**Exercise - ERD**

A company database needs to store information about employees (identified by ssn, with salary and phone as attributes), departments (identified by dno, with dname and budget as attributes), and children of employees (with name and age as attributes). Employees work in departments; each department is managed by an employee; a ch ldi must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known. Draw an ER diagram that captures this information.

Dependent

Department

Employee

Works in

Manages

Child

Notown Records has decided to store information about musicians who perform on its albums (as well as other company data) in a database. The company has wisely chosen to hire you as a database designer

* Each musician that records at Notown has an SSN, a name, an address, and a phone number. Poorly paid musicians often share the same address, and no address has more than one phone.
* Each instrument used in songs recorded at Notown has a unique identification number, a name (e.g., guitar, synthesizer, flute) and a musical key (e.g., C, B-flat, E-flat).
* Each album recorded on the Notown label has a unique identification number, a title, a copyright date, a format (e.g., CD or MC), and an album identifier.
* Each song recorded at Notown has a title and an author.
* Each musician may play several instruments, and a given instrument may be played by several musicians.
* Each album has a number of songs on it, but no song may appear on more than one album.
* Each song is performed by one or more musicians, and a musician may perform a number of songs.
* Each album has exactly one musician who acts as its producer. A musician may produce several albums, of course.

Design a conceptual schema for Notown and draw an ER diagram for your schema. The preceding information describes the situation that the Notown database must model. Be sure to indicate all key and cardinality constraints and any assumptions you make. Identify any constraints you are unable to capture in the ER diagram and briefly explain why you could not express them.

Plays

Album

Musician

Perform

Produce

Instrument

Appear

Song

Consider the following information about a university database:

* Professors have an SSN, a name, an age, a rank, and a research specialty.
* Projects have a project number, a sponsor name (e.g., NSF), a starting date, an ending date, and a budget.
* Graduate students have an SSN, a name, an age, and a degree program (e.g., M.S. or Ph.D.).
* Each project is managed by one professor (known as the project’s principal investigator).
* Each project is worked on by one or more professors (known as the project’s co-investigators).
* Professors can manage and/or work on multiple projects.
* Each project is worked on by one or more graduate students (known as the project’s research assistants).
* When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
* Departments have a department number, a department name, and a main office.
* Departments have a professor (known as the chairman) who runs the department.
* Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
* Graduate students have one major department in which they are working on their degree.
* Each graduate student has another, more senior graduate student (known as a student advisor) who advises him or her on what courses to take.

Design and draw an ER diagram that captures the information about the university. Use only the basic ER model here; that is, entities, relationships, and attributes. Be sure to indicate any key and participation constraints.

Project

Professor

Manage

Work on

Dept

Work in

run

Work on

Major

advisor

Graduate