CS564 Project: Personal Database Application (PDA) part #2

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Modified E/R Diagram

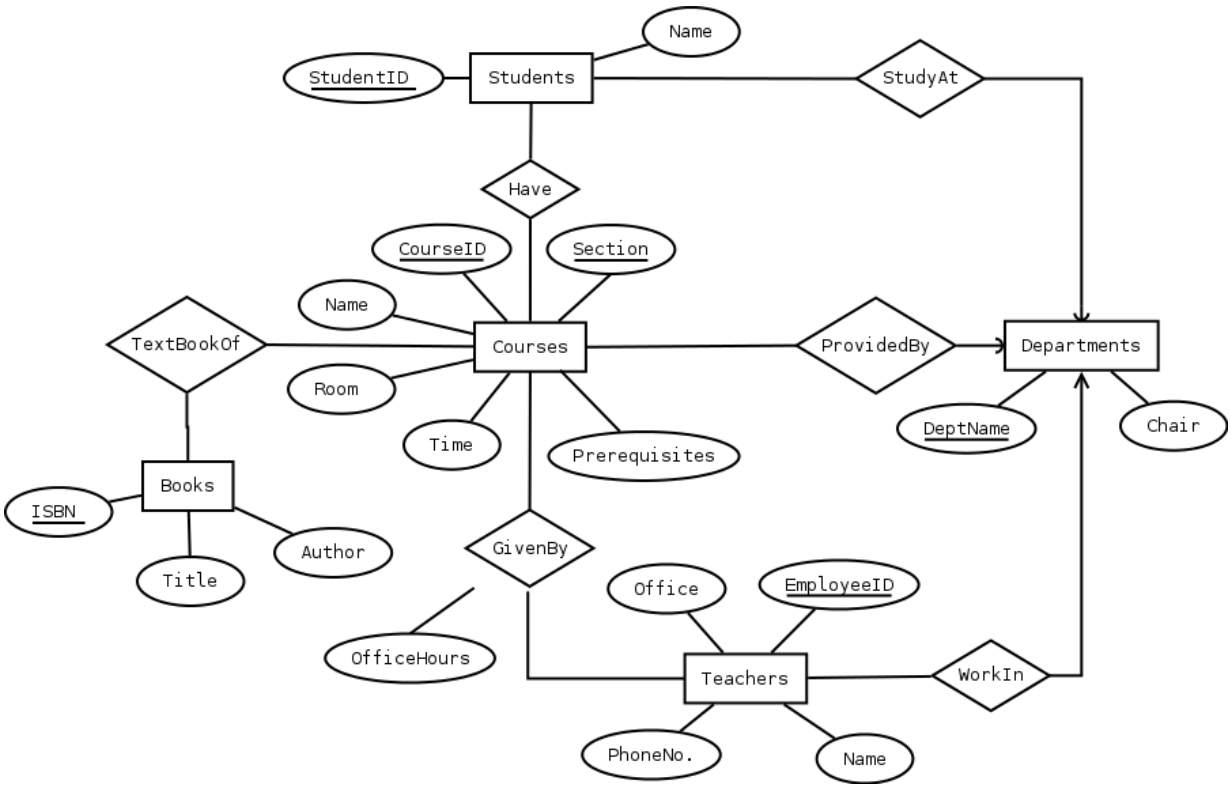

Figure 1: E/R diagram of Course Register System

Comment: The OfficeHours now is attached to the Relationship as an attribute. Assume one course can have multiple teachers, their may all have their own OfficesHours.

1 Relations and FDs

From Entity:

1. Students(StudentID, Name, DeptName)
   StudentID → Name.
   StudentID → DeptName
   Comment:
   - Assume that it is possible that two students with the same name are in exactly one department. So Name with DeptName can not uniquely define a student. Thus Name DeptName can not define StudentID.
   - All the FD's for this relation are in BCNF, since their left sides are superkey.
2. Departments(DeptName, Chair)
   DeptName → Chair.
   Comment:
   - Assume the Chairs of different departments may be the same person or have the same name. So Chair can not define DeptName.
   - All the FD's for this relation are in BCNF, since their left sides are superkey.
3. Teachers(EmployeeID, Office, PhoneNo, Name, DeptName)
   Basic FD's
   EmployeeID → Office
   EmployeeID → PhoneNo
   EmployeeID → Name
   EmployeeID → DeptName
   Comment:
   - Suppose PhoneNO is not unique for each person. Several persons may share the office and share a phone.
   - All the identified FD's are in BCNF.
4. Books(ISBN, Title, Author)
   ISBN → Title
   ISBN → Author
   Comment:
   - All the FD's for this relation are in BCNF, since their left sides are superkey.
5. Courses(CourseID, Section, Prerequisities, Time, Room, CourseName, DeptName)
   CourseID Section → Prerequisities
   CourseID Section → Time
   CourseID Section → Room
   CourseID Section → CourseName
   CourseID Section → DeptName
   Time Room → CourseID Section
   Comment:

- Since Time Room can uniquely define CourseID Section, Time Room can also serve as key for this relation.
- We can infer: Time Room → Prerequisities CourseName DeptName
- Time Room → CourseID Section is not in BCNF. However, the right side are primes, so it is in 3NF.

From Relationships:

1. TextBookOf(<u>CourseID</u>, <u>Section</u>, <u>ISBN</u>)
   CourseID, Section →→ ISBN

   Comment: The identified MVD is in 4NF since all attributes appear.

2. HaveClass(<u>StudentID</u>, <u>CourseID</u>, <u>Section</u>)
   StudentID →→ CourseID, Section

   Comment: The given MVD is in 4NF since all attributes appears.

3. GivenBy(<u>CourseID</u>, <u>Section</u>, <u>EmployeeID</u>, OfficeHours)
   CourseID Section →→ EmployeeID OfficeHours
   CourseID Section EmployeeID → OfficeHours

   Comment: The MVD is trivial since leftside + rightside are all the attributes. The left side of the FD is the superkey. So no violation.

4. Since relationships **WorkIn, StudyAt, ProvidedBy** are many-to-one, so the are integrated into Relations of relevant entities.

CS564 Project: Personal Database Application (PDA) part #1

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General Description

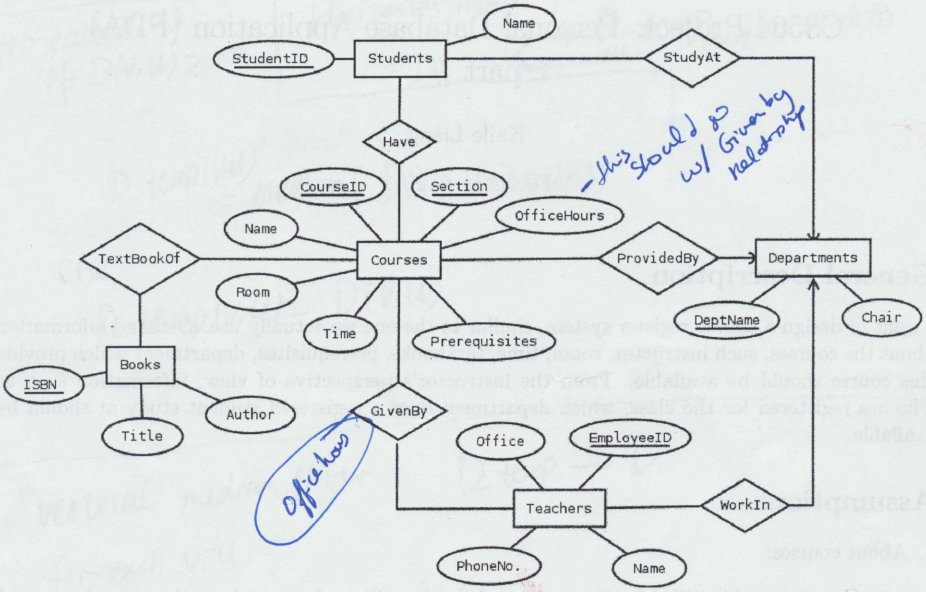
I want to design a course register system, similar to the one we actually use. Detailed information about the courses, such instructor, room, time, textbooks, prerequisites, department which provide this course should be available. From the instructor's perspective of view, information such as who are registered for the class, which department does a registered student study at should be available.

Assumptions

1. About courses:
   - Courses are identified by CourseID and Section. Since for one class, there can be several sections, such as online, inclass, remote.
   - Courses are provided by *exactly one* department. If two departments want to cooperate together to provide one class, this class has to be registered under only one department.
   - One course can have more than one teachers.
2. About teachers:
   - Assume teachers belong to *at most* one department, since teachers may come from companies, labs and so on.
   - Teacher from one department may teach classes in another department.
   - Assume teachers can cooperate to give one course.
3. About Students: Assume students study at *exactly one* department.
4. About Books: Assume one course can have more than one textbook, and one book can be textbook of several courses.

good!

E/R Diagram



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