

COP 4710: Database Systems Spring 2013

Chapter 3 – In Class Exercises

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Introduction

- Transform each of the ER diagrams shown on this and the following few pages, into a set of relational schemas which show referential integrity constraints.

Problem #1

Employee
<u>employee-id</u>
employee-name
address
{skill}
[years-employed]



Solution for Problem #1

EMPLOYEE

<u>Employee-ID</u>	Employee-Name	Address	Date-Employed
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EMPLOYEE SKILL

<u>Employee-ID</u>	<u>Skill</u>
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Derived attribute is “replaced” with the attribute actually maintained in the database. Transformation technique is not indicated at this level.

Multi-valued attribute is contained in a separate table.



Problem #2

Flight
<u>flight-id</u> (flight-number, date) number-of-passengers



Solution for Problem #2

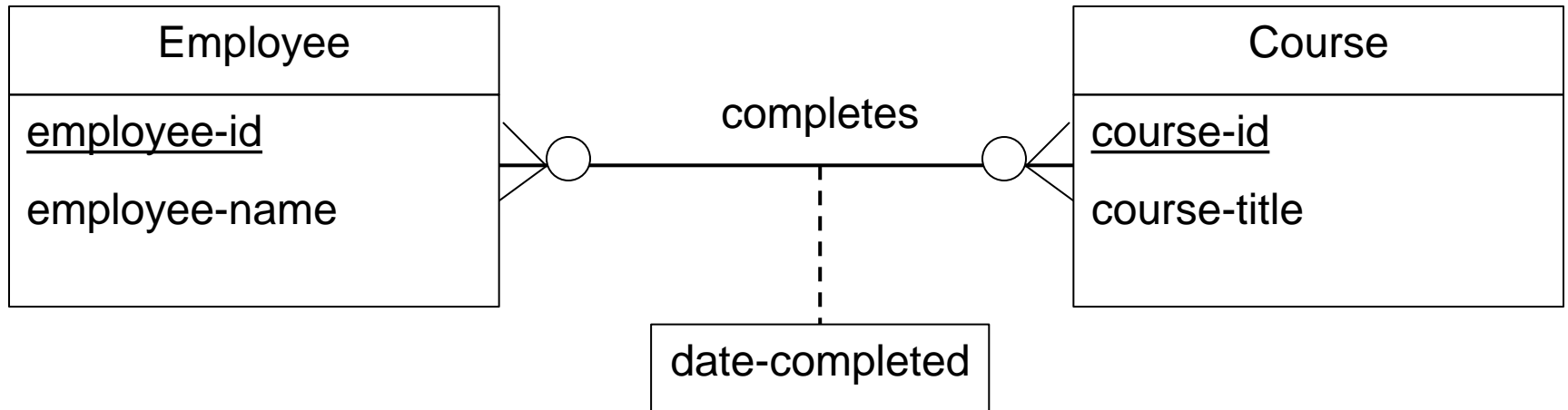
FLIGHT

<u>Flight-Number</u>	<u>Date</u>	Number-of-Passengers
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Composite attribute Flight-ID is replaced by both of the sub-component attributes of the original composite attribute. Note that since the original composite attribute was a key attribute that all of the sub-component attributes are now key attributes.



Problem #3



Solution for Problem #3

EMPLOYEE

<u>Employee-ID</u>	Employee-Name
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COMPLETION

<u>Employee-ID</u>	<u>Course-ID</u>	Date-Completed
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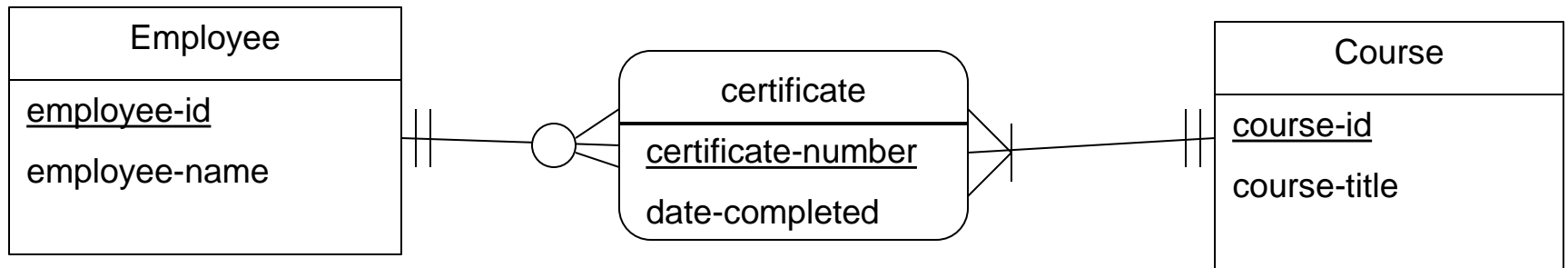
COURSE

<u>Course-ID</u>	Course-Title
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The M:M relationship is modeled as a third table.



Problem #4



Note that this is the same problem as #3, however, this time the relationship has been modeled as an associative entity rather than as a simple N:M binary relationship.



Solution for Problem #4

EMPLOYEE

<u>Employee-ID</u>	Employee-Name
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CERTIFICATE

<u>Certificate-No</u>	<u>Employee-ID</u>	<u>Course-ID</u>	Date-Completed
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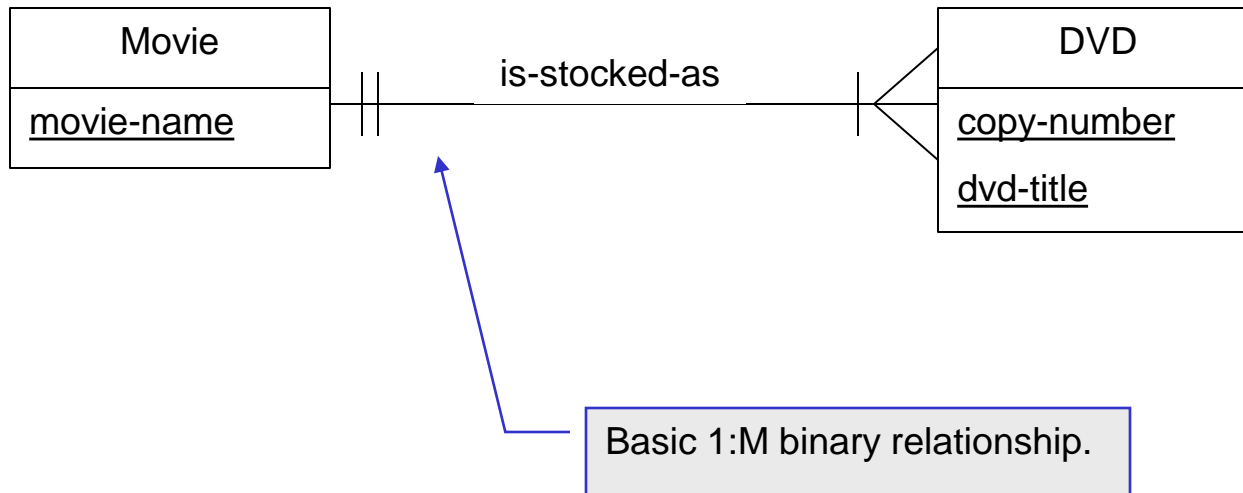
COURSE

<u>Course-ID</u>	Course-Title
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When the certificate is modeled as an associative entity and has an identifier (in this case the certificate number), that identifier becomes the key of the relation scheme with the identifiers in the two participating entity sets becoming foreign keys in the associative entity table.



Problem #5

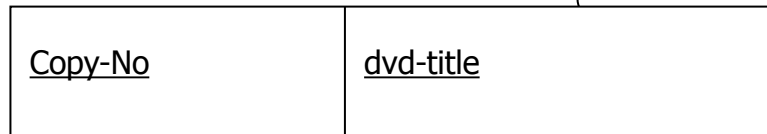


Solution for Problem #5

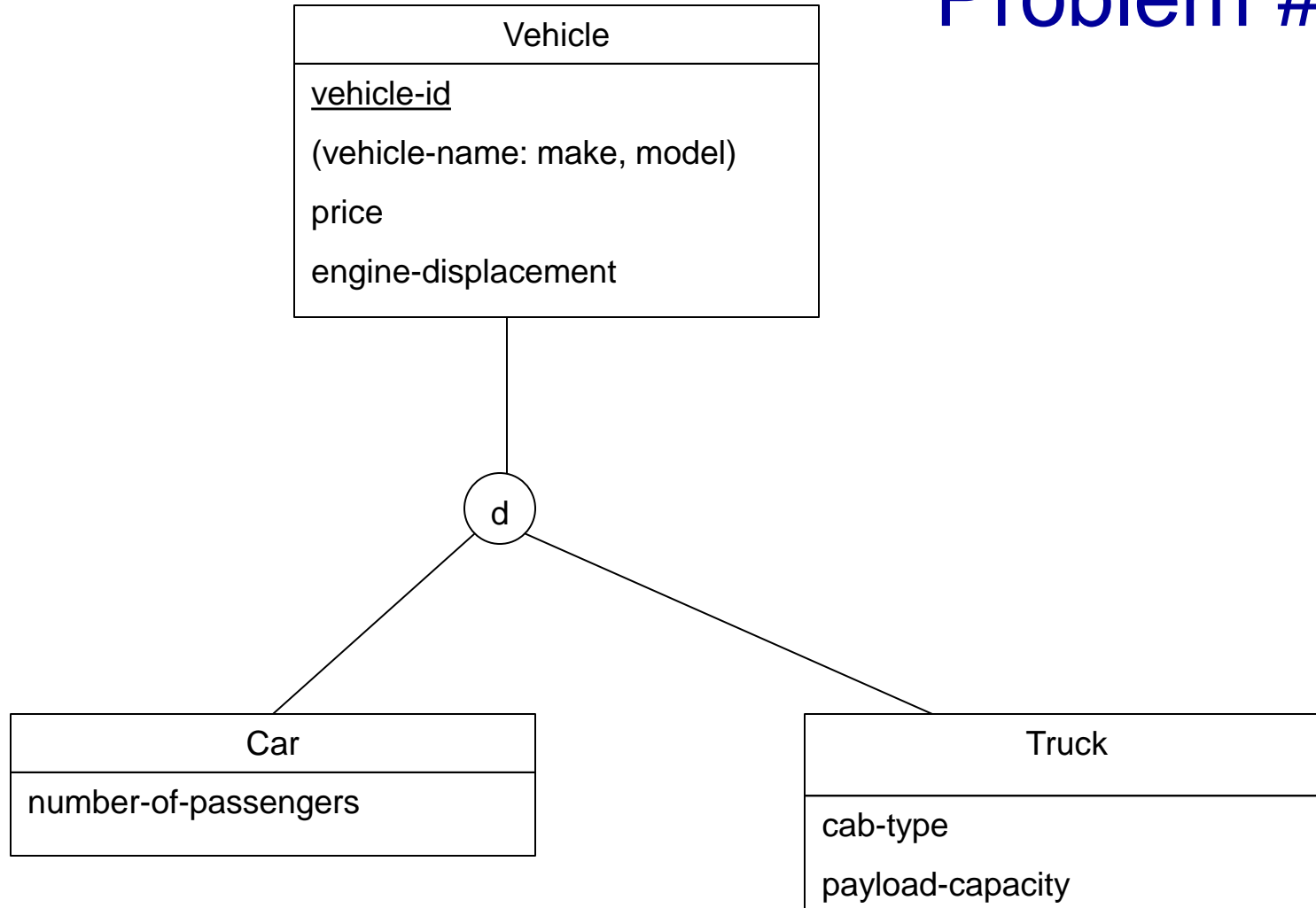
MOVIE



DVD



Problem #6



Solution for Problem #6

VEHICLE

<u>Vehicle-ID</u>	Price	Make	Model	Engine-Displacement	type
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CAR

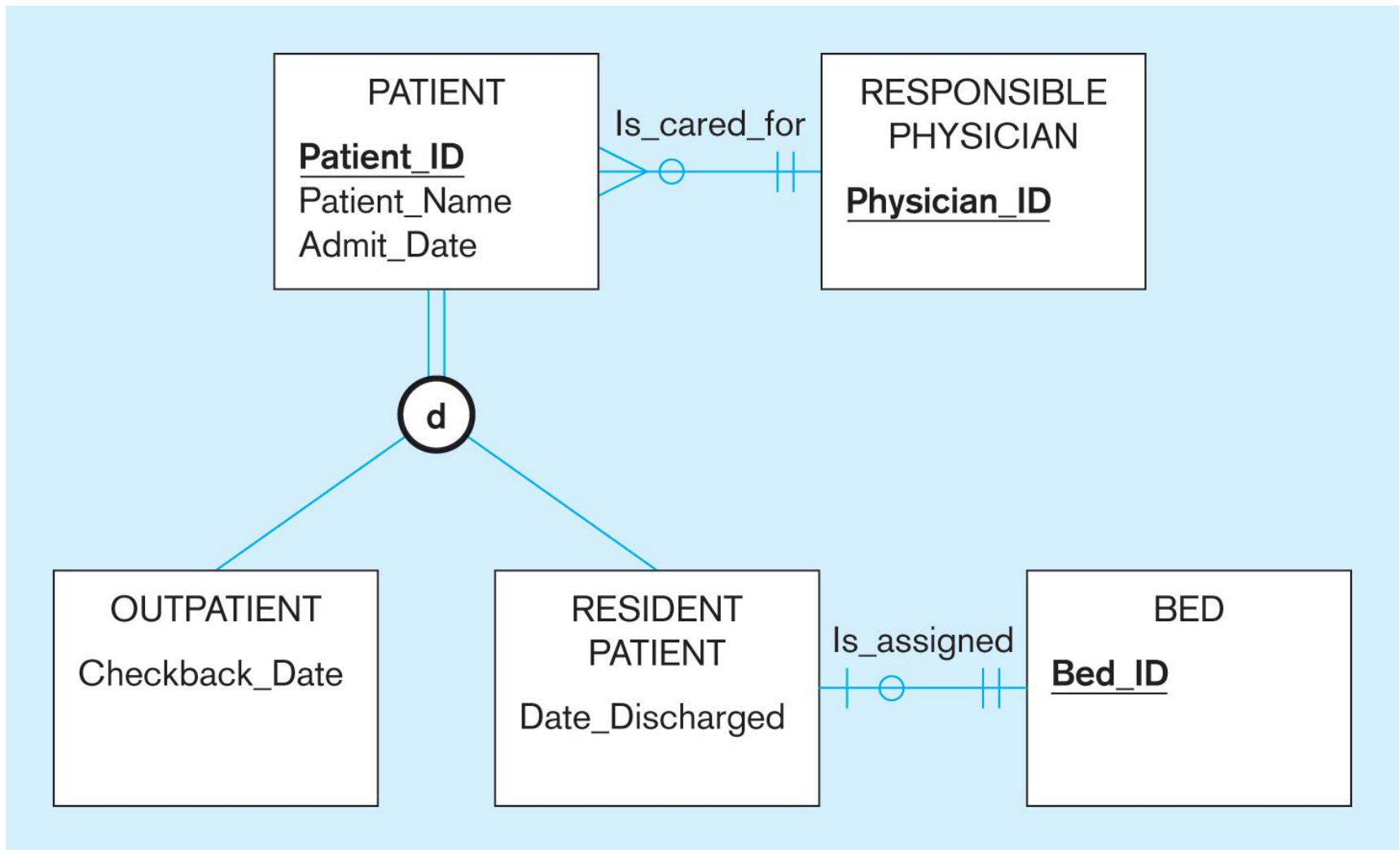
<u>C-Vehicle-ID</u>	No-of-Passengers
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TRUCK

<u>T-Vehicle-ID</u>	Cab-Type	Capacity
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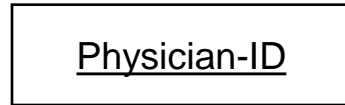


Problem #7

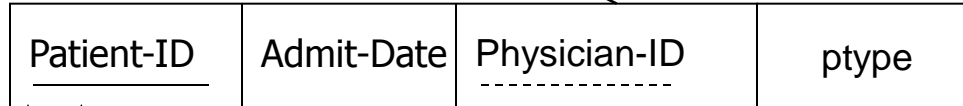


Solution for Problem #7

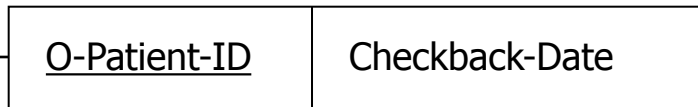
RESPONSIBLE PHYSICIAN



PATIENT



OUTPATIENT



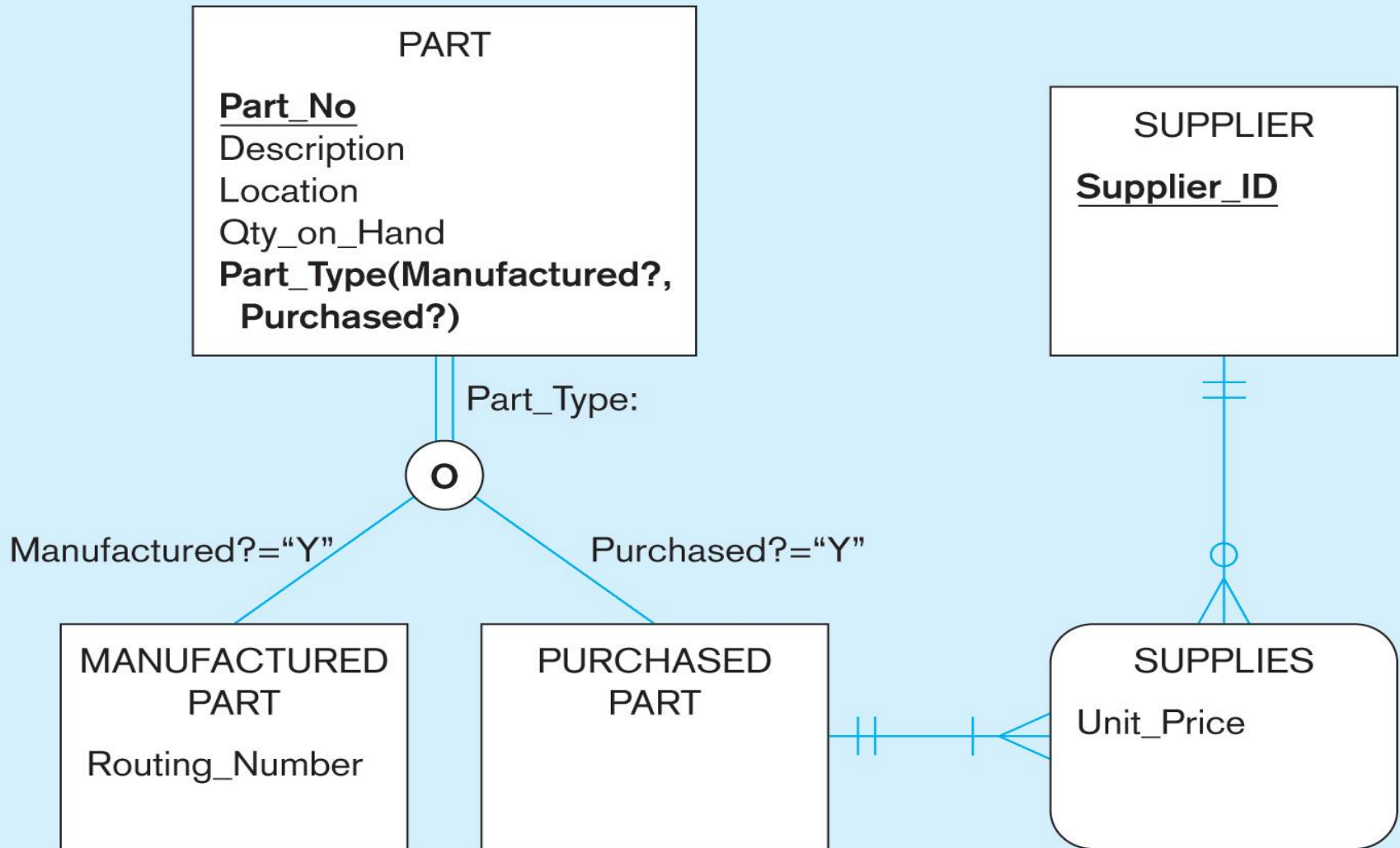
RESIDENT PATIENT



BED



Problem #8



Solution for Problem #8

