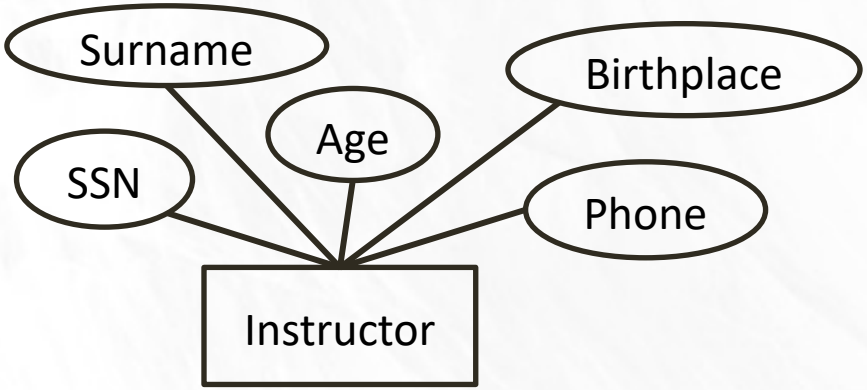
Recitation
ER Diagrams

Source

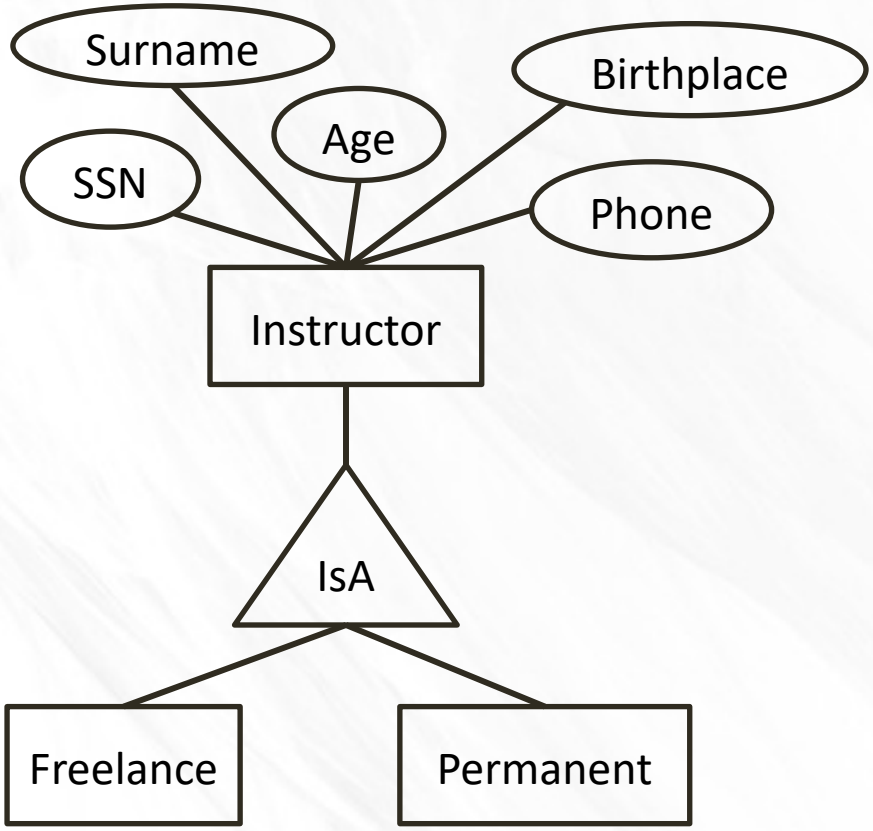
- Database Systems by Atzeni et. al.
  - Example from chapter 6.1 and 6.6
- http://dbbook.dia.uniroma3.it/dbbook.pdf

We wish to create a database for a company that runs training courses. For this, we must store data about the trainees and the instructors. For each course participant (about 5000), identified by a code, we want to store the social security number, surname, age, sex, place of birth, employer's name, address and telephone number, previous employers (and period employed), the courses attended (there are about 200 courses) and the final assessment of each course. We need also to represent the seminars that each participant is attending at present and, for each day, the places and times the classes are held. Each course has a code and a title and any course can be given any number of times. Each time a particular course is given, we will call it an 'edition' of the course. For each edition, we represent the start date, the end date, and the number of participants. If a trainee is a self-employed professional, we need to know his or her area of expertise, and, if appropriate, his or her title. For somebody who works for a company, we store the level and position held. For each instructor (about 300), we will show the social security number, surname, age, place of birth, the edition of the course taught, those taught in the past and the courses that the tutor is qualified to teach. All the instructors' telephone numbers are also stored. An instructor can be permanently employed by the training company or can be freelance.

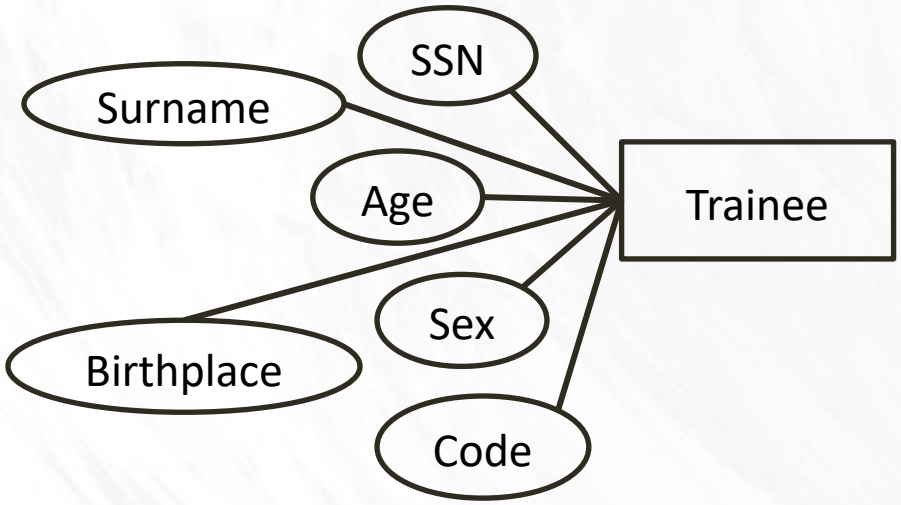
Instructor



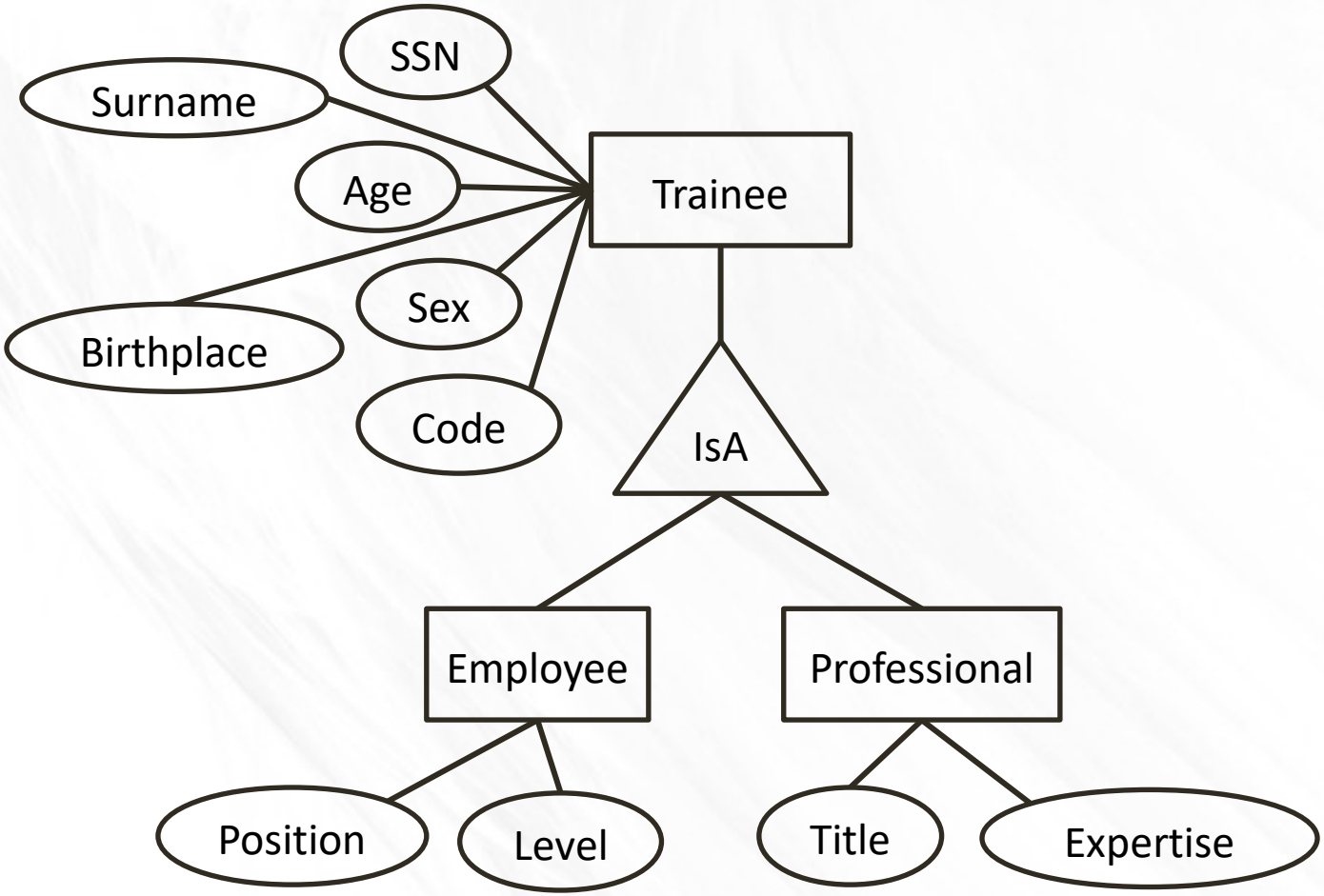
Instructor


Surname
Birthplace
Age
SSN
Phone
Instructor
IsA
Freelance
Permanent

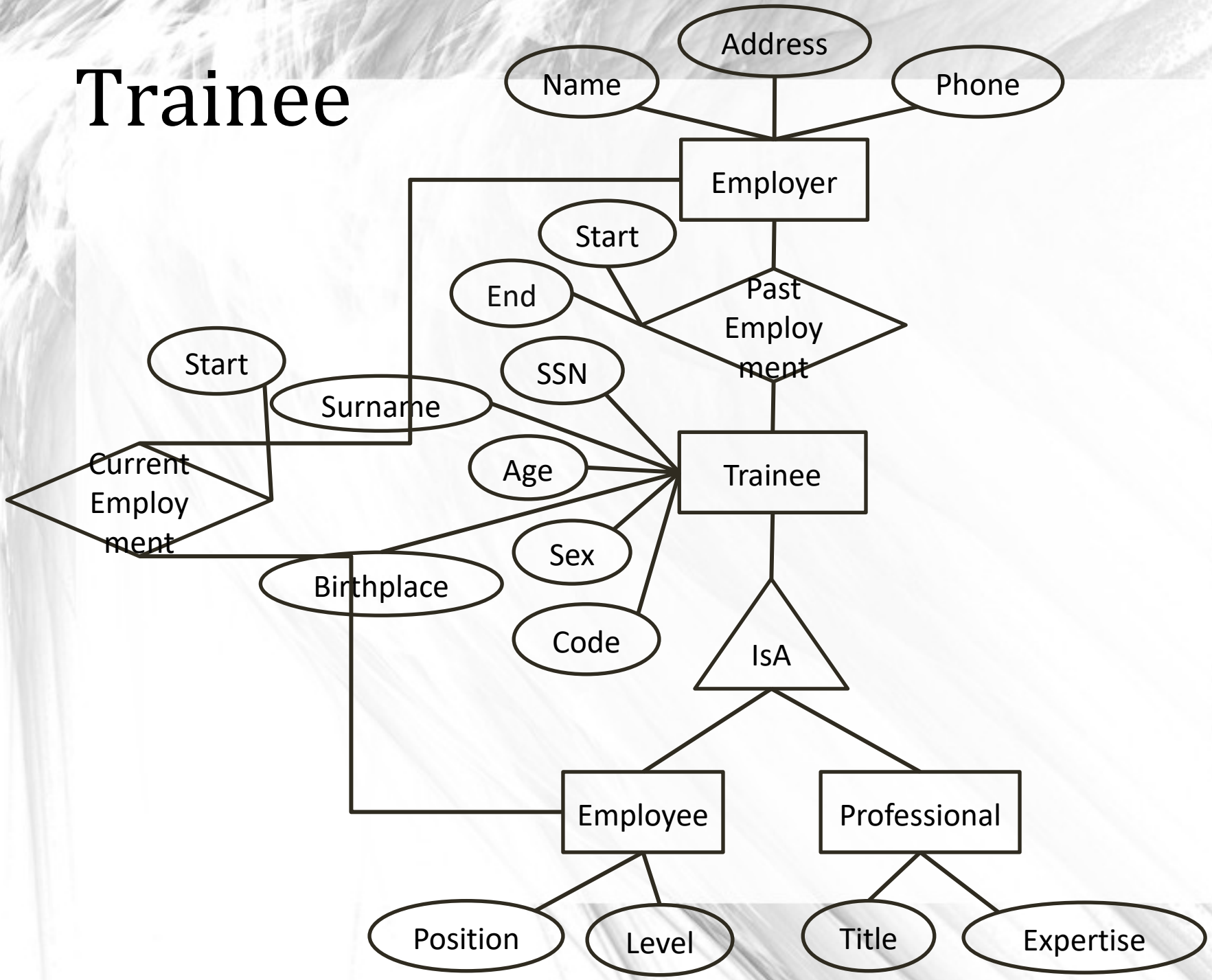
Trainee



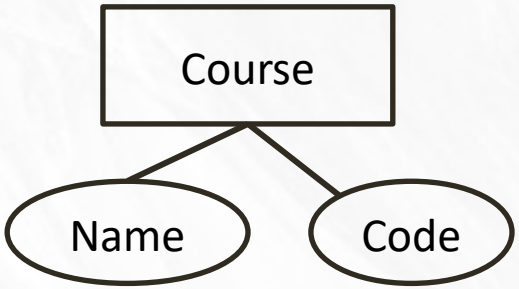
Trainee


SSN
Surname
Age
Trainee
Sex
Birthplace
Code
IsA
Employee
Professional
Position
Level
Title
Expertise

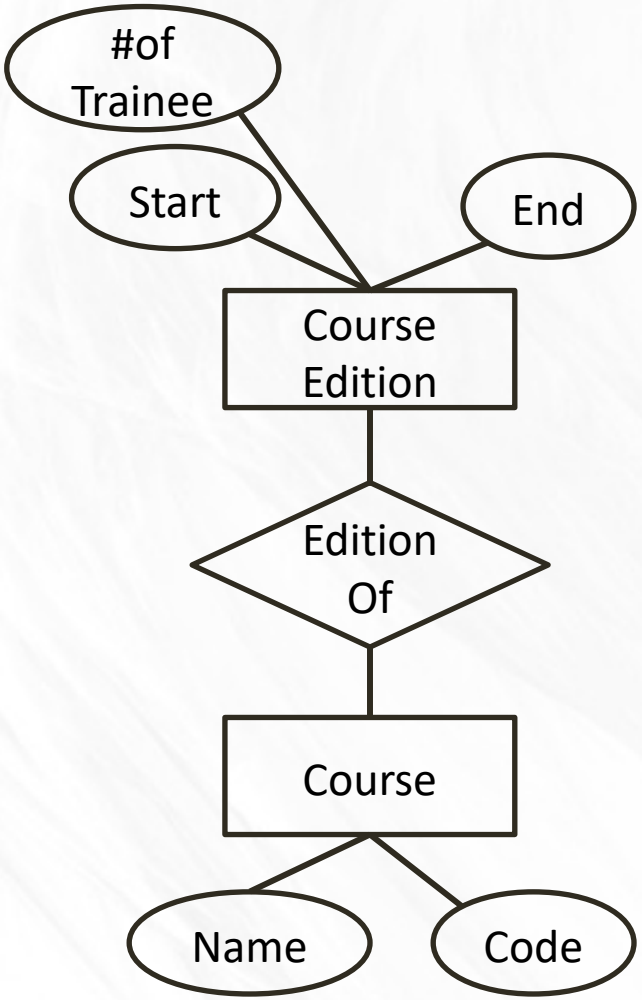
Trainee


Address
Name
Phone
Employer
Start
End
Past Employ ment
Start
SSN
Surname
Current Employ ment
Age
Trainee
Sex
Birthplace
Code
IsA
Employee
Professional
Position
Level
Title
Expertise

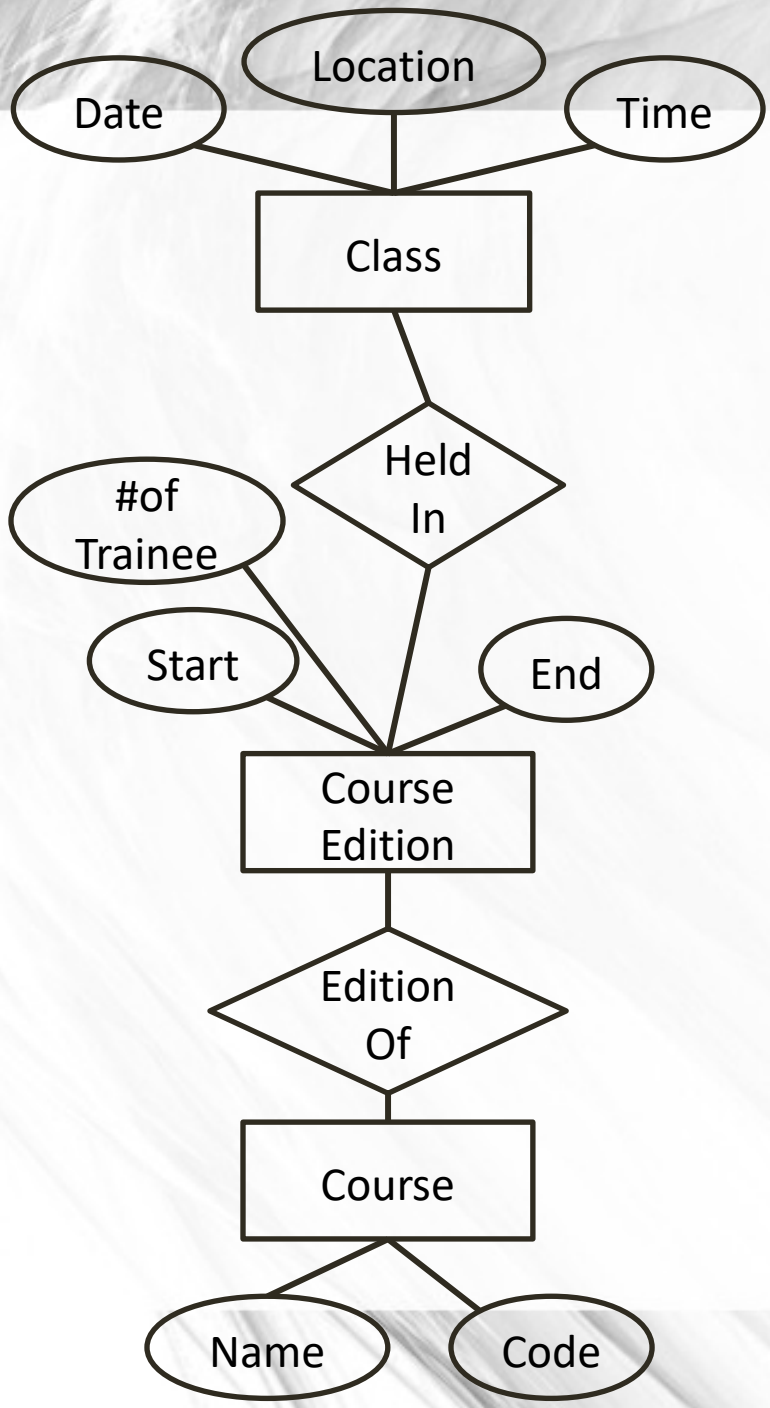
Course



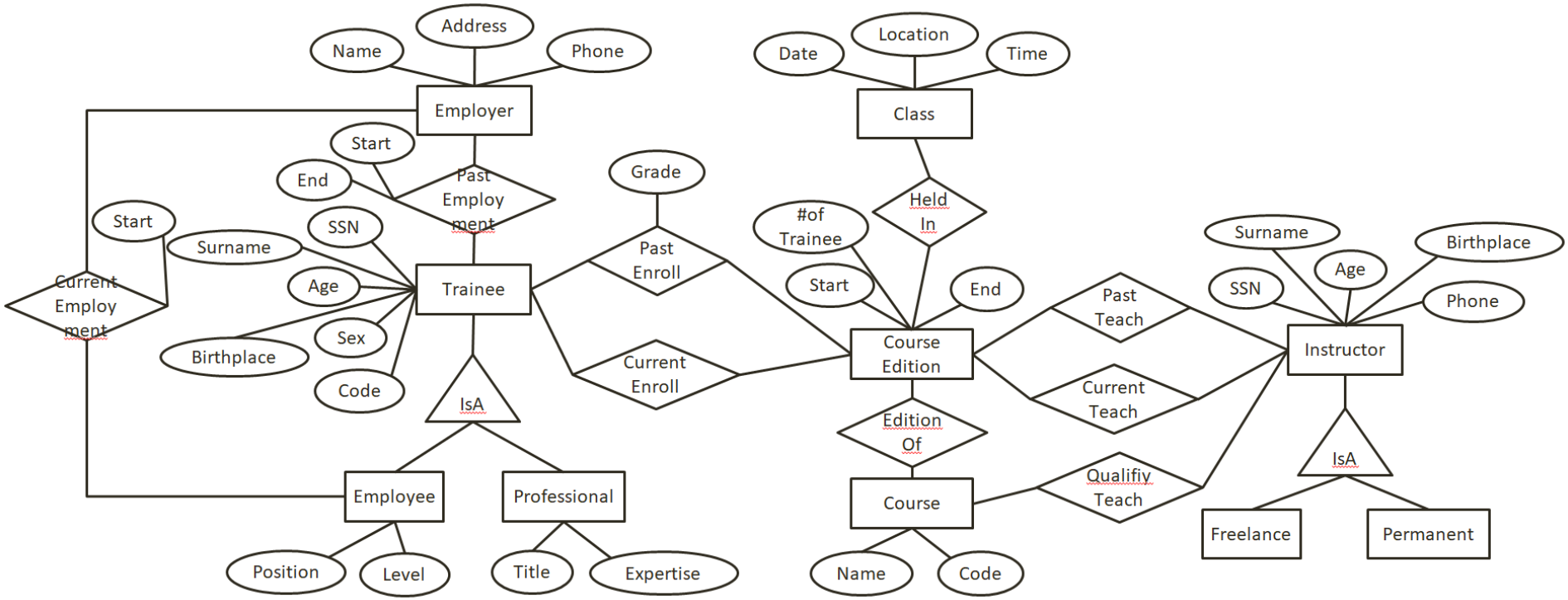
Course


#of Trainee
Start
End
Course Edition
Edition Of
Course
Name
Code

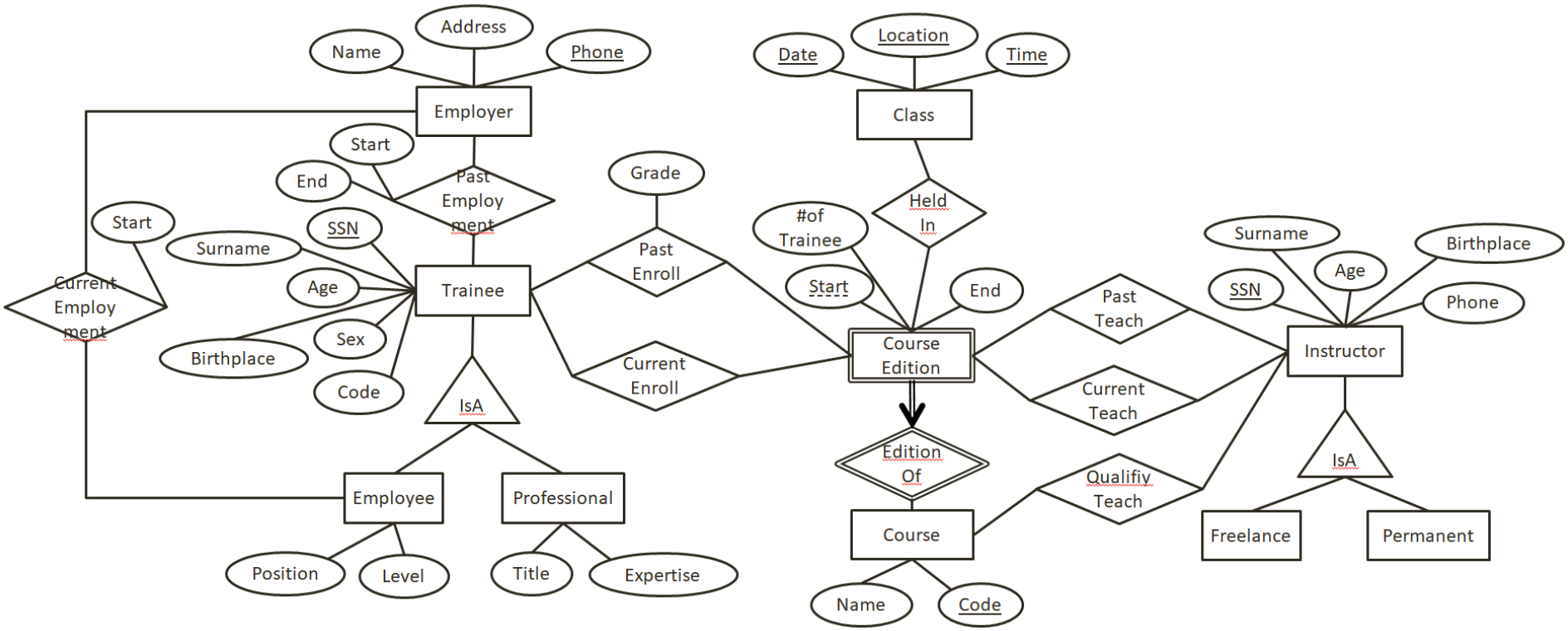
Course


Location
Date
Time
Class
Held
In
#of
Trainee
Start
End
Course
Edition
Edition
Of
Course
Name
Code

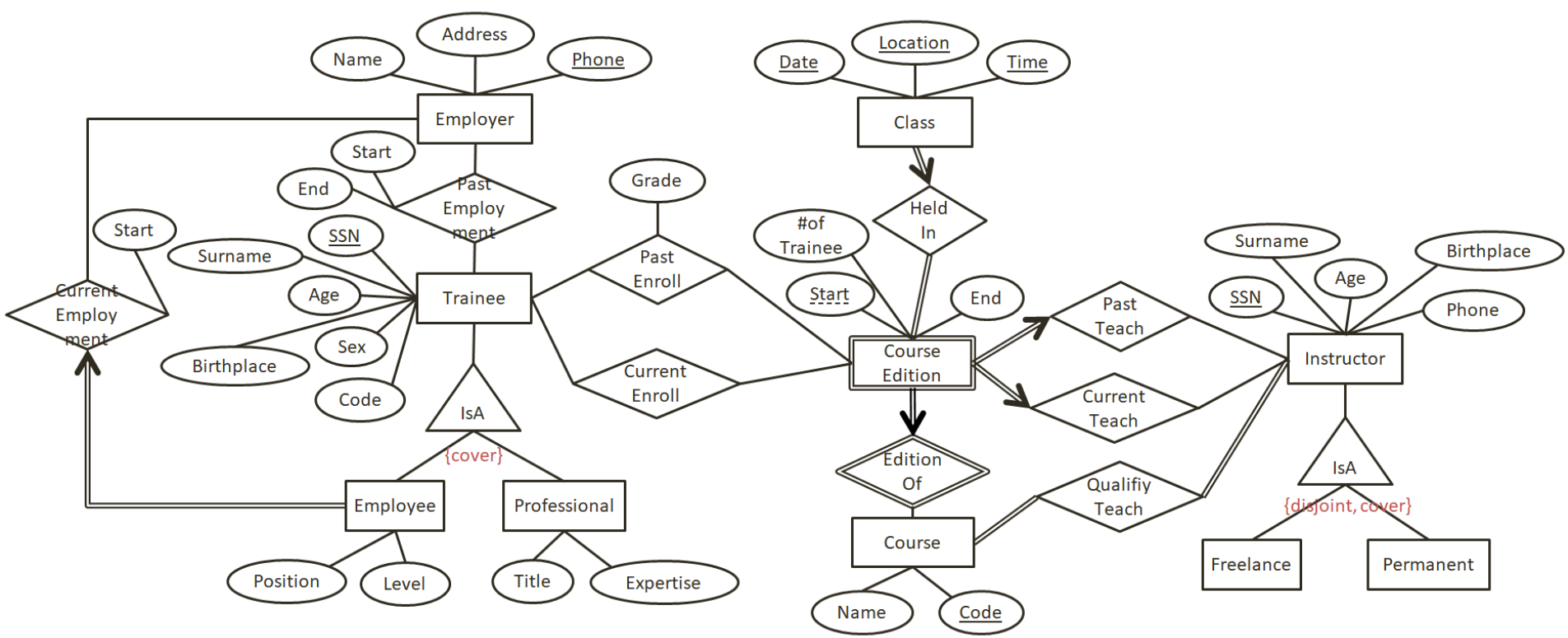
Putting it all together…



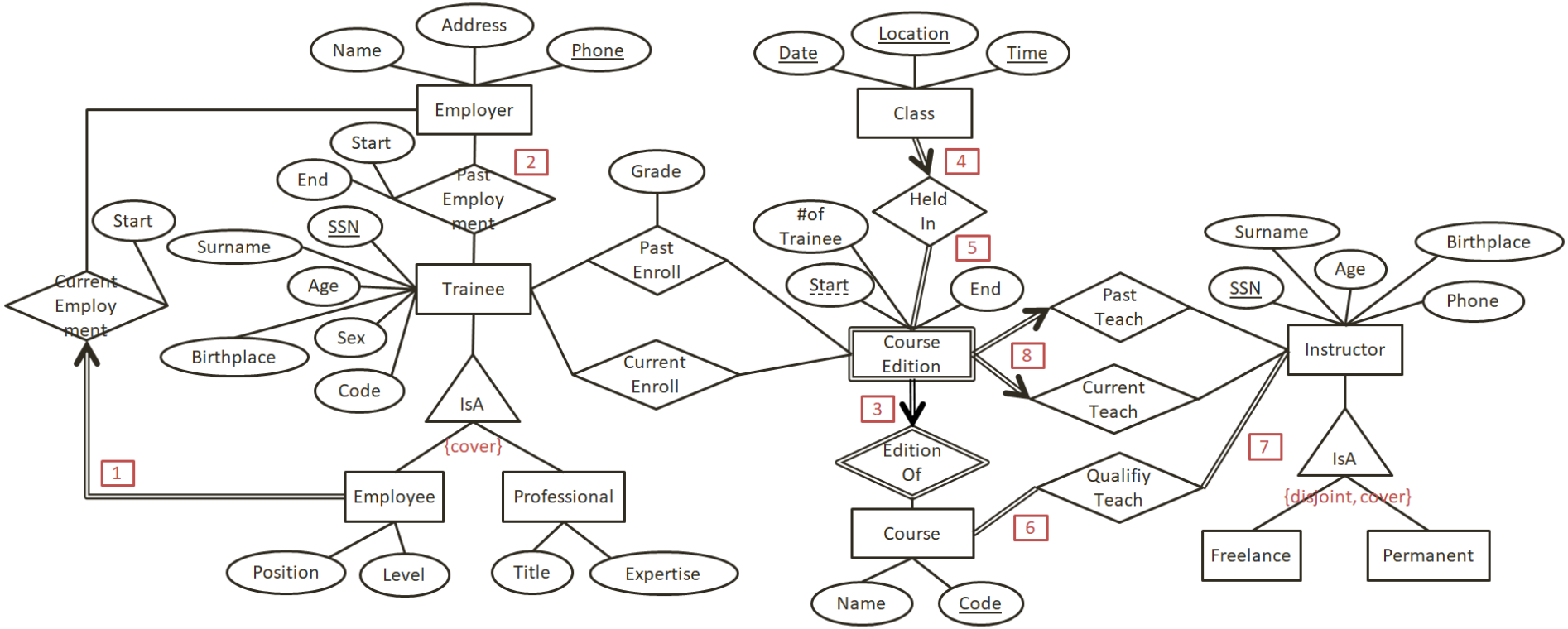
Identify Keys



Identify Constraints



Notes


Address
Name
Phone
Employer
Start
End
Past Employ ment
2
Grade
Past Enroll
Current Enroll
Start
Current Employ ment
SSN
Surname
Age
Trainee
Sex
Birthplace
Code
IsA
{cover}
1
Employee
Professional
Position
Level
Title
Expertise
Date
Location
Time
Class
4
Held In
#of Trainee
5
Start
End
Course Edition
3
Edition Of
Course
Name
Code
8
Past Teach
Current Teach
6
Qualifiy Teach
Surname
Age
Birthplace
SSN
Phone
Instructor
7
IsA
{disjoint, cover}
Freelance
Permanent

1. Every Employee has at least one Employer (thick). Each Employee has at most one Employer (arrow).

2. Recall that (Trainee, Employer) is a SET of tuples. So by this diagram, an Employee cannot have worked with the same Employer twice.

3. Course Edition is a weak entity and uses Course's key. Every Course Edition corresponds to at least one "Course" (thick). Each Course Edition corresponds to at most one course (arrow).

4. Every Class corresponds to at least one Course Edition (thick). Each Class corresponds to at most one Course Edition (arrow).

5. Every Course Edition must be held in at least one Class (thick).

6. Every Course must have at least one qualified Instructor (thick).

7. Every Instructor must be qualified to teach at least one Course (thick).

8. Every Course Edition is/was taught by at least an Instructor (thick). Each Course Edition is/was taught by at most one Instructor (arrow)