CIS430/530 Lab Assignment 2_1

You are designing and creating a database named COMPANY for an HR (Human Resource) Dept of a Software Consulting Company to manage their employees and their assigned work (projects) in the company.

First Step to Design a Database Scheme (table structures) and Create a Database is Creating an E-R Diagram by Identifying Entities, Attributes and Relationships between any two Entities.

In this lab, Create an E-R Diagram for the Company database from the raw data files given below and the business rules of the company given below using the symbols of E-R Diagram.

To create the E-R Diagram for the Company database, we identified 4 Entities in class as below.

Entities:

- Employee
- Department
- Dependent – Weak Entity
- Project

For each Entity:

1. Identify all the attributes for each Entity
2. Identify the Attribute Type of each attribute per Entity
    - Multi-Valued Attribute,
    - Composite Attributes,
    - Key attribute:
        - If there are more than one key attribute, mark each as a possible key attribute.
        - If there is no key attribute in an Entity, identify two (existing) attributes as a composite key.
    - Derived Attributes.
3. With the given raw data at the end of this lab sheet and the given Compamy rules as specified below,
   Identify any relationship between any two Entities with its Cardinality ratio and participation constraint covered in class. You must identify all the relationships that exist between any two entities in the Company to develop an E-R Diagram for the Company.
   Note that there could be more than one relationship between two entities. For example, between Employee and Department, there are more than one relationship.

There could be no relationship between some pairs of two entities.

Note that it is decided here that we don't create a separate entity for the Supervisor role and the Manager role separately as an Entity. The Supervisor role and the Manager role are combined into one Employee Entity since a manager, a supervisor, or a regular employee can be represented as the entity Employee.

In general, you can identify the cardinality ratio and participation constraint of a relationship from the Company operation rules below, the values of a column in the raw data files, or common sense/rules in life. If you can't find the participation information anywhere, make it a partial participation as a default.

Company Rules:

- Every employee should work for only one department.
- A department could have no employee.
- Every employee should work on at least one project or more.
- Every project should have at least one employee or more that work(s) on
- A Project can be worked by multiple employees
- Some employees in Employee are managers. A Manager (in the Employee entity) is the one who manages a Department.
- Only some of the employees are Managers.
- Some employees in Employee are Supervisors. A Supervisor (in the Employee entity) is the one who supervises his/her regular employees.
- Only some of the employees are Supervisors.
- Every department can have only one manager. A manager can manage only one department.
- A department controlls projects.
- Every Project should be controlled by only one department.
- Every dependent should have only one employee that he/she belongs to.

For each realtionship, identify the followings:

- Name the realtionship
- Identify the Cardinality of each relationship between two entities as either
  1 – 1
  1 – N or N – 1
  N – M (N - M represents Many to Many with two different numbers N, M)
- Identify participant types: Total or Partial Participation for each entity that participates in a relationship
- If there is no clear indication either from raw data or the rules for participation info of a relationship, leave it as partial participation as default

With Your E-R Diagram, Provide the list of the relationships with Cardinality ratio and Participation info to explain your E-R diagram.
For example,

The list of the relationships:

- Employee Work_For Department: N - 1, Total Participation for Employee, Partial Participation for Department
- Employee Has Dependent: 1 - N, ...
- ...

Submission:

Submit your Lab2_1 report in doc file with your E-R diagram (either using a E-R Diagram Tool (See Lab 1 section for this) or your own drawings in doc file, or E-R Diagram in pencel and paper would be ok).
Give a brief explaination of the identified relationships and cardinality of each realtionship in your E-R diagram.
Submit on Blackboard.

Example of a Relationship with Cardinality between Employee and Departmemnt in E-R diagram

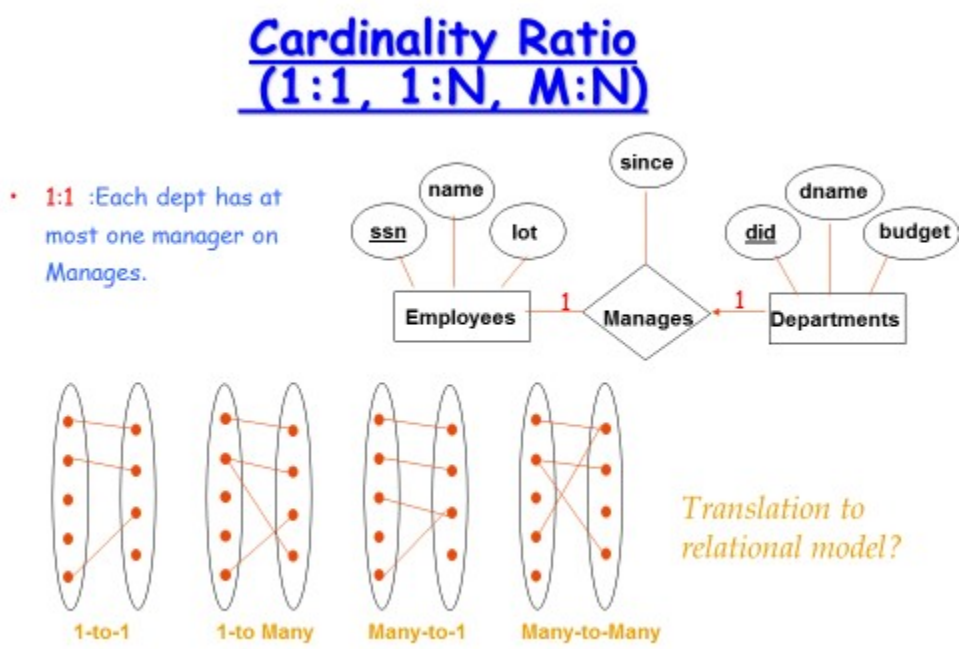

Figure 3. Symbols of ER diagrams

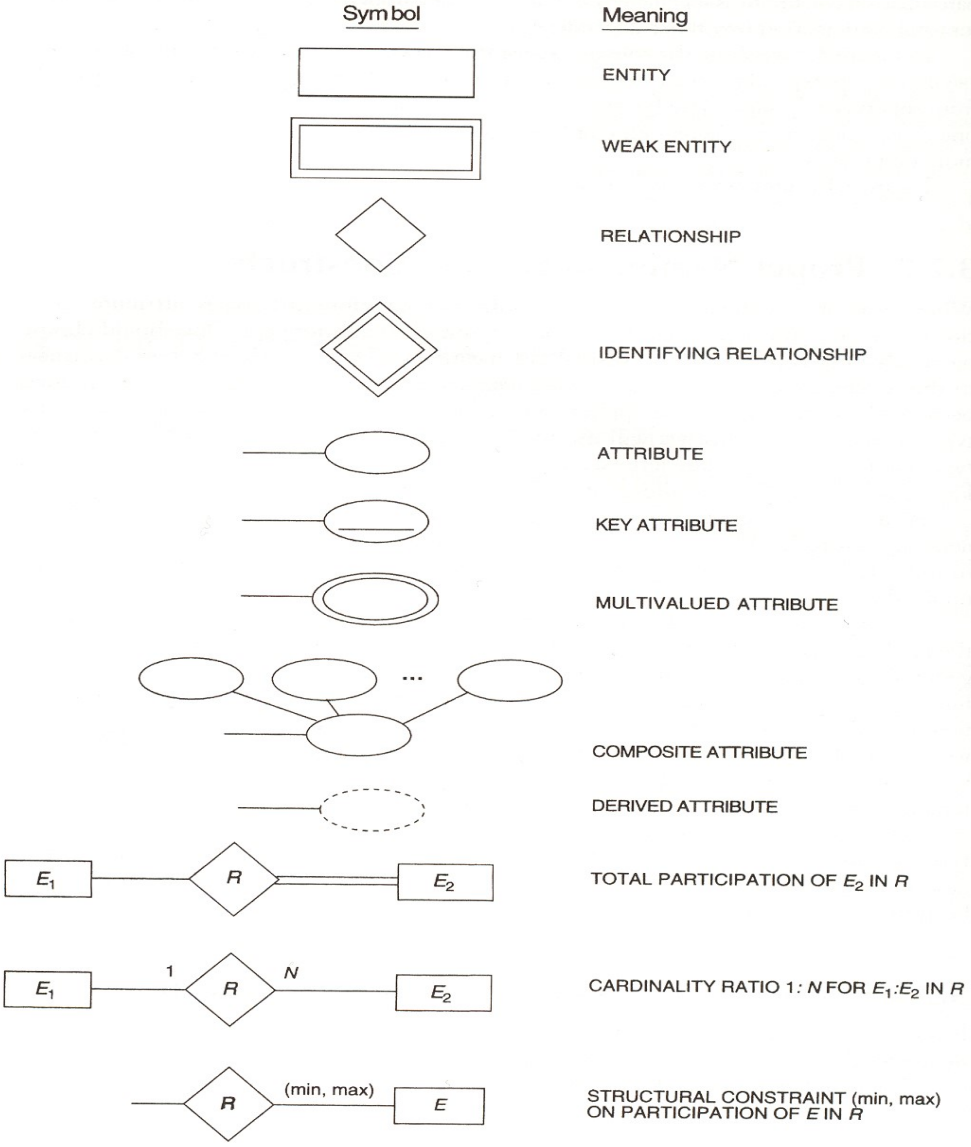

FIGURE 3.14 Summary of the notation for ER diagrams.

Company

EMPLOYEE

NAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN
John B Smith	123456789	09-Jan-55	731 Fondren, Houston, TX	M	30000	987654321
Franklin T Wong	333445555	08-Dec-45	638 Voss, Houston, TX	M	40000	888665555
Joyce A English	453453453	31-Jul-62	5631 Rice, Houston, TX	F	25000	333445555
Ramesh K Narayan	666884444	15-Sep-52	975 Fire Oak, Humble, TX	M	38000	333445555
James E Borg	888665555	10-Nov-27	450 Stone, Houston, TX	M	55000	
Jennifer S Wallace	987654321	20-Jun-31	291 Berry, Bellaire, TX	F	43000	888665555
Ahmad V Jabbar	987987987	29-Mar-59	980 Dallas, Houston, TX	M	25000	987654321
Alicia J Zelaya	999887777	19-Jul-58	3321 Castle, SPring, TX	F	25000	987654321

DEPARTMENT

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE	DLOCATION
Headquarters	1	888665555	19-Jun-71	Houston
Administration	4	987654321	01-Jan-85	Stafford
Research	5	333445555	22-May-78	Bellaire, Sugarland, Houston
Automation	7	123456789	06-Oct-05	Cleveland

DEPENDENT

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP
123456789	Alice	F	31-Dec-78	Daughter
123456789	Elizabeth	F	05-May-57	Spouse
123456789	Michael	M	01-Jan-78	Son
333445555	Alice	F	05-Apr-76	Daughter
333445555	Joy	F	03-May-48	Spouse
333445555	Theodore	M	25-Oct-73	Son
987654321	Abner	M	29-Feb-32	Spouse

PROJECT

PNAME	PNUMBER	PLOCATION	DNUM
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4