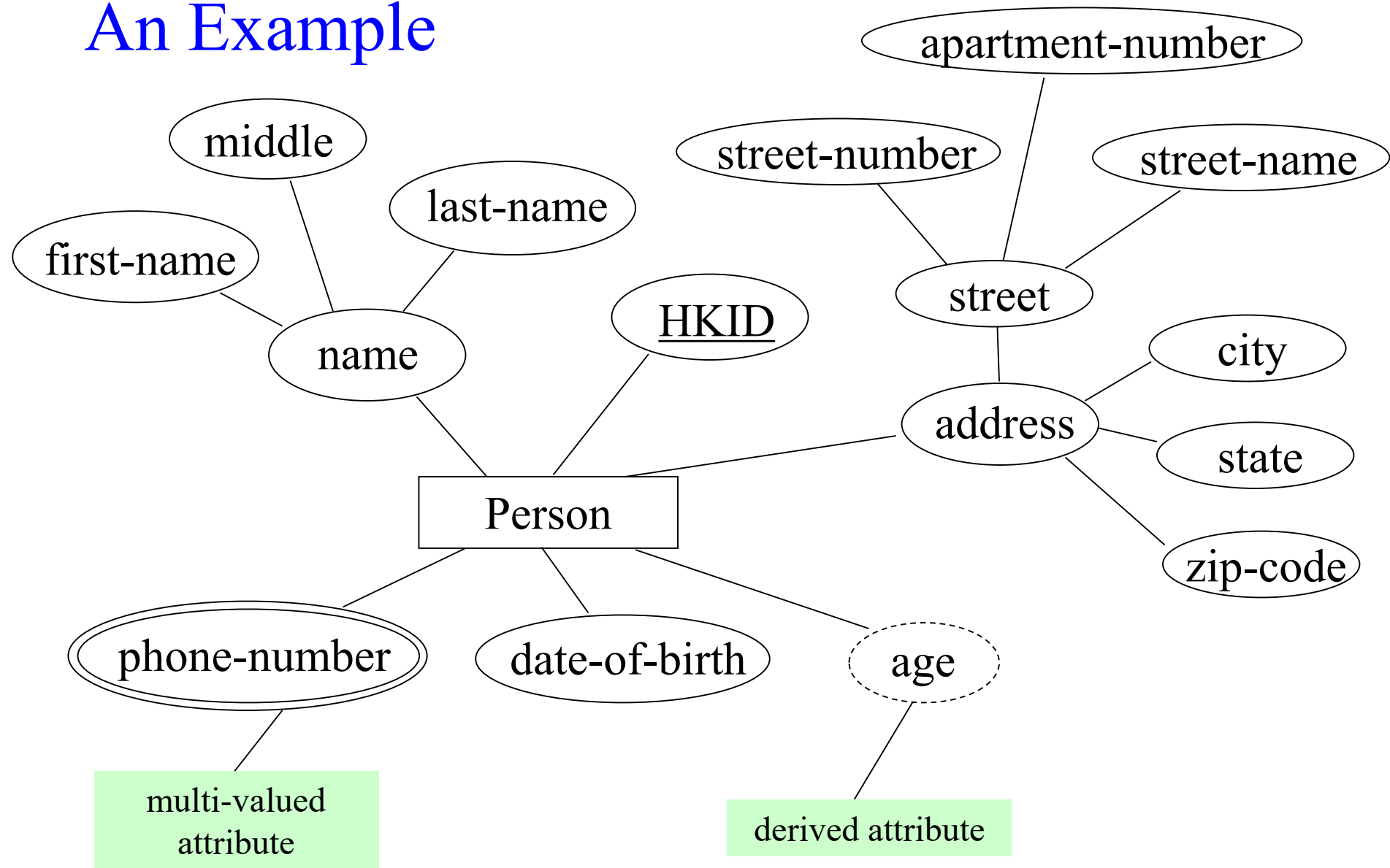
➤ *Name* vs. *phone-numbers*

❑ Derived vs. non-derived

➤ *Date of birth*: Non-derived

➤ *Age*: Derived

An Example



In-Class Exercise

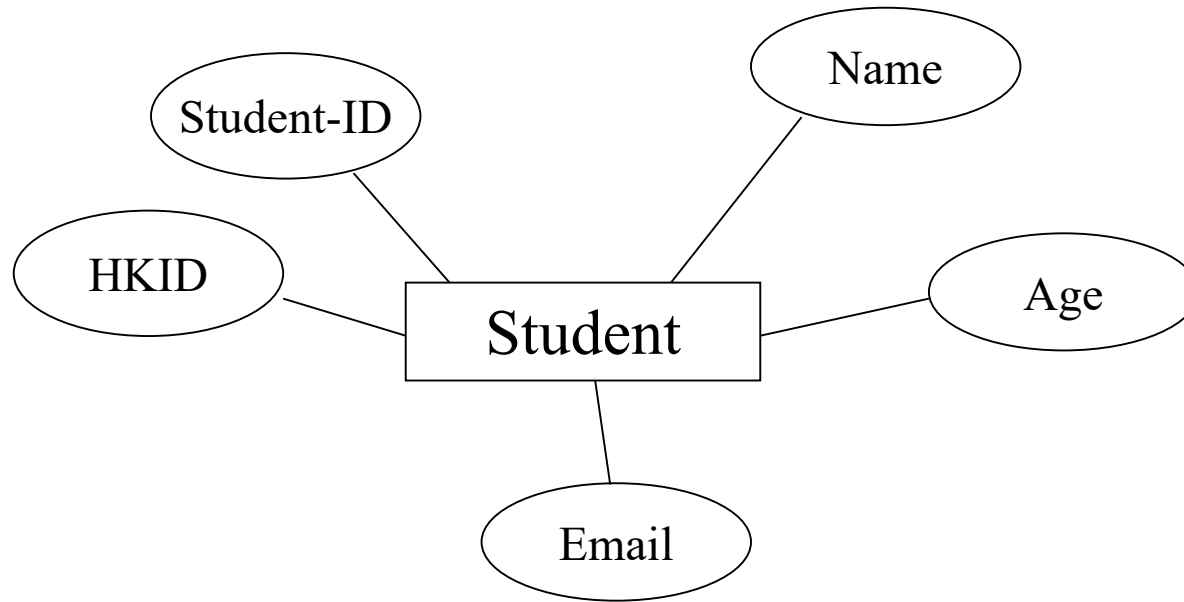
□ Student

Student-ID	Name	HKID	Age	Email
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- Draw the entity set of Students
- What are the candidate keys?

Solution

- ❑ Draw the entity set of Students



- ❑ Candidate keys: Student-ID, HKID, and Email

In-Class Exercise

- ❑ You are asked to develop a small database for our department.
 - Record the information regarding available COMP courses in a specific semester.
 - Record the information of course instructors who will teach these courses.
 - Record the information of all the students who will enroll in these courses.



What are the entity sets in this database?

Solution

- 3 entity sets: Course, Instructor, and Student

