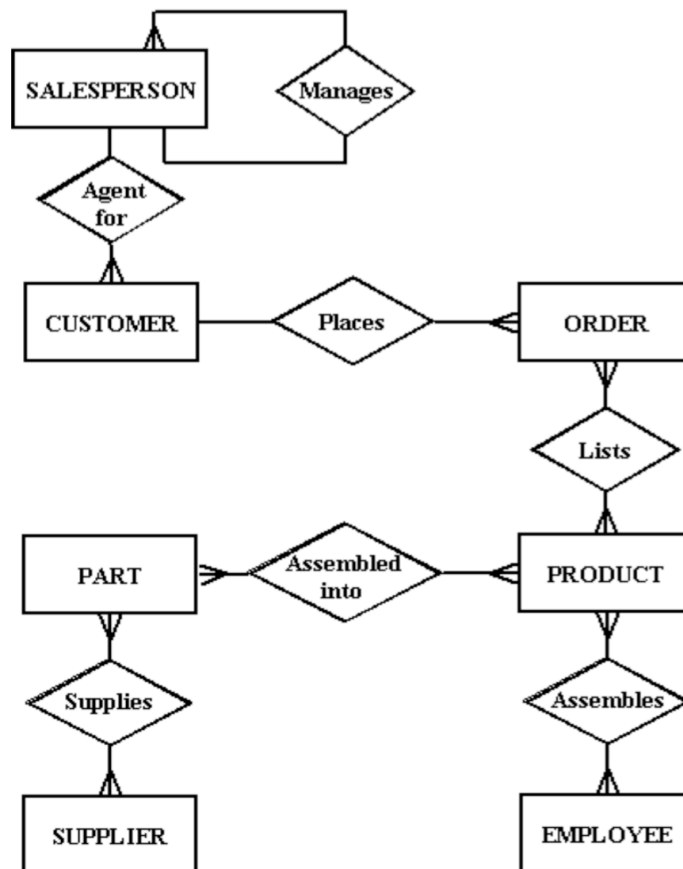1. Draw an ERD for the following scenario (show cardinality). Translate the diagram into tables:

A sales-person may manage many other sales-people. A sales-person is managed by only one sales-people. A sales-person can be an agent for many customers. A customer is managed by one sales-person. A customer can place many orders. One customer can place each order. An order lists many inventory items. An inventory item may be listed on many orders. An inventory item is assembled from many parts. A part may be assembled into many inventory items. Many employees assemble an inventory item from many parts. A supplier supplies many parts. Many suppliers may supply the same part.

Answer:

Salesperson (SP_ID (PK), SP_ID (FK) – manager ID for the recursive relationship)
Customer (Customer_ID (PK), SP-ID (FK), …)
Order (Order_ID (PK), Customer_ID (FK), …)
Lists (Order_ID (FK), Product_ID (FK), …)
Product (Product_ID (PK) …)
Assembles1 (Product_ID (FK), Employee_ID (FK), …)
**Assembles2 (Product_ID (FK), Part_ID (FK), …)**
Part (Part_ID (PK), …)
Supplier (Supplier_ID (PK), …)
Supplies (Part_ID (FK), Supplier_ID (FK), …)
Employee (Employee_ID (PK), …)

2. Draw an ERD for the following scenario (show cardinality). Translate the diagram into tables:

The university has several academic departments. Each department has a unique name and a street address (number, street name) associated with it. The departments offer courses with distinct names, each of which is taught by a single professor and one or more TAs. A TA can only be assigned to one course. The course is offered once a week at a fixed time. Students belong to a single department but can register for courses offered by any department. When a student takes a course, he/she is assigned to a TA for help (i.e., each TA of the course helps different set of students). Each person (professor, student, TA) has a name and a unique SSN. Professor and TA also earn a salary. **Finally, the university also wants to keep track of the one or more languages that the TA can speak.**

Works_for   prof   teaches

languages   Ta_for

employsTA   TA

dept   course

Belongs_to

helps
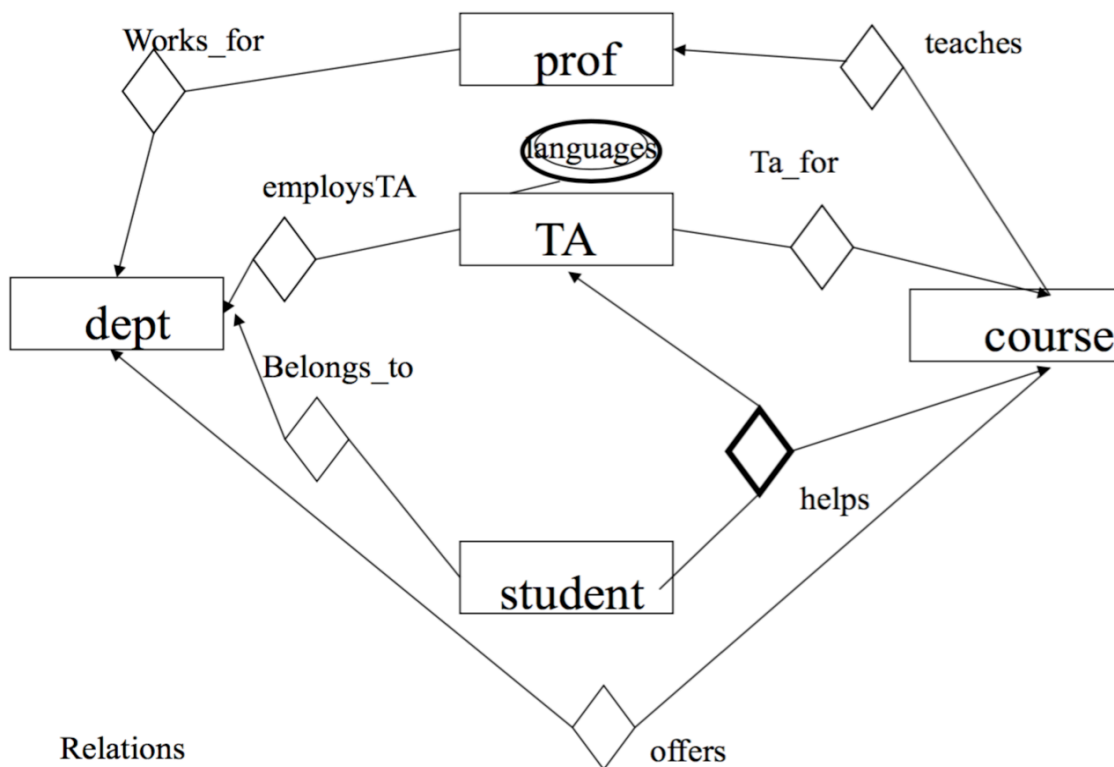
student

Relations   offers

•dept(deptname, addr_num, addr_street)
•prof(SSN, profname, deptname, salary)
•course(coursename, deptname, profSSN, time)
•student(SSN, studentname, deptname)
•TA(SSN, Taname, deptname, salary, tacourse)
•guides(TA_SSN, student_SSN, coursename)
•speaks(TA_SSN, language)

F-K constraints:
prof(deptname) -> dept(deptname)
guides(coursename) -> course(coursename)
course(deptname) -> course(coursename)
etc.

3. Draw an ERD for the following scenario (show cardinality). Translate the diagram into tables:

The university keeps track of each student's name, student number, social security number, permanent address and several contact numbers, birth date, age, sex, and major, and degree program (B.S., M.S., Ph.D.). Some user applications need to refer to the city, state, and zip code of the student's permanent address and to the student's last name. Both social security number and student number have unique values for each student.

1. Each department is described by a name, department code, office number, office phone, and college. Both name and code have unique values for each department.
2. **A department can train other departments. (Recursive Relationship)**
3. Each student must enroll in one department.
4. Each course has a course name, description, and course number, number of credit hours, level. The value of course number is unique for each course.
5. Course may generate many sections, each has a semester, year, section number, and references a single course. The section number distinguishes sections of the same course that are taught during the same semester/year.
6. **Each section may contain many students**
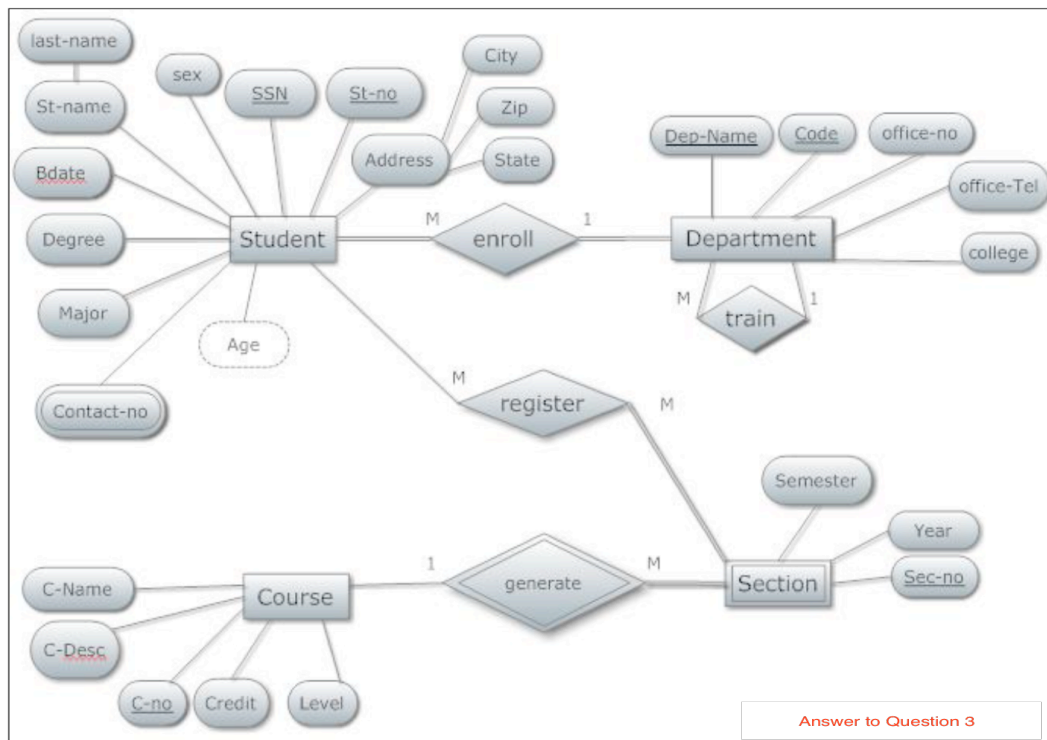
Student (Student_ID (PK), Department_ID (FK), …)
Department (Department_ID (PK), Train_Department_ID (FK), …)
Registration (Student_ID (PK), Section_ID(FK), …)
Course (Course_ID (PK), …)
Section (Section_ID (PK), year, semester)