COP 4710: Database Systems
Fall 2013

ERD Practice Problems

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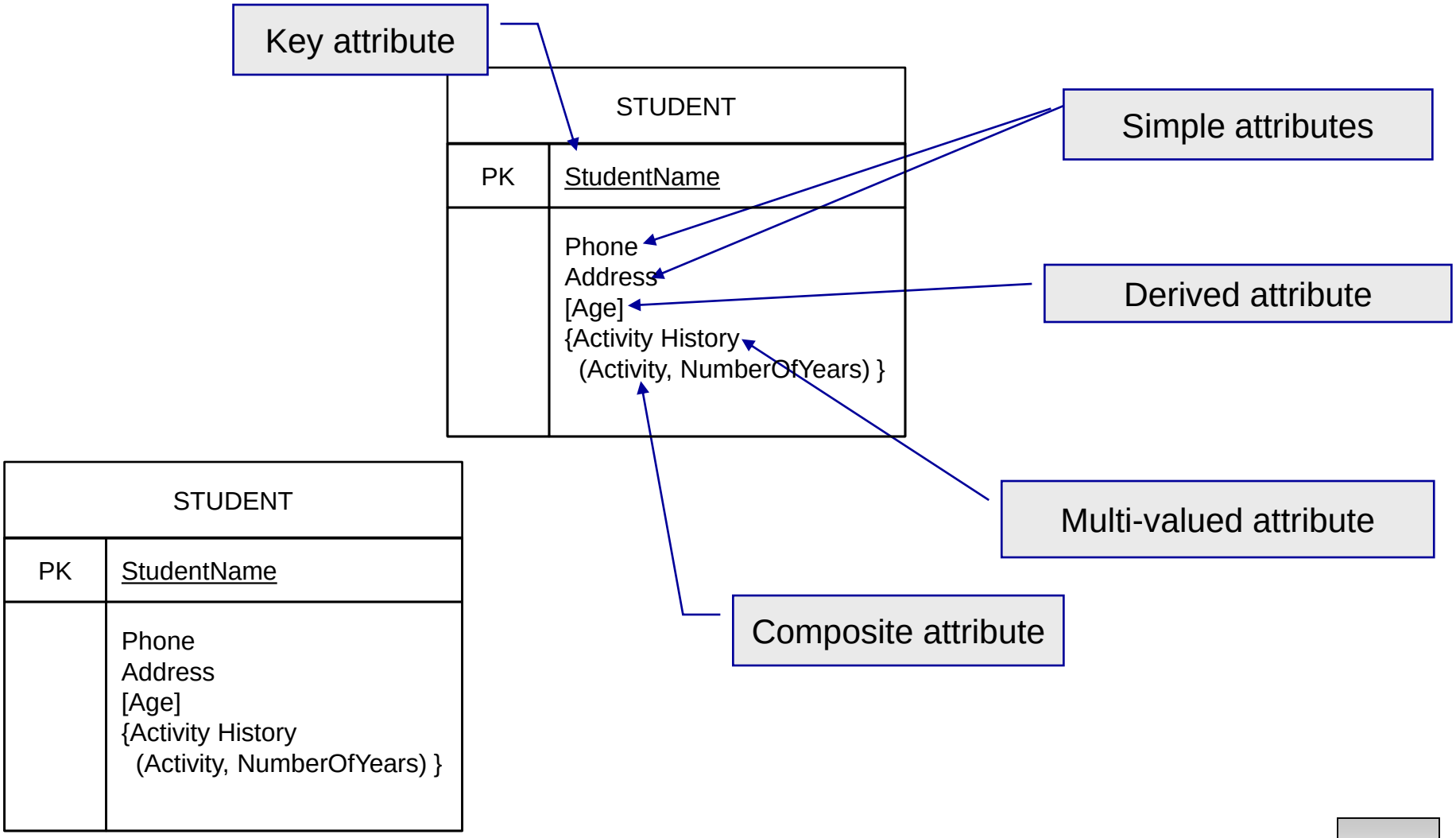
Scenario #1

- The entity type STUDENT has the following attributes: Student_Name, Address, Phone, Age, Activity, and No_of_years. Activity represents some campus-based student activity, and No_of_years represents the number of years the student has engaged in this activity.
- A given student may engage in more than one activity.

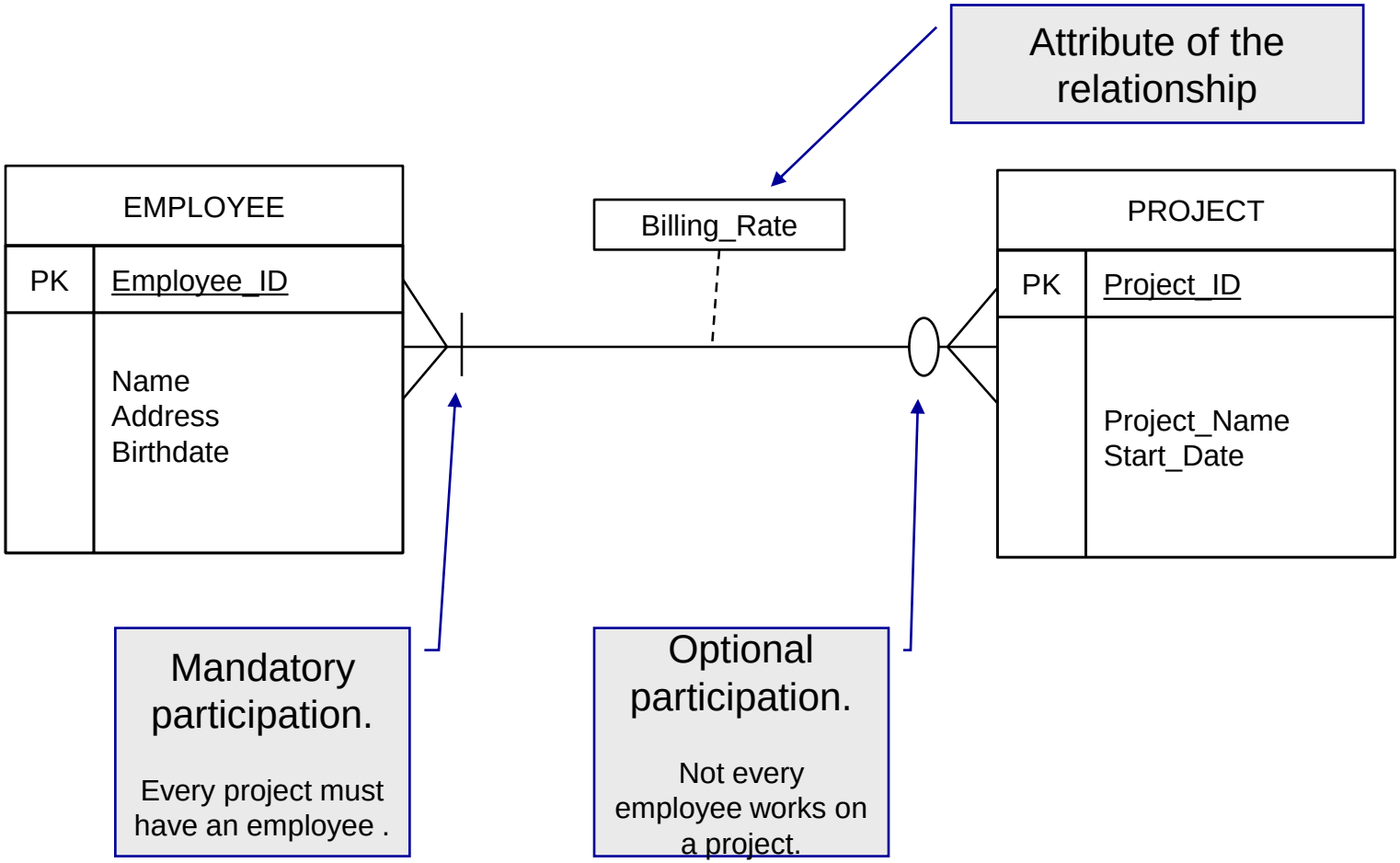
ERD For Scenario #1



Scenario #2

- A company has a number of employees. The attributes of EMPLOYEE include Emp_ID (identifier), Name, Address, and Birthdate.
- The company also has several projects. Attributes of PROJECT include Proj_ID (identifier), Proj_Name, and Start_Date.
- Each employee may be assigned to one or more projects, or may not be assigned to any project.
- A project must have at least one employee assigned to it, and may have any number of employees assigner to it.
- An employee's billing rate may vary by project, and the company wishes to record the applicable billing rate (Billing_Rate) for each employee when assigned to a particular project.

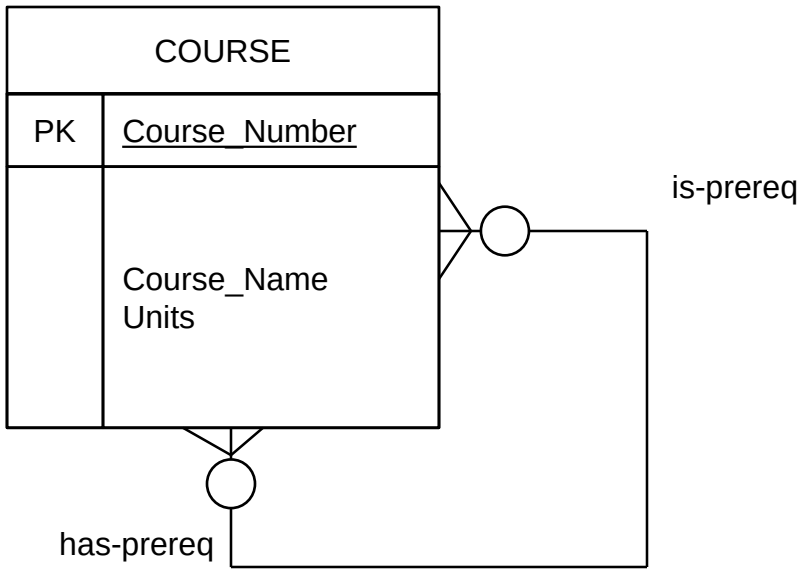
ERD For Scenario #2



Scenario #3

- A university has a large number of courses in its catalog.
- Attributes of COURSE include Course_num (identifier), Course_Name, and Credit_Hrs.
- Each course may have one or more different courses as prerequisites, or may have no prerequisites.
- Similarly, a particular course may be a prerequisite for any number of courses, or may not be a prerequisite for any other course.

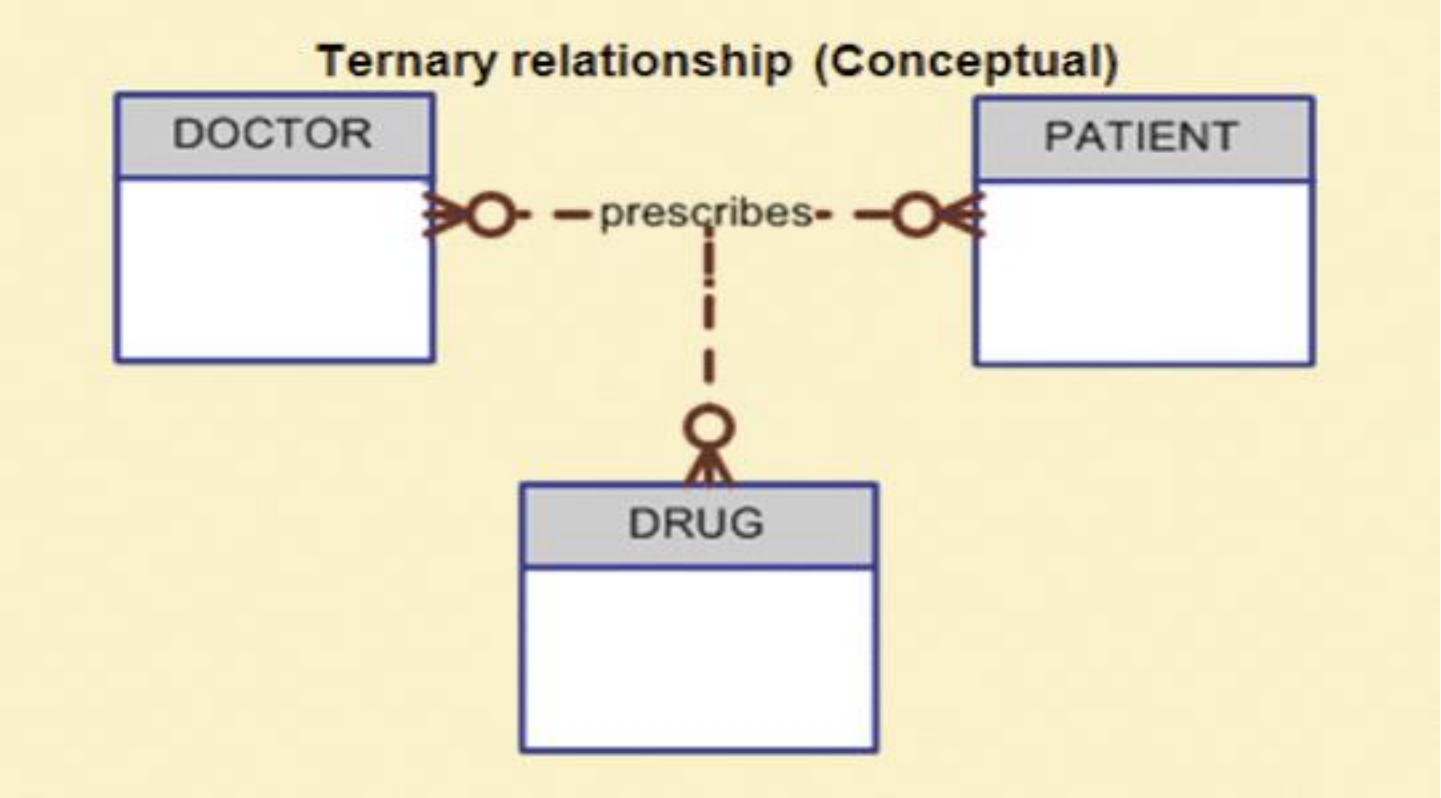
ERD For Scenario #3



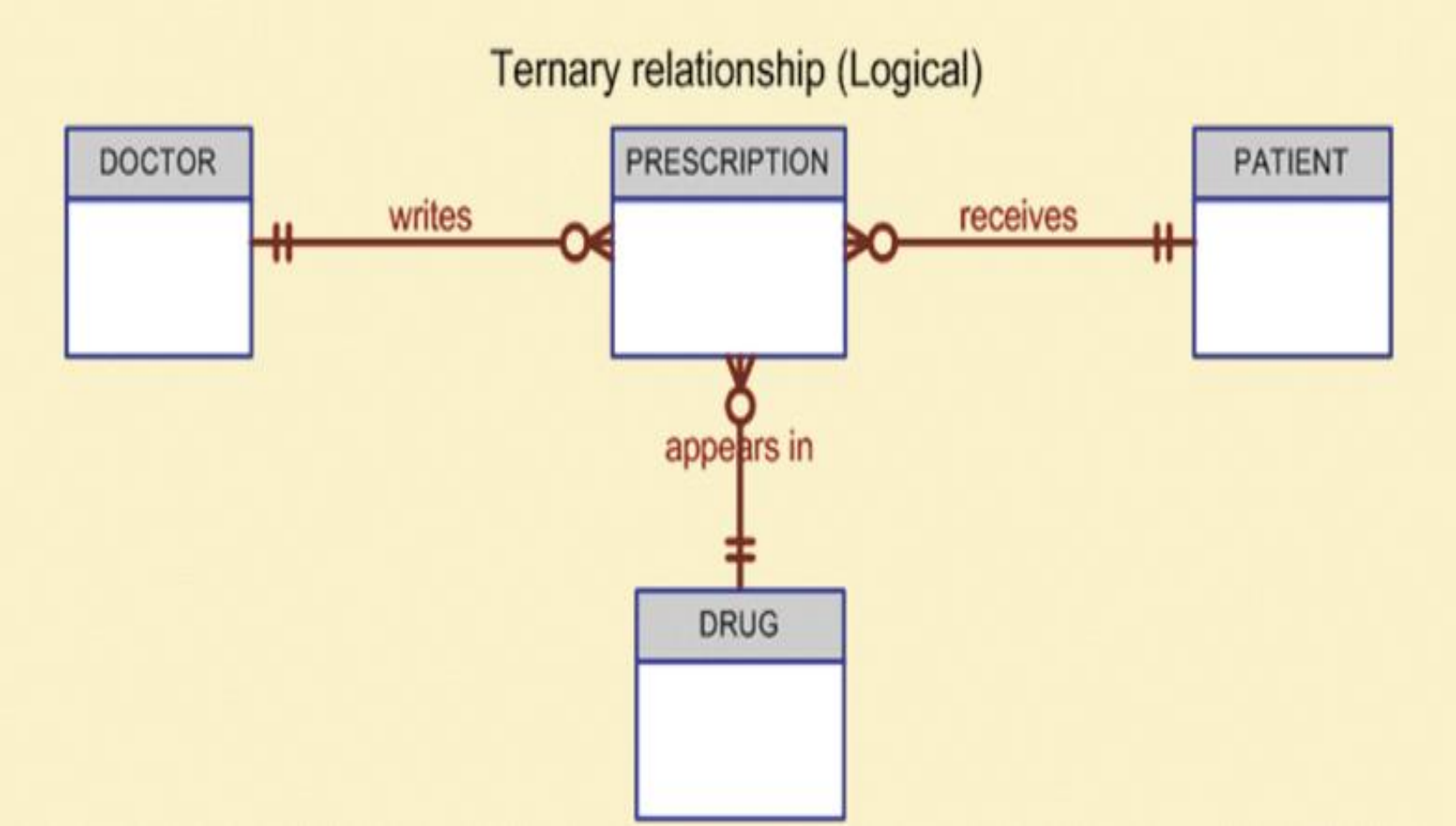
Scenario #4

- A DOCTOR writes one or more prescriptions.
- A PATIENT may receive one or more prescriptions.
- A DRUG may appear in one or more prescriptions.
- To simplify this scenario, assume that each prescription contains only one drug. In short, if a doctor prescribes more than one drug to a single patient, a separate prescription must be written.

Conceptual View For Scenario #4



Logical View For Scenario #4



An Instance For Scenario #4

Table name: DRUG

DRUG_CODE	DRUG_NAME	DRUG_PRICE
AF15	Afgapan-15	25.00
AF25	Afgapan-25	35.00
DRO	Droalene Chloride	111.89
DRZ	Druzocholar Cryptolene	18.99
KO15	Koliabar Oxyhexalene	65.75
OLE	Oleander-Drizapan	123.95
TRYP	Tryptolac Heptadimetric	79.45

Table name: PATIENT

PAT_NUM	PAT_TITLE	PAT_LNAME	PAT_FNAME	PAT_INITIAL	PAT_DOB	PAT_AREACODE	PAT_PHONE
100	Mr.	Kolmycz	George	D	15-Jun-1942	615	324-5456
101	Ms.	Lewis	Rhonda	G	19-Mar-2005	615	324-4472
102	Mr.	Vandam	Rhett		14-Nov-1958	901	675-8993
103	Ms.	Jones	Anne	M	16-Oct-1974	615	898-3456
104	Mr.	Lange	John	P	08-Nov-1971	901	504-4430
105	Mr.	Williams	Robert	D	14-Mar-1975	615	890-3220
106	Mrs.	Smith	Jeanine	K	12-Feb-2003	615	324-7883
107	Mr.	Diante	Jorge	D	21-Aug-1974	615	890-4567
108	Mr.	Wiesenbach	Paul	R	14-Feb-1966	615	897-4358
109	Mr.	Smith	George	K	18-Jun-1961	901	504-3339
110	Mrs.	Genkazi	Leighla	W	19-May-1970	901	569-0093
111	Mr.	Washington	Rupert	E	03-Jan-1966	615	890-4925
112	Mr.	Johnson	Edward	E	14-May-1961	615	898-4387
113	Ms.	Smythe	Melanie	P	15-Sep-1970	615	324-9006
114	Ms.	Brandon	Marie	G	02-Nov-1932	901	882-0845
115	Mrs.	Saranda	Hermine	R	25-Jul-1972	615	324-5505
116	Mr.	Smith	George	A	08-Nov-1965	615	890-2984

Table name: DOCTOR

DOC_ID	DOC_LNAME	DOC_FNAME	DOC_INITIAL	DOC_SPECIALTY
29827	Sanchez	Julio	J	Dermatology
32445	Jorgensen	Annelise	G	Neurology
33456	Korenski	Anatoly	A	Urology
33989	LeGrande	George		Pediatrics
34409	Washington	Dennis	F	Orthopaedics
36221	McPherson	Katye	H	Dermatology
36712	Dreifag	Herman	G	Psychiatry
38995	Minh	Tran		Neurology
40004	Chin	Ming	D	Orthopaedics
40028	Feinstein	Denise	L	Gynecology

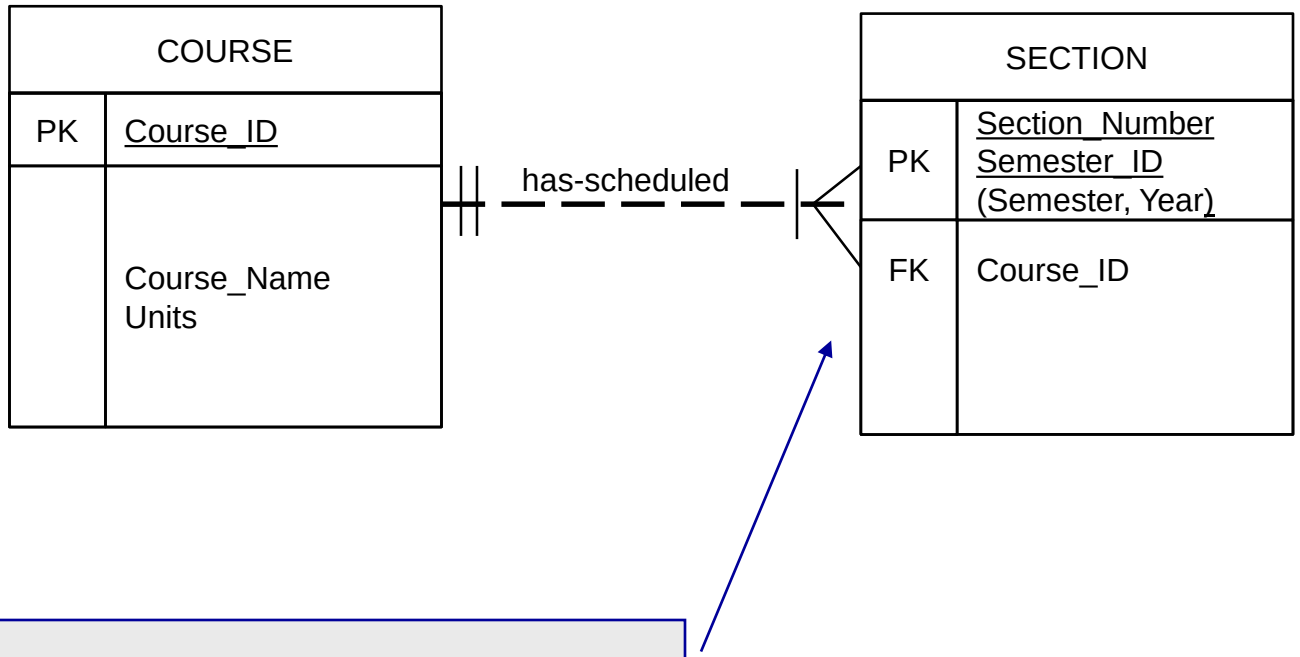
Table name: PRESCRIPTION

DOC_ID	PAT_NUM	DRUG_CODE	PRES_DOSAGE	PRES_DATE
32445	102	DRZ	2 tablets every four hours -- 50 tablets total	12-Nov-12
32445	113	OLE	1 teaspoon with each meal -- 250 ml total	14-Nov-12
34409	101	KO15	1 tablet every six hours -- 30 tablets total	14-Nov-12
36221	109	DRO	2 tablets with every meal -- 60 tablets total	14-Nov-12
38995	107	KO15	1 tablet every six hours -- 30 tablets total	14-Nov-12

Scenario #5

- A university course may have one or more scheduled sections, or it may not have a scheduled section.
- Attributes of COURSE include Course_ID (identifier), Course_Name, and Credit_Hrs.
- Attributes of SECTION include Section_Number and Semester_ID. Semester_ID is composed of two parts: Semester and Year. Section_Number is an integer that distinguishes one section from another for the same course but it does not uniquely identify a section.

ERD For Scenario #5



Section was modeled as a weak entity. It could have been modeled as a multi-valued attribute of course, however, this model allows a section of a course to have a relationship with another entity (think instructor or student)…the multi-valued attribute case would not allow this relationship.

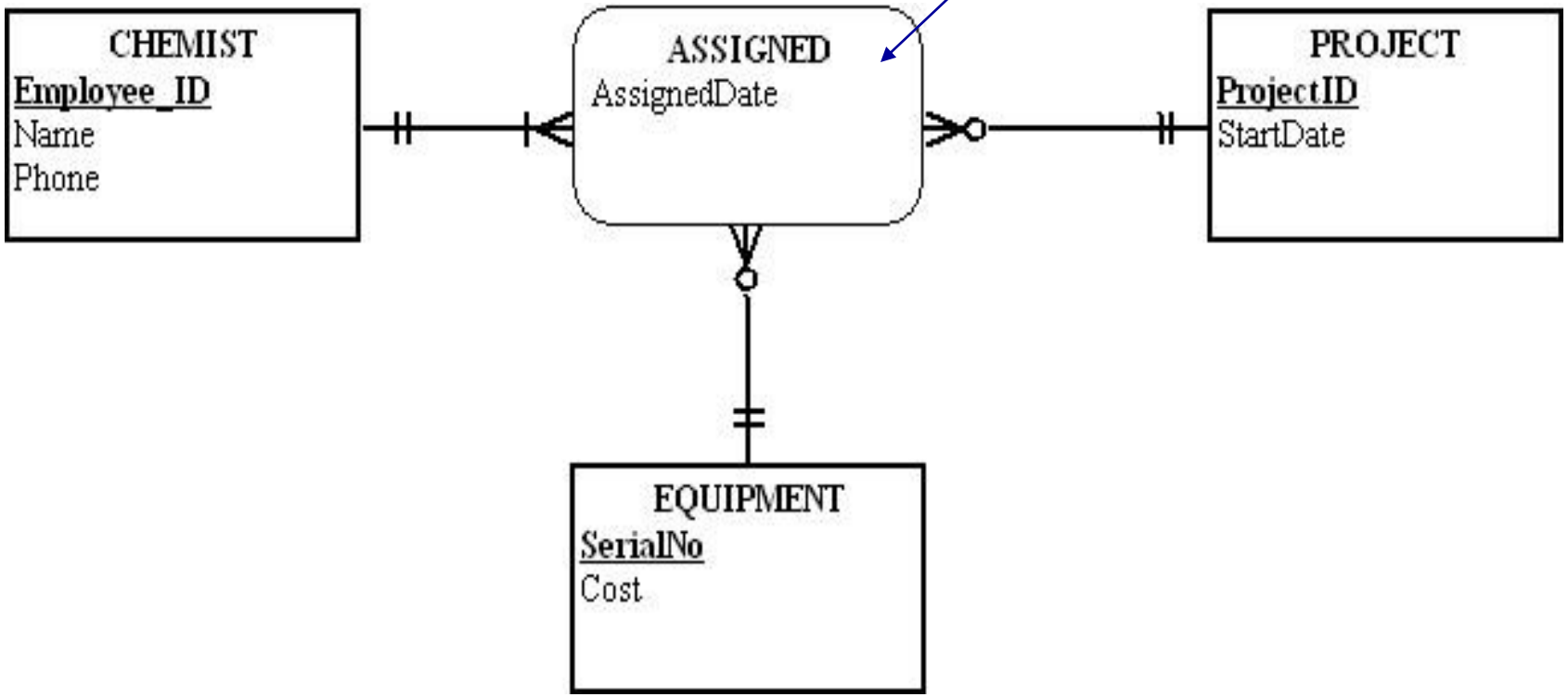
Scenario #6

- A laboratory has several chemists who work on one or more projects. Chemists may also use certain kinds of equipment on each project. Attributes of CHEMIST include Employee_ID (identifier), Name, and Phone_no.
- Attributes of PROJECT include Project_ID (identifier) and Start_Date.
- Attributes of EQUIPMENT include Serial_no. and Cost.
- The organization wants to record Assign_Date – that is, the date when a given equipment item was assigned to a particular chemist working on a specified project.
- A chemist must be assigned to at least one project and one equipment item.
- A given piece of equipment need not be assigned, and a given project need not be assigned either a chemist nor a piece of equipment.

ERD For Scenario #6

This relationship was created to show what projects a chemist works on. In the case where no equipment is used for a project, there would be no way of showing an assignment using the Assigned relationship.

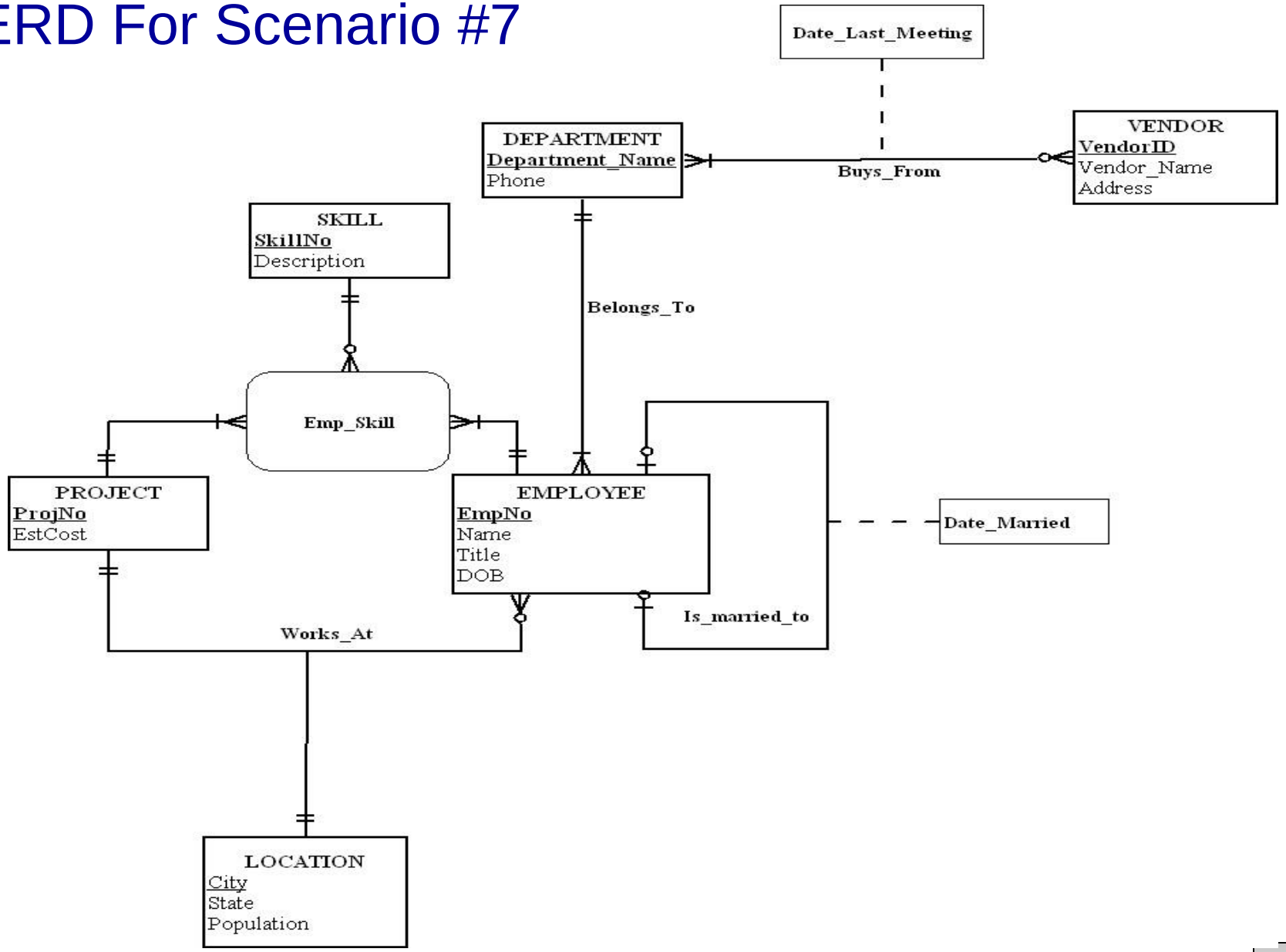
All three entities participate in an assignment. However, EQUIPMENT and PROJECT do not need to participate in any assignments. All entities can have multiple assignments.



Scenario #7

- Projects Inc., is an engineering firm with approximately 500 employees. A database is required to keep track of all employees, their skills, assigned projects, and departments in which they work.
- Every employee has a unique number assigned by the firm, a name, and date of birth. If an employee is married to another employee of the firm, the data of the marriage and who is married to whom must be stored; however, no record of marriage is required if an employee's spouse is not also an employee. Each employee has a job title. Each employee does only one type of job at a time, and we only need to retain information about an employee's current job.
- There are 11 different departments in the firm, each with a unique name. An employee can report to only one department. Each department has a phone number.
- To procure various types of equipment, each department deals with many vendors. A vendor typically supplies equipment to many departments. We need to store the name and address of each vendor and the date of the last meeting between a department and a vendor.
- Many employees can work on a project. An employee can work on many projects, but can only be assigned to at most one project in a given city. For each city, we are interested in its state and population.
- An employee can have many skills, but they can use only a given set of skills on a particular project. Employees use each skill that they posses in at least one project. Each skill is assigned a number, and we will record a short description of each skill.
- Projects are distinguished by project numbers and we must store the estimated cost of each project.

ERD For Scenario #7



Scenario #7

- Each semester, each student must be assigned an advisor who counsels students about degree requirements and helps the students register for classes.
- Each student must register for classes with the help of an advisor, but if the student's assigned advisor is not available, the student may register with any advisor.
- We must keep track of students, the assigned advisor for each, and the name of the advisor with whom the student registerd for the current term.

ERD For Scenario #7