Entity Supertypes and Subtypes

- Example: Consider an aviation business, which employs pilots, mechanics, secretaries, accountants, database managers, and many other types of employees.
  - ✓Common attributes: last name, hire_date, etc.
  - ✓Pilots (license, ratings, etc.)
  - ✓Mechanics (title, certificate, etc.)
  - ✓Accountant (title, CPA_date, etc.)
  - ✓……

Entity Supertypes and Subtypes

Can we store all employee characteristics and unique attributes (e.g. pilot's license, ratings, etc.) in one table?
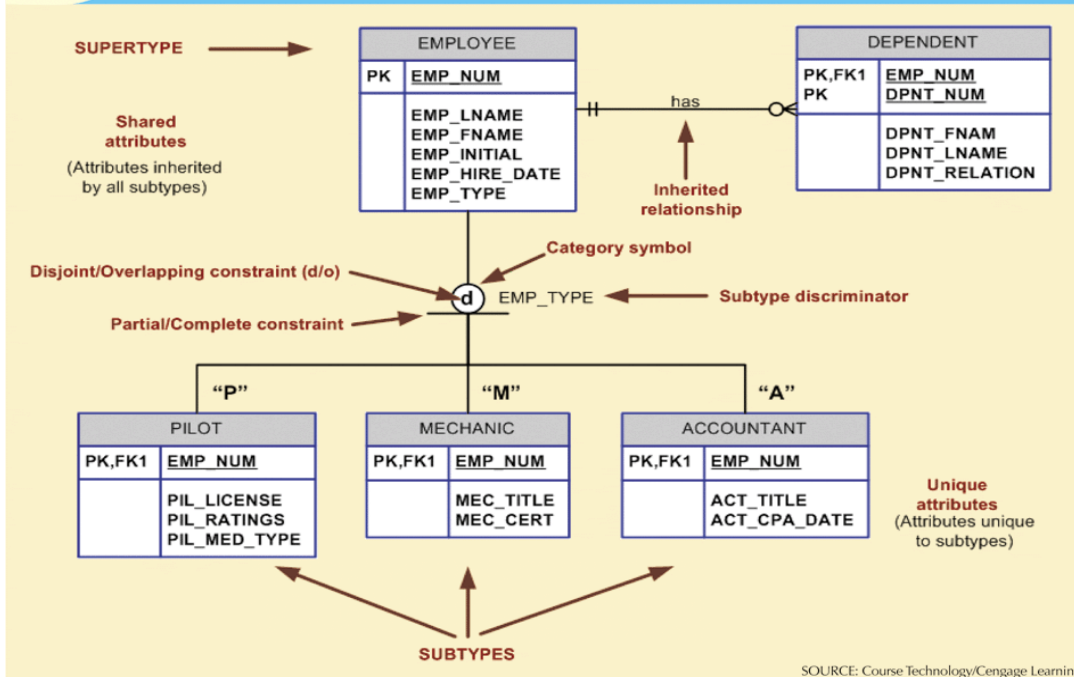
FIGURE 5.1	Nulls created by unique attributes

Database name: Ch05_AirCo

EMP_NUM	EMP_LNAME	EMP_FNAME	EMP_INITIAL	EMP_LICENSE	EMP_RATINGS	EMP_MED_TYPE	EMP_HIRE_DATE
100	Kolmycz	Xavier	T				15-Mar-88
101	Lewis	Marcos		ATP	SEL/MEL/Instr/CFII	1	25-Apr-89
102	Vandam	Jean					20-Dec-93
103	Jones	Victoria	R				28-Aug-03
104	Lange	Edith		ATP	SEL/MEL/Instr	1	20-Oct-97
105	Williams	Gabriel	U	COM	SEL/MEL/Instr/CFI	2	08-Nov-97
106	Duzak	Mario		COM	SEL/MEL/Instr	2	05-Jan-04
107	Diante	Venite	L				02-Jul-97
108	Wiesenbach	Joni					18-Nov-95
109	Travis	Brett	T	COM	SEL/MEL/SES/Instr/CFII	1	14-Apr-01
110	Genkazi	Stan					01-Dec-03

SOURCE: Course Technology/Cengage Learning

A lot of nulls!

Entity Supertypes and Subtypes

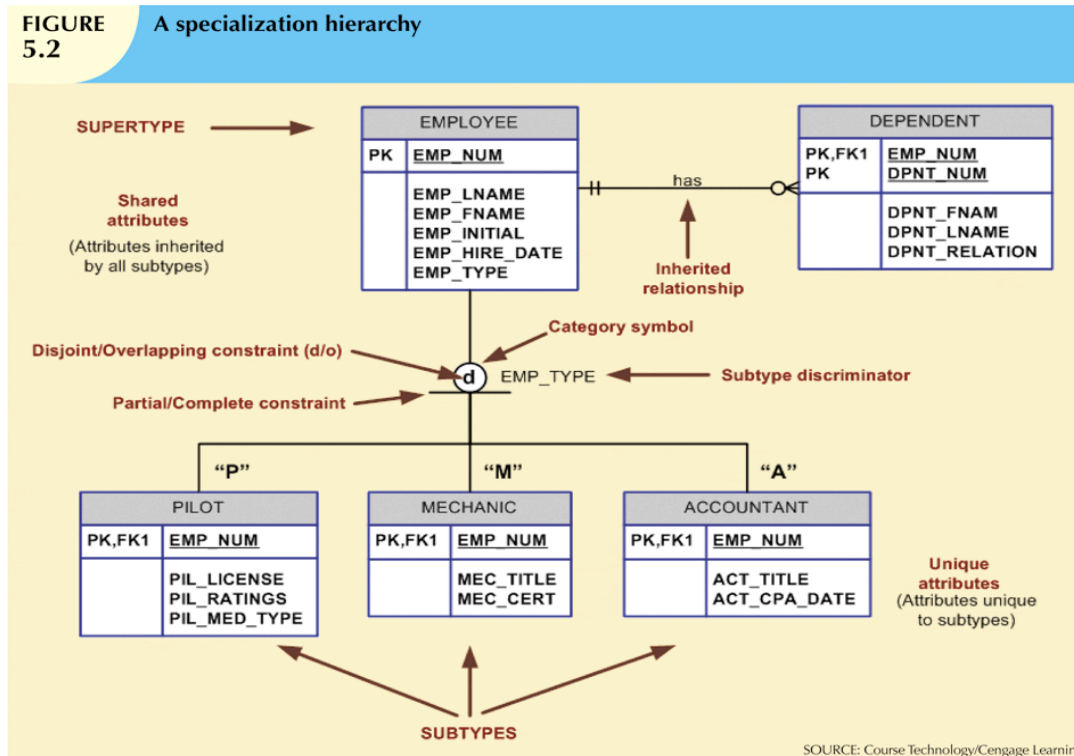
FIGURE 5.2 A specialization hierarchy

Is-a relationship – 1:1

Every subtype can have only one supertype to which it is directly related.

Can have many levels

Entity Supertypes and Subtypes

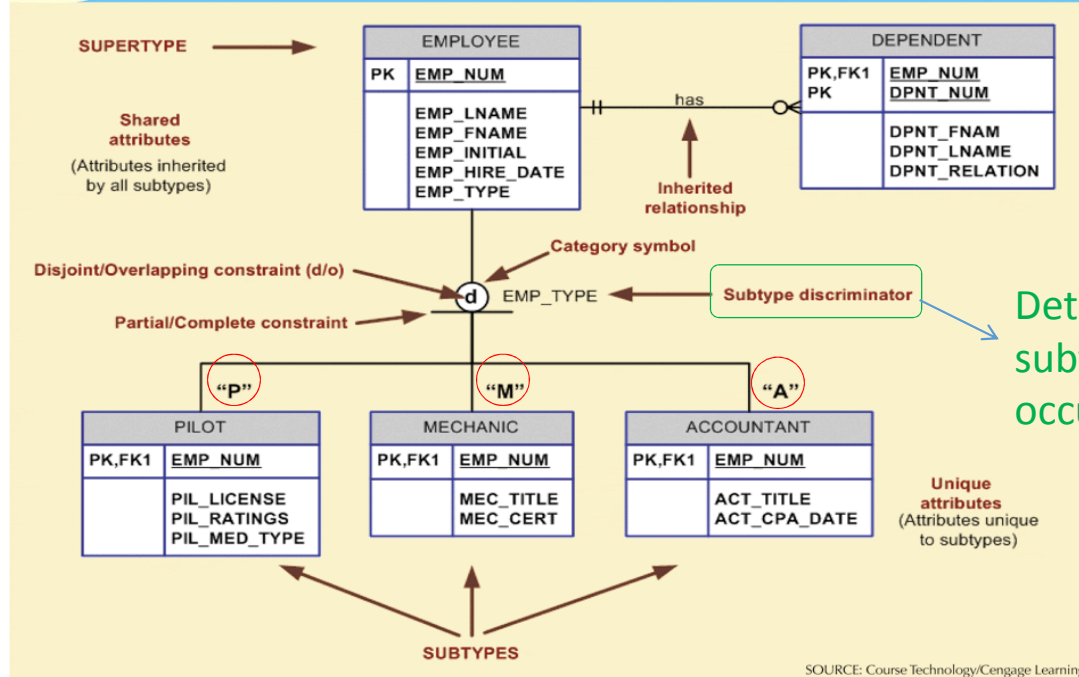**FIGURE 5.2** A specialization hierarchy

Subtype entities inherit all attributes and relationships of supertype

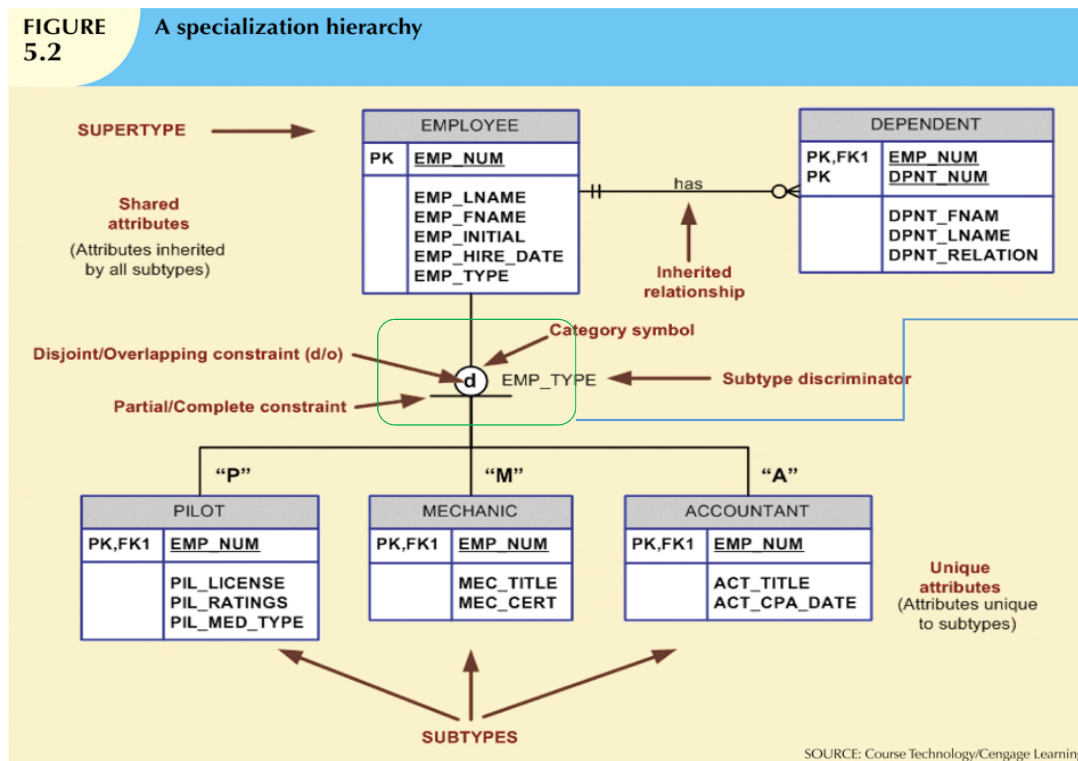Inherit primary key

Subtype Discriminator

FIGURE 5.2 — A specialization hierarchy

Determines to which entity subtype each supertype occurrence is related

Disjoint Subtypes

FIGURE 5.2 A specialization hierarchy

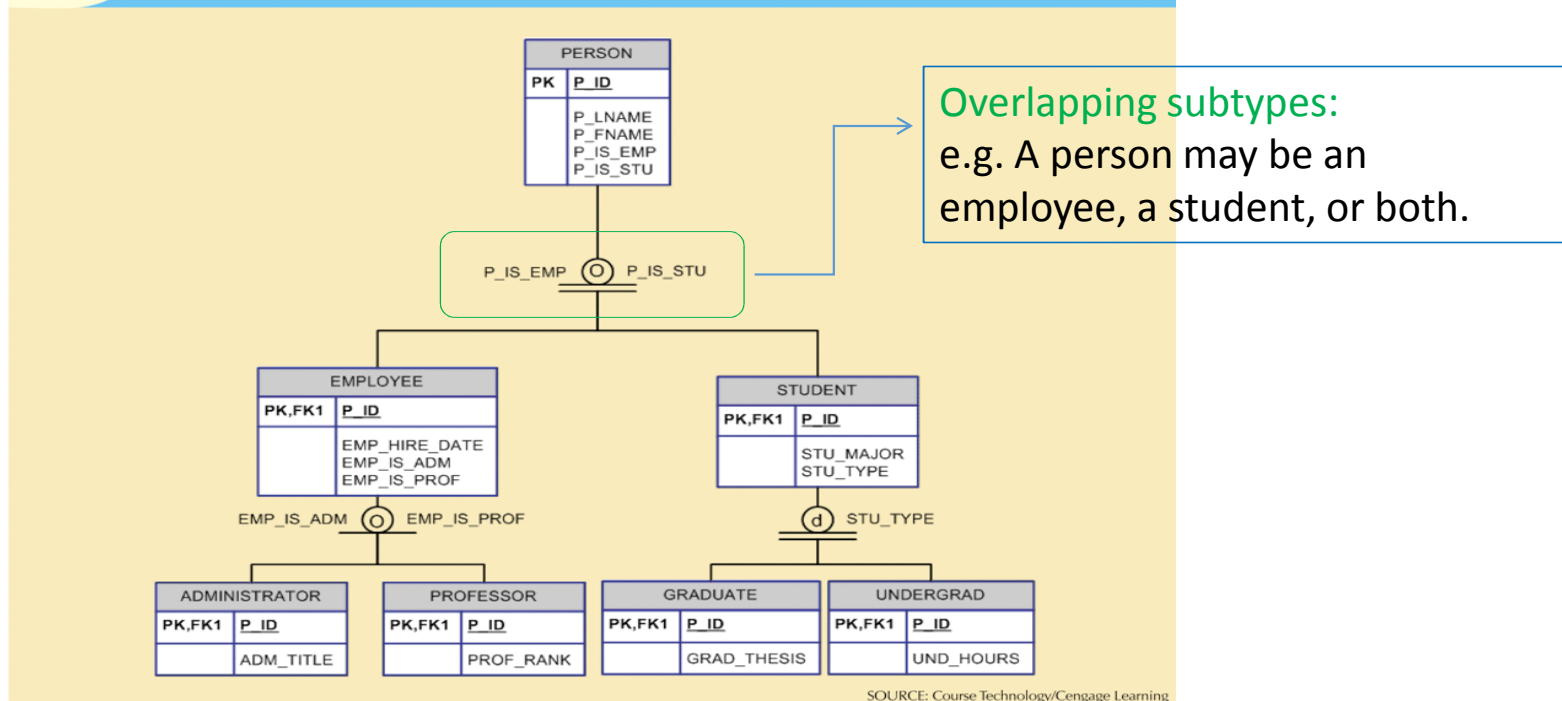SOURCE: Course Technology/Cengage Learning

Disjoint subtypes:
e.g. An employee cannot be a pilot and a mechanic at the same time.

Overlapping Subtypes

FIGURE 5.4 — Specialization hierarchy with overlapping subtypes

Overlapping subtypes:
e.g. A person may be an employee, a student, or both.

Partial/Total Completeness

FIGURE 5.4 — Specialization hierarchy with overlapping subtypes

Partial completeness:
E.g. An employee may not be an administrator or a professor.

Total completeness:
E.g. each student must be either graduate or undergraduate

SOURCE: Course Technology/Cengage Learning

42