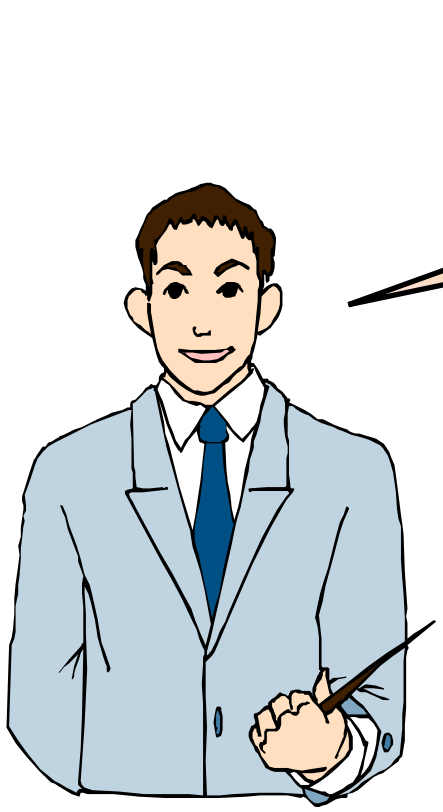
Objectives

- In this session, you will learn to:
  - Identify tips of logical database design

Tips on Logical Database Design

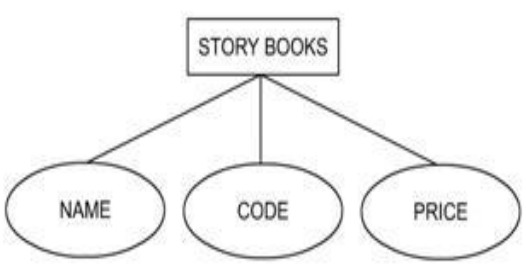


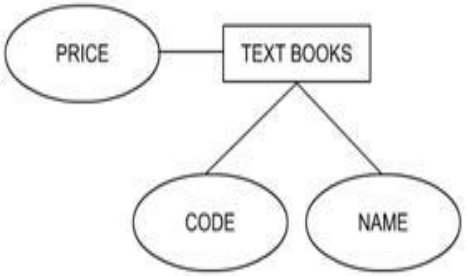
Attributes

- Do not introduce any unnecessary attributes.
- An attribute serves the following purposes:
  - It identifies its owner entity.
  - It refers to another entity.
  - It simplifies the description of an entity.
- If there are any entities with common attributes, merge the entities.

Attributes (Contd.)

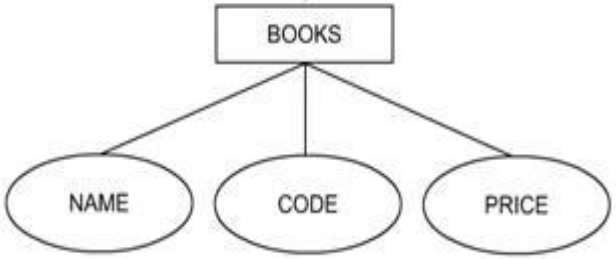
- The following diagram shows how you can merge two entities that contain common attributes.





Every category of book will have NAME, CODE, and PRICE as its attributes.

Instead of making STORY BOOKS and TEXT BOOKS as different entities, you can create one entity, BOOKS.



Keys

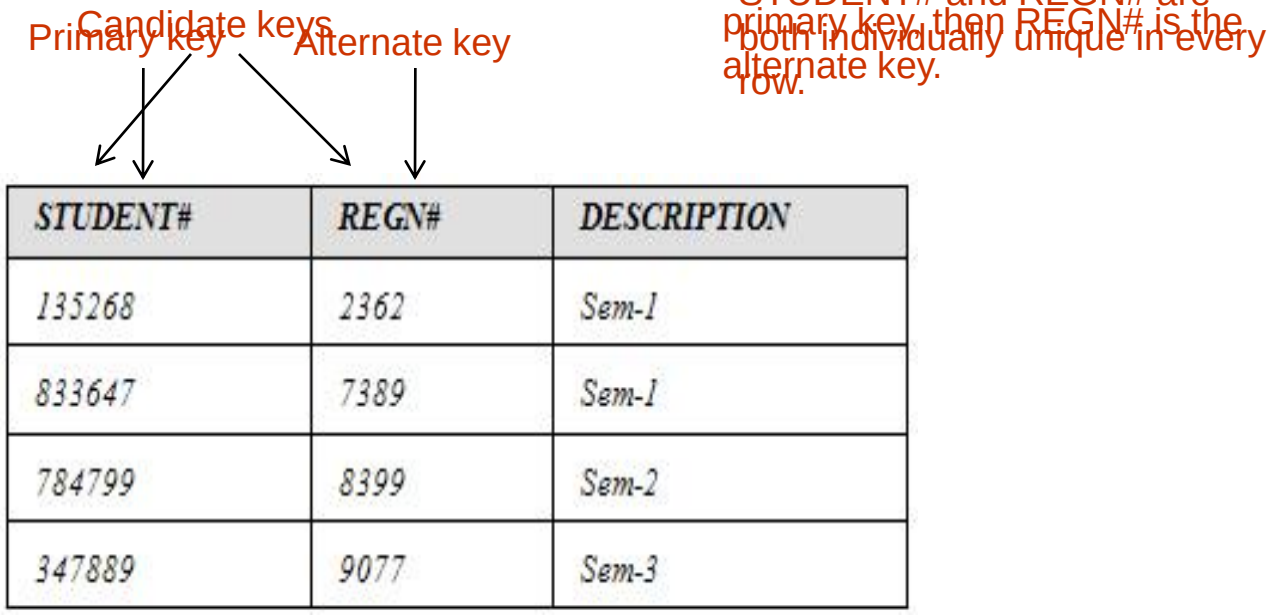
- An RDBMS identifies and locates rows by value.
- The physical address is transparent to the user.
- Relational systems require keys that can uniquely identify the rows of a table.
- The various types of keys used in an RDBMS are:
  - Primary
  - Foreign
  - Candidate
  - Alternate
  - Composite

Keys (Contd.)

- Any attribute (or set of attributes) that uniquely identifies a row in a table is a candidate for the primary key. Such an attribute is called a candidate key.
- Any attribute that is a candidate for the primary key but is not the primary key is called the alternate key.
- When the key that uniquely identifies the rows of the table is made up of more than one attribute, it is called a composite key.

Keys (Contd.)

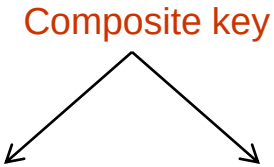
- Consider the STUDENT table, as shown in the following diagram.



STUDENT#	REGN#	DESCRIPTION
135268	2362	Sem-1
833647	7389	Sem-1
784799	8399	Sem-2
347889	9077	Sem-3

Keys (Contd.)

- Consider the table, WORKING HOURS of an employee, as shown in the following diagram.



EMPLID	PROJECTID	HOURS
E309	P675	18
E453	P908	5
E334	P876	20

Each row can be uniquely identified by a composite key composed of EMPLID and PROJECTID.

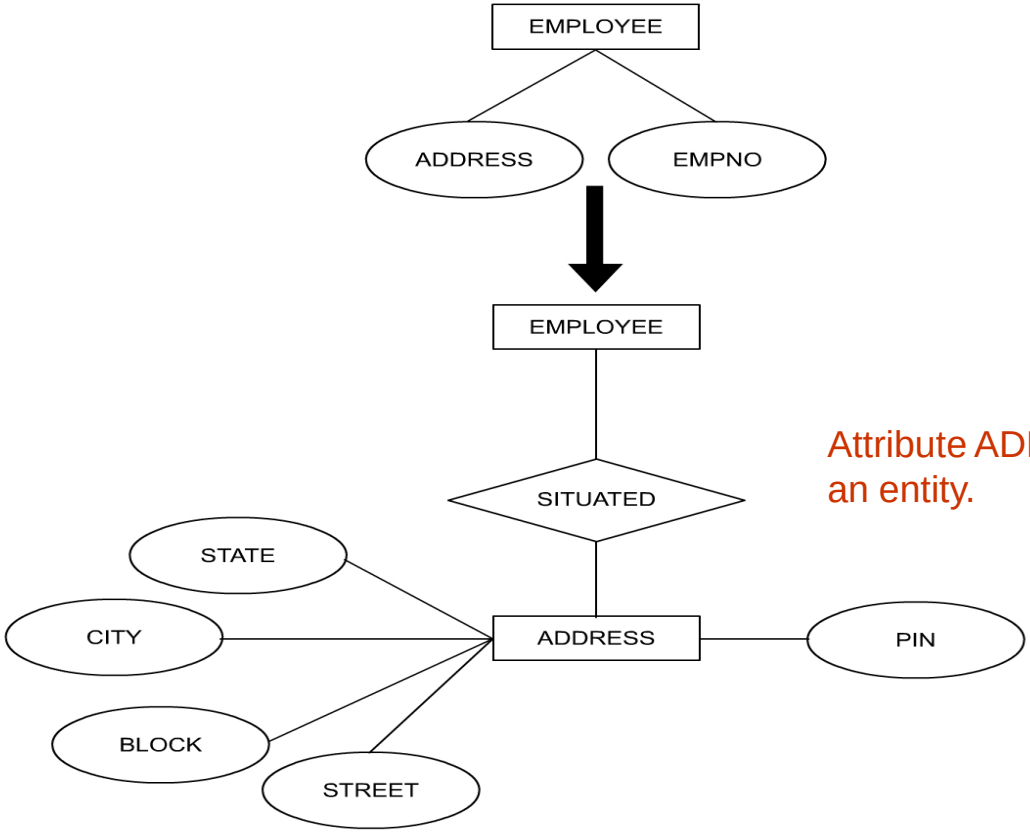
Just a minute

- Define the following terms:
  1. Candidate Key
  2. Alternate Key

- Solution:
  1. Any attribute (or set of attributes) that uniquely identifies a row in a table is a candidate for the primary key. Such an attribute is called a candidate key.
  2. Any attribute that is a candidate for the primary key but is not the primary key is called the alternate key.

Entities

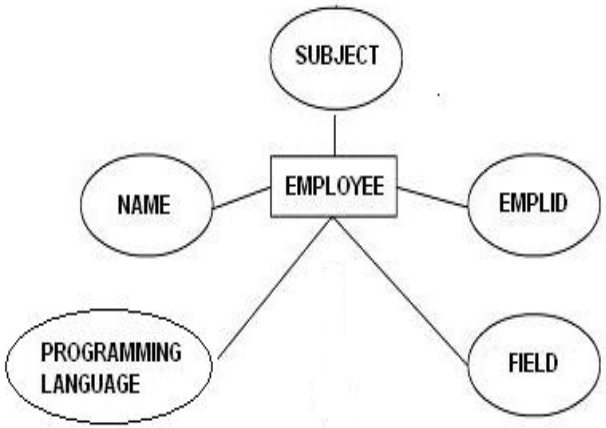
- You can create a new entity to represent important recurring groups of attributes, as shown in the following diagram.



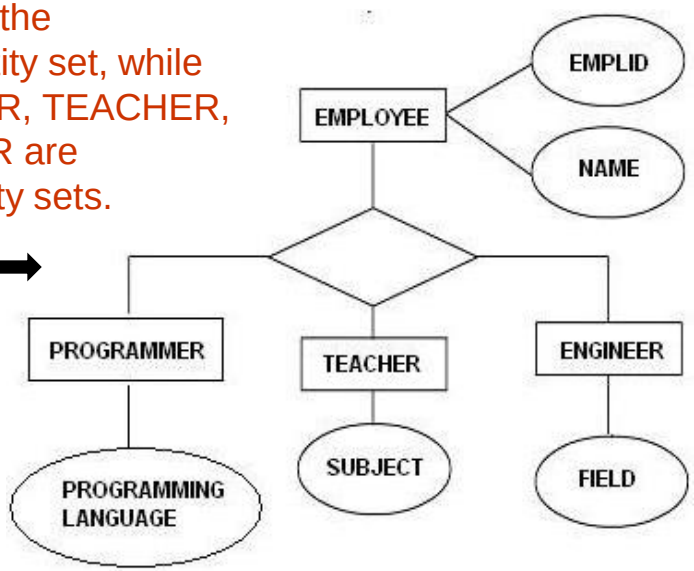
Attribute ADDRESS becomes an entity.

Subentities

- Entities that have optional attributes can be replaced with subentities.
- Specialization is the result of taking a subset of a higher-level entity set to form a lower-level entity set, as shown in the following diagram.



EMPLOYEE is the higher-level entity set, while PROGRAMMER, TEACHER, and ENGINEER are lower-level entity sets.

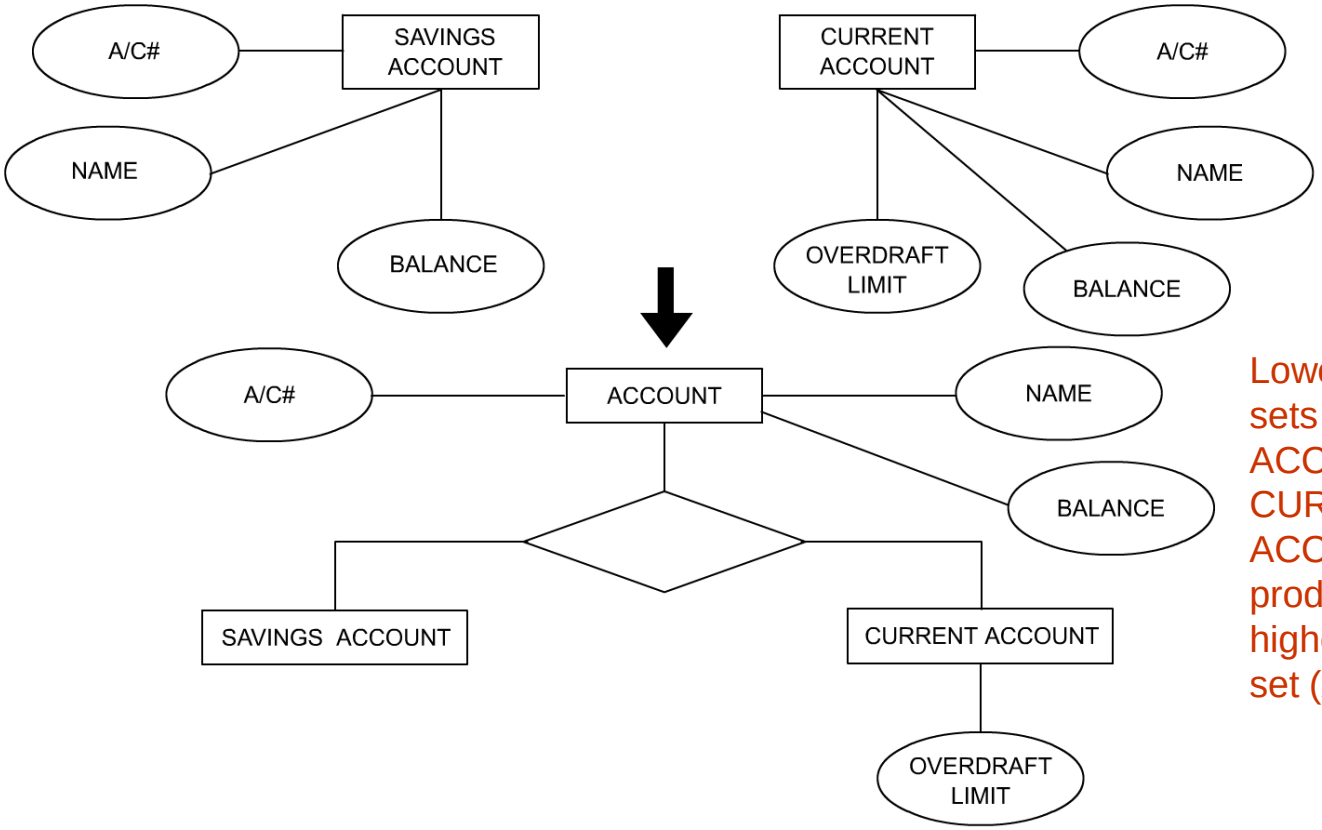


Subentities (Contd.)

- Generalization is the result of taking the union of two or more lower-level entity sets to produce a higher-level entity set.
- Generalization is the opposite of specialization.
- In generalization, every higher-level entity must also be a lower-level entity. Specialization does not have this constraint.

Subentities (Contd.)

- The following diagram represents the concept of generalization.



Lower-level entity sets (SAVING ACCOUNT and CURRENT ACCOUNT) produce a higher-level entity set (ACCOUNT).

Summary

- In this session, you learned that:
  - A candidate key is a candidate for the primary key. An alternate key is a candidate key that is not a primary key.
  - Optional attributes should be replaced with subentities. This is called specialization.
  - To simplify multiple references, a new superentity should be introduced. This is called generalization.