06. Database Design Case Studies [Solved]

[PM Jat, DAIICT, Gandhinagar]

#1: Company Schema [elmasri/navathe]

We have employees. We maintain eno (unique), fname, minit, lname, dob, gender information of every employee. We maintain dno (unique), depname of departments. We also record department locations (city); a department might be located in multiple cities.

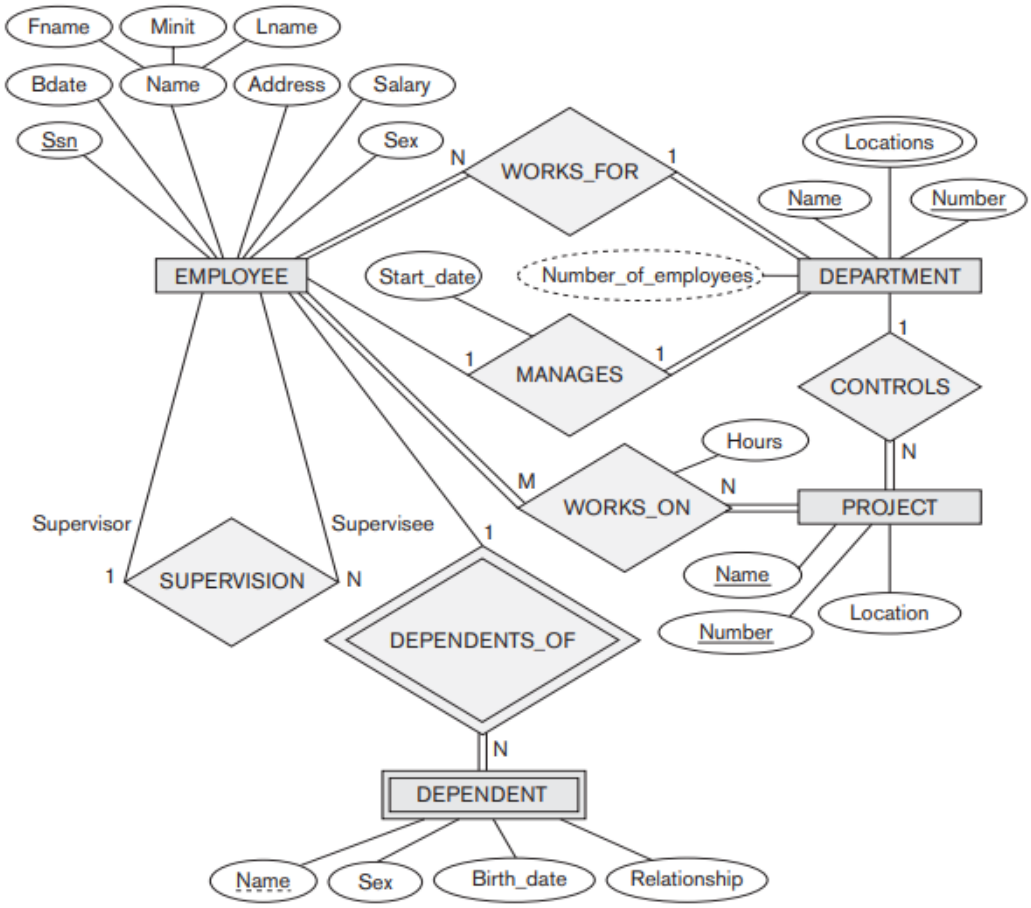
Every employee is assigned to a department; that department is called work department of the employee. It is mandatory that every employee has some department as work department; however an employee can have only one department as work department.

Every Department (necessarily) has a manager. Any employee can becomes a Manager. AN employee can be manager of at max one department.

An employee may have a supervisor; not necessary everyone has a supervisor. An employee can supervise more than one employee.

There are number of projects company work on. We record pno (unique), pname for each project. Projects are controlled by some (but only one) department. Employees work on projects; an employee can work on any number of projects. We record number of hours an employee work on a project.

We also record information of dependents of employees; we keep dep_name, gender, and relation information for every dependent of an employee.


Fname
Minit
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Sex
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Relationship

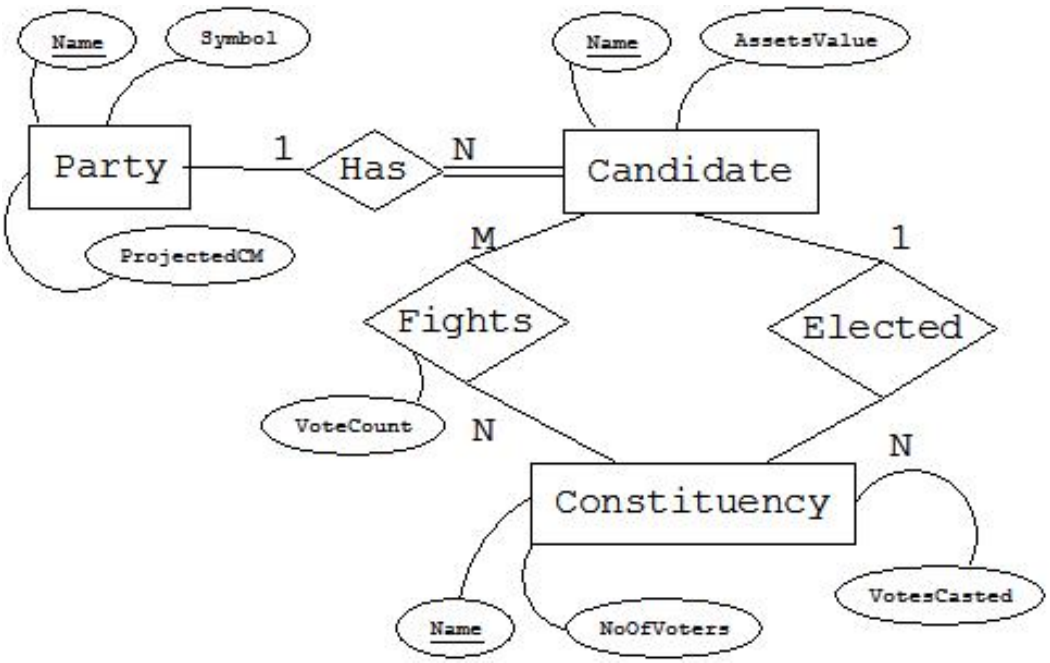
#2: Polling for MLA elections

Suppose polling data of an assembly election in an Indian state are to be recorded. Below is a short introduction to the scenario and terms used. Assembly Constituency: a political territory from where an assembly member is to be elected. Each constituency has definite set of voters. Election Candidate: At each constituency various political party nominate their candidates in the election race. Normally there are many candidates fighting elections at a constituency. When polling starts, a voter votes to only one candidate. Once voting is done, counting is done, and candidate with maximum votes is declared as winner. The winner candidates is said to be an elected Member of Legislative Assembly (MLA) from that constituency.

Let us decide to record following data –

- For political parties: Name of party, party symbol, and name of projected chief minister.
- For constituency: Name, and Number of voters. Assume constituency name to be unique.
- For candidate: Candidate name, value of assets declared. Let candidate names be unique.
- As counting is done, we record vote count for each candidate (for each constituency it fight at), votes casted in each constituency, and name of elected candidate for each constituency.

Assume: One candidate belongs to only one party but can be candidate (fighting election) from more than one constituency. Also, one candidate can get elected from more than one constituency



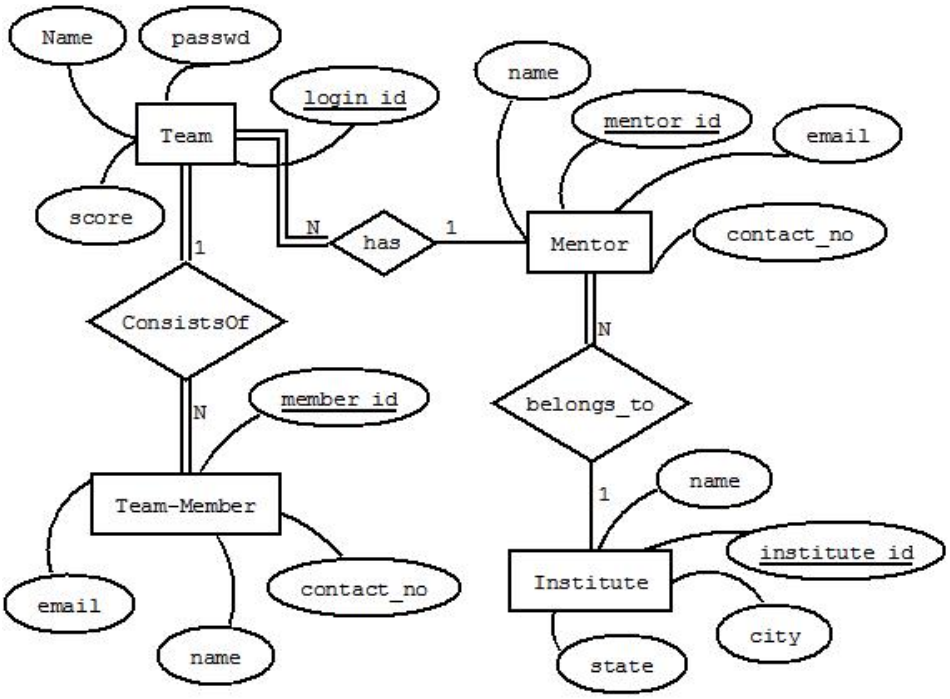
#3: The Great Mind Challenge

IBM organizes an annual event called The Great Mind Challenge (TGMC). A number of Teams from various institutes around the country participate in the event. There can be more than one team from an institute.

Every participating team has to register online at TGMC site www.tgmc.in. While registering teams are required to furnish following details- Team Name, Login ID, Password, and details of team members. For each team member, name, email, and contact number are captured. Each Team has a faculty mentor from same institute. Mentor Details- Name, Designation, email, and contact number are also furnished on the time of registration. A faculty can be mentor for more than one team.

At the end of event, Winner, Runner teams are declared. In addition appreciation to other top-10 teams is also given.

The objective of building this database is that the organizer is able to maintain records of all teams registered for the event and for there after math. Motivated with various statistical summaries, city and state of institute is also recorded.



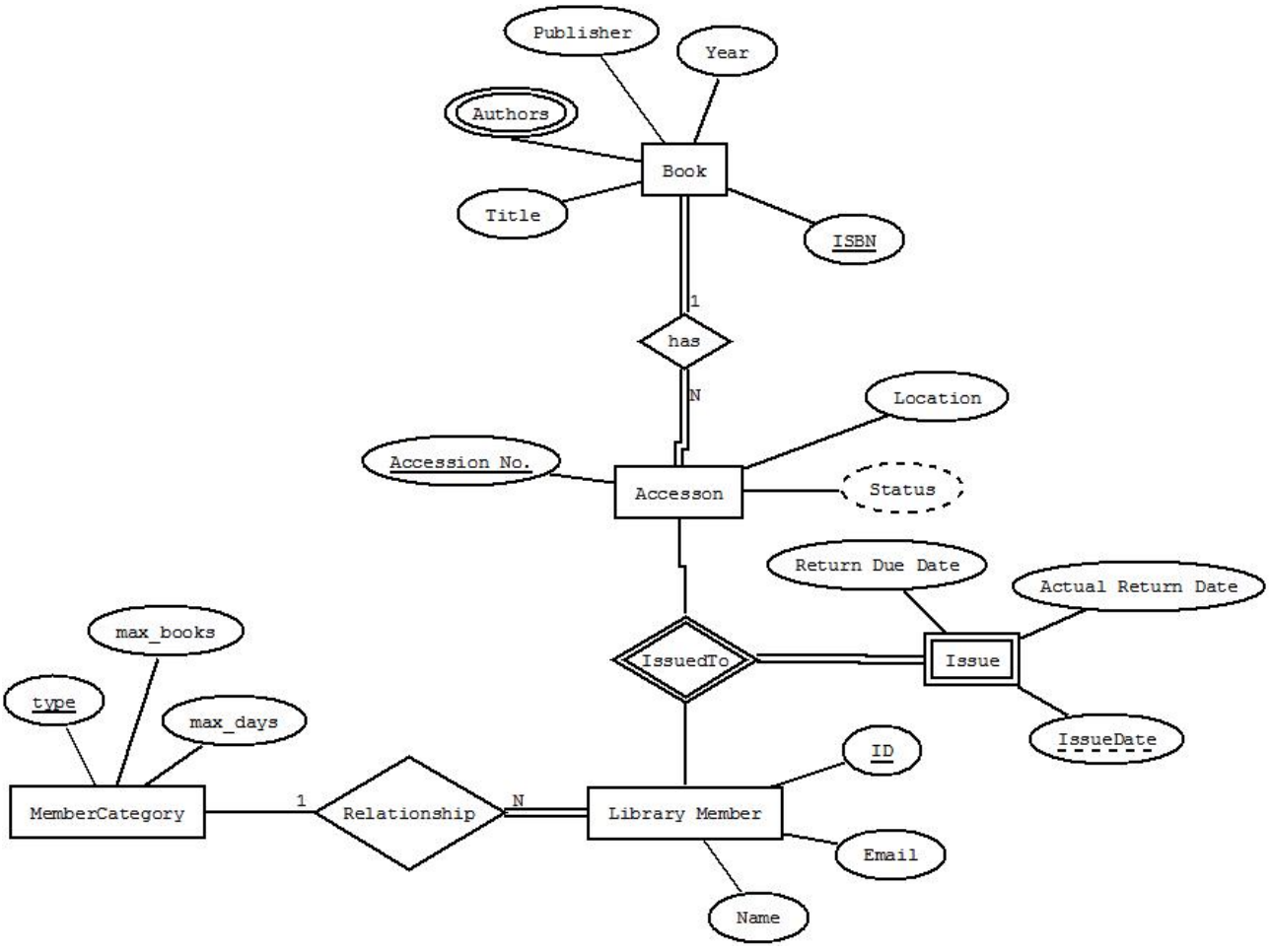
#3: Library Database

Objective of building Database: Keeps records of books, library members, issues and returns. Let us be limited to books only.

In Library system there is notion of Accession. Every copy of book is given a unique accession number in the library. Suppose there are five copies of book “Database Systems” by elmasri/navathe, each copy would be given different accession numbers. Individual copy of book is called as accession in library.

Book issue and returns – keeps record of date of issue, due date, date of actual return etc.

Library Members: Let us say we record ID, Name, Email, and Phone number of all the library members. Assume there are three types of library members: Faculty, Student, and Staff. Category of member decides number of books that can be issued to a member, maximum number of days for an issue.



#4: DA-Acad

Scope of Database:

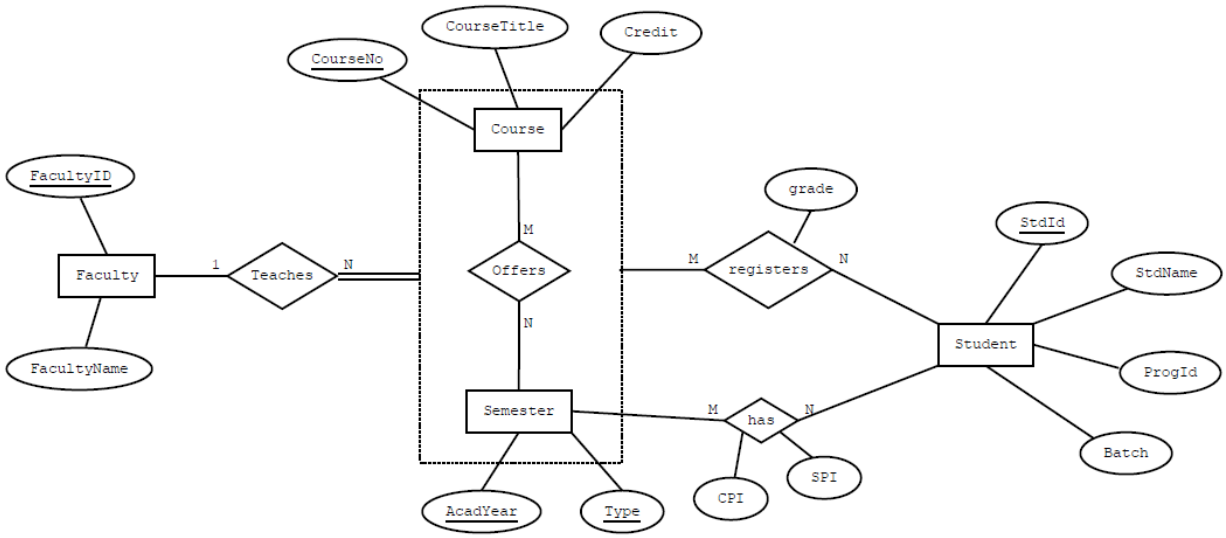
It involves keeping records of all academic details of students: courses take, grades earned, spi of every semester, and cpi at the end of every semester. Details of courses offered in each semester, instructor associated with a courses offering.

Description:

DAIICT offers a number of ug and pg programs. Students are admitted under various programs. One student can study in one program only at a time. An Academic year typically begins in the month of last week of July and ends around middle of july next year. For this year academic years are represented by start-year and end-year; for example this is Academic year 2011-12. For database purposes we can use only start year to represent an academic year; that is academic year 2011 (represents 2011-12).

An academic year consists of three semesters named as Autumn, Winter, Summer. In every semester a number of courses are offered. Each offering gets an instructor assigned. A number of students register in a course-offering. At the end of semester grades are awarded to every registered student in all offered courses in a semester. Based on grade, student earn and credit of the courses, SPI of student is computed for that semester, and also resultant CPI updated.

For students, typically we record attributes: Student ID, Student Name, Batch (i.e., year of registration), and CPI. For each course we need to record CourseNo, Course Title, and Credit. Programs at DAIICT have codes like '01' for B.Tech.(ICT), '11' for MTech, '12' for MScIT, or so.



#5: Personal Accounting System

Bank Account

- ID, Bank, AccNo, Balance

Expenditure:

- Have expenditure heads, for each head we have budget assigned; any time I should be able add more heads.
- Actual expenditures recorded as following
    - Date, Head, Amount, AccountNo

Income:

- Have heads like
    - Salary, Rent, Interest Earned, Other
- Income is recorded as following
    - Date, Head, Amount, Account