Natural language specifications

- The requirements specifications are often written in natural language, at least in the first draft.
- Natural language is, by nature subject to ambiguity and misinterpretation.
- We need to carry out an in-depth analysis of the specification document in order to remove any inaccuracies and ambiguous terms.

Example of requirements in natural language

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 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.

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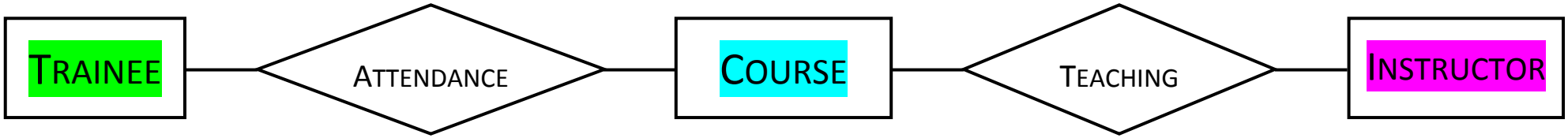
An example of a glossary of terms

Term	Description	Synonym	Links
Trainee	Participant in a course. Can be an employee or self-employed.	Participant	Course, Employer
Instructor	Course tutor. Can be freelance.	Tutor	Course
Course	Course offered. Can have various editions.	Seminar	Instructor, Trainee
Employer	Company by which a trainee is employed or has been employed.		Trainee

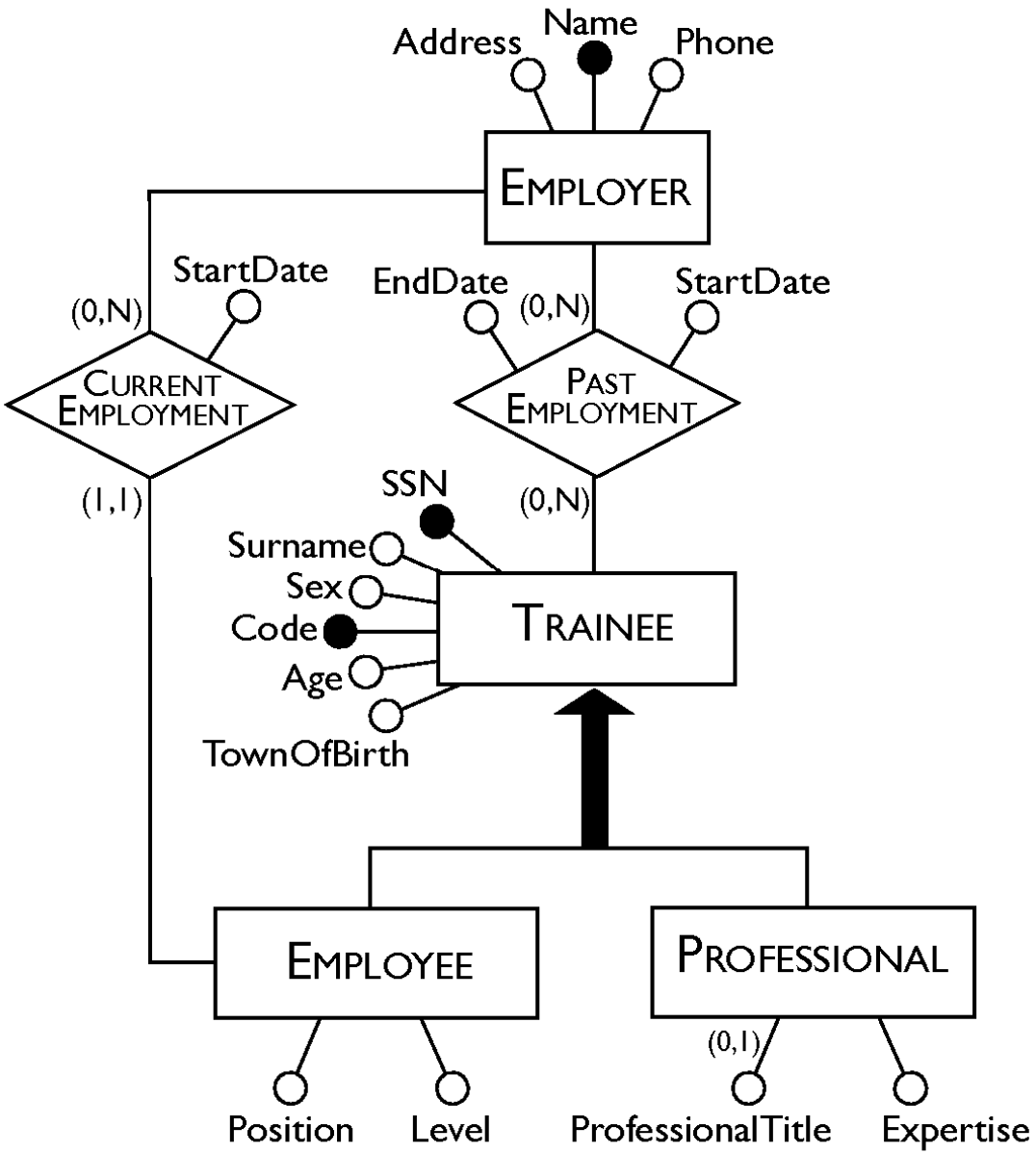
General criteria for data representation

- If a concept has significant properties and/or describes classes of objects with an autonomous existence, it is appropriate to represent it by an entity.
- If a concept has a simple structure, and has no relevant properties associated with it, it is convenient to represent it by an attribute of another concept to which it refers.
- If the requirements contain a concept that provides a logical link between two (or more) entities, it is convenient to represent this concept by a relationship.
- If one or more concepts are particular cases of another concept, it is convenient to represent them by means of a generalization.

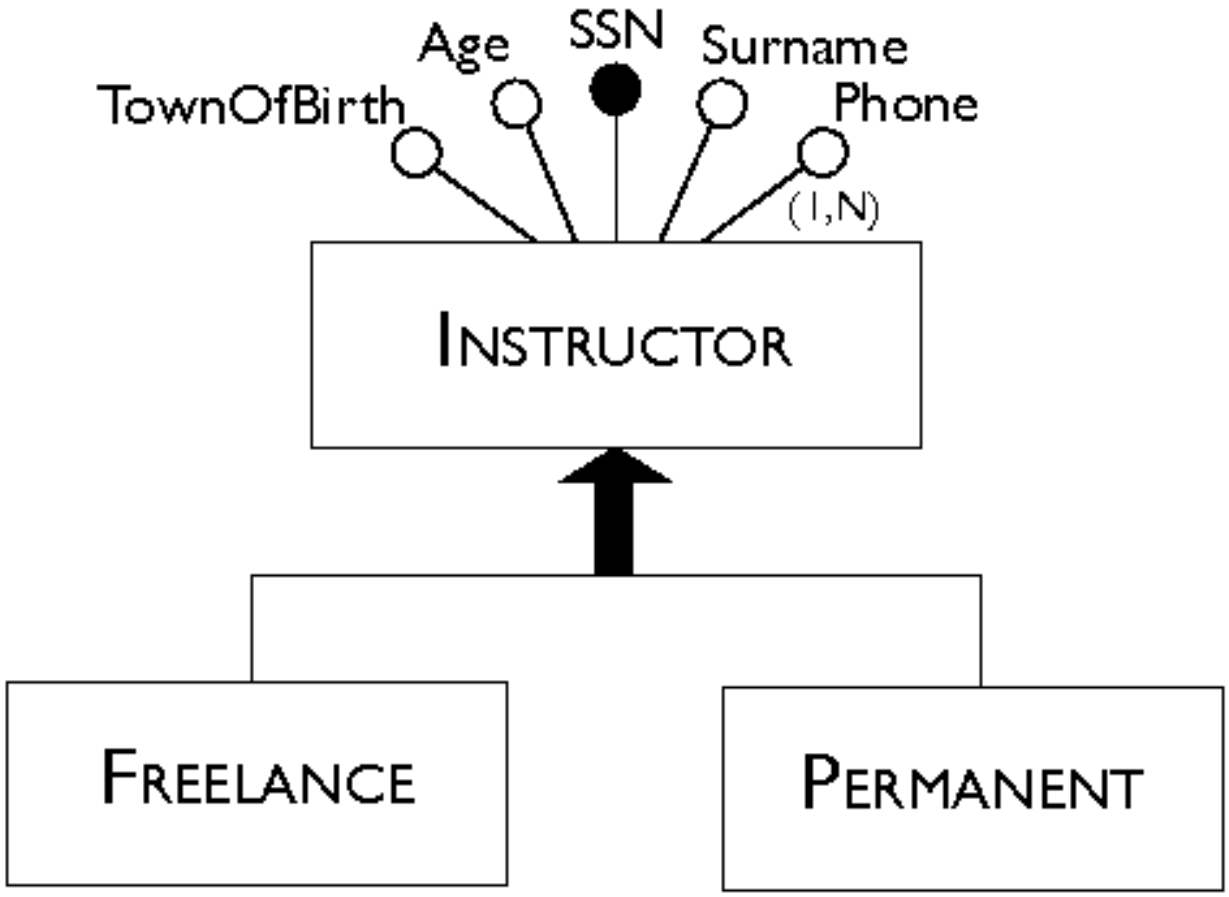
Skeleton schema for a training company



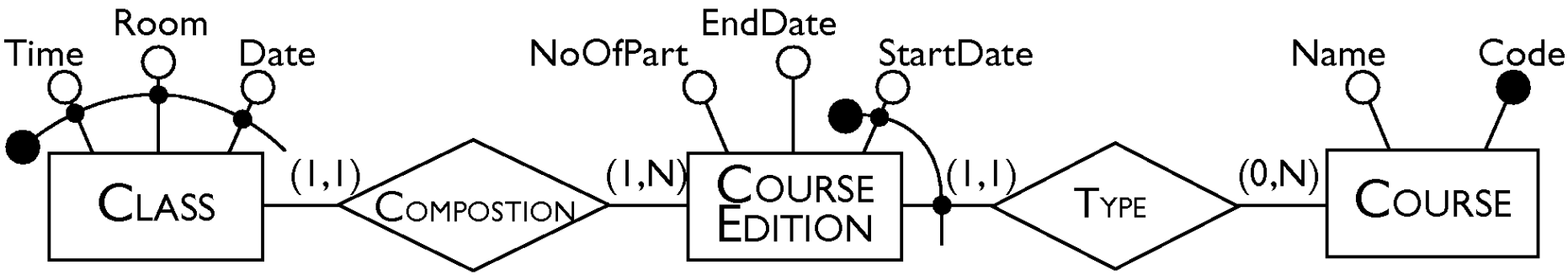
The refinement of a portion of the skeleton schema



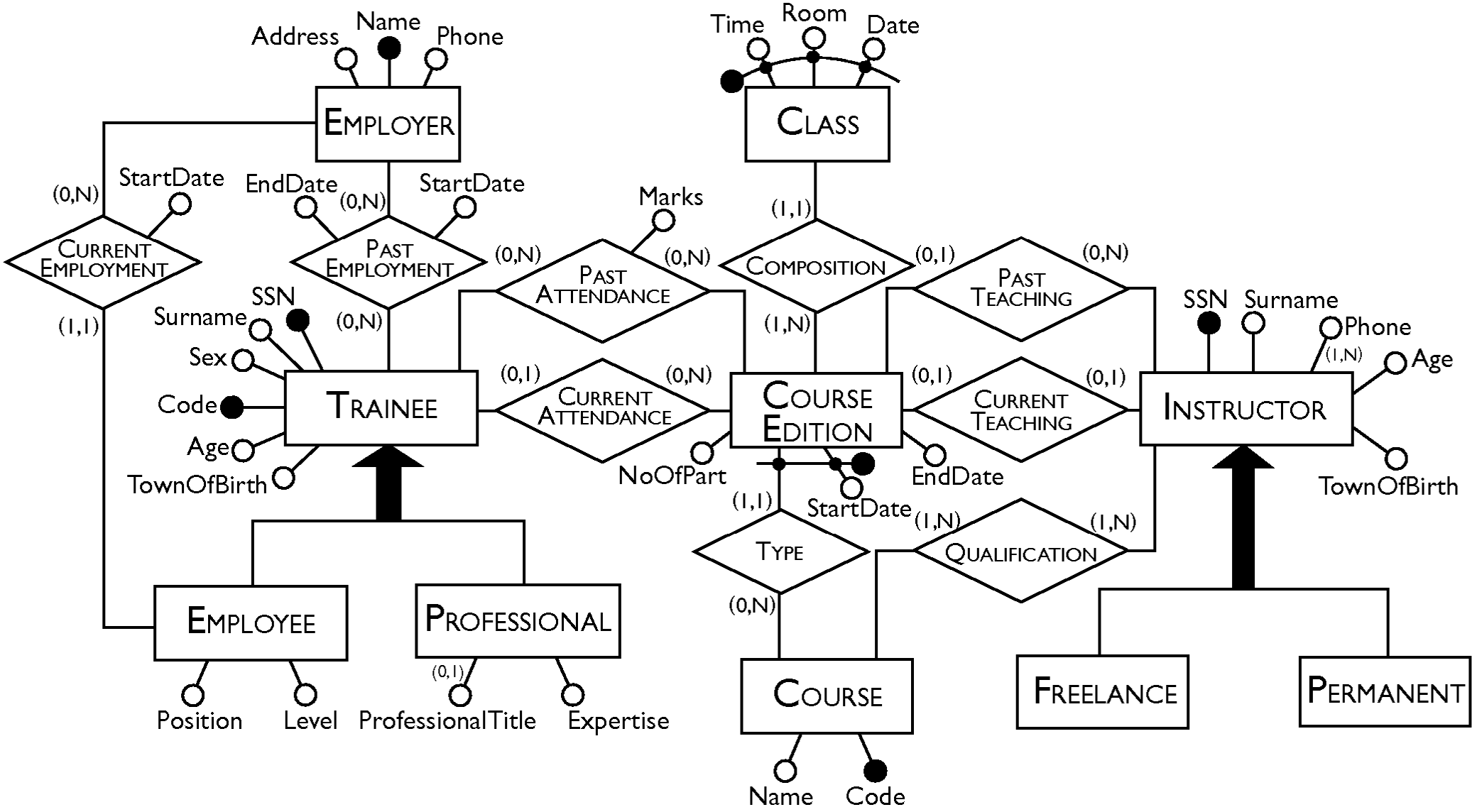
The refinement of another portion of the skeleton schema



The refinement of another portion of the skeleton schema



The final E-R schema for the training company



Quality of a conceptual schema

- Correctness
- Completeness
- Readability
- Minimality