LAB ASSIGNMENT - 1

Q1: Draw an ERD for given specification.
a) Each kid likes some candy and each candy likes by at most one kid.
b) Every professor teaches exactly one course.
c) Every professor teaches exactly one course and every course must be taught by some professor.

Q2: A university database contains information about professors (identified by social security number, or SSN) and courses (identified by courseid). Professors teach courses; each of the following
situations concerns the Teaches relationship set. For each situation, draw an ER diagram that describes it (assuming that no further constraints hold).
Professors can teach the same course in several semesters, and each offering must be recorded.
Professors can teach the same course in several semesters, and only the most recent such offering
needs to be recorded. (Assume this condition applies in all subsequent questions.)

Every professor must teach some course.
Every professor teaches exactly one course (no more, no less).
Every professor teaches exactly one course (no more, no less), and every course must be taught by
some professor.

Now suppose that certain courses can be taught by a team of professors jointly, but it is possible that
no one professor in a team can teach the course. Model this situation, introducing additional entity
sets and relationship sets if necessary.

Q3: 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.

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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 them 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.

Q4: Computer Sciences Department frequent fliers have been complaining to Dane County Airport officials about the poor organization at the airport. As a result, the officials have decided that all information related to the airport should be organized using a DBMS, and you've been hired to design the database. Your first task is to organize the information about all the airplanes that are stationed and maintained at the airport. The relevant information is as follows:

Every airplane has a registration number, and each airplane is of a specific model.
The airport accommodates a number of airplane models, and each model is identified by a model number (e.g., DC-10) and has a capacity and a weight.

A number of technicians work at the airport. You need to store the name, SSN, address, phone number, and salary of each technician.

Each technician is an expert on one or more airplane models, and his or her expertise may overlap with that of other technicians. This information about technicians must also be recorded.

Traffic controllers must have an annual medical examination. For each traffic controller, you must store the date of the most recent exam.

All airport employees (including technicians) belong to a union. You must store the union membership number of each employee. You can assume that each employee is uniquely identified by the social security number.

The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. Each test has a Federal Aviation Administration (FAA) test number, a name, and a maximum possible score.The FAA requires the airport to keep track of each time that a given airplane is tested by a given technician using a given test. For each testing event, the

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information needed is the date, the number
of hours the technician spent doing the test, and the score that the airplane received on the test.

Tasks:
Draw an ER diagram for the airport database. Be sure to indicate the various attributes of each entity
and relationship set; also specify the key and participation constraints for each relationship set.