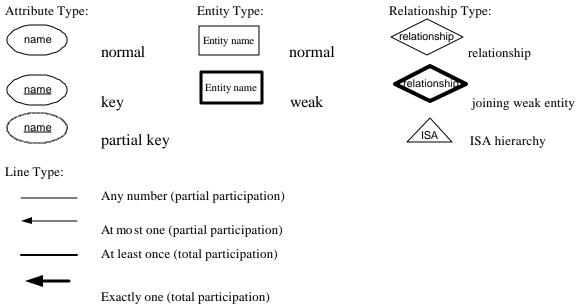
Fall 2002- SIMS 257

Teaching Assistant- Catherine Lai (clai@sims.berkeley.edu)

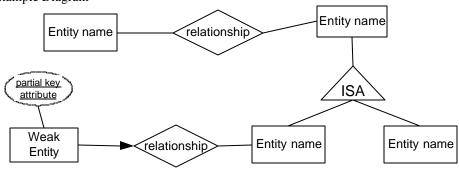
Office Hours: Wednesday 9:30-10:30 in the upstairs lab, 1-2 in the downstairs lab.

## The Entity-Relationship (ER) Model

- 1) Describes/Model
  - a. Entities- real world objects, described using a set of attributes
  - b. Relationships- associations among two or more entities
- 2) Features
  - a. Integrity constraints
    - i. Key constraint- must be unique
    - ii. Participation constraint (on a relationship)- entity must have at least one relationship with other entity
  - b. Weak Entities entity requires another entity to be uniquely identified
  - c. N-way relationship relates more than two entities
  - d. ISA Hierarchies allows for specific sub-types of entities
- 3) Basic E-R notation



## 4) Example Diagram



- 5) Some Rules in general
  - a. All normal entities must have at least a key
  - b. All weak entities must have a partial key
  - **c.** All weak entities must be connected via a relationship to a normal entity with total participation

**Exercise** (modified from Ramakrishnan/Gehrke chapter 3)

## Part 1 (40 minutes)

A company database needs to store information about employees (identified by *ssn*, *name*, parking *lot* as attributes); departments (identified by *did*, *dname*, and *budget* as attributes); and dependents (identified by *pname* and *age* as attributes). Employees *work in* departments; each department is *managed by* at most one employee; a child must be identified uniquely by *pname* when the parent (who is an employee; assume that only one parent works for the company) is known; and each dependent is required to have a covering policy. We are not interested in information about a child once the parent leaves the company.

Other key attributes to consider include:

- The date an employee started working
- The date an employee started managing a department
- Policy cost

Draw an ER diagram that captures this information. Use the ER model here, that is, entities, relationships, and attributes. Be sure to indicate any key and participation constraints.

If you have time add the following to the model: Some employees are Hourly\_Emps and some are Contract\_Emps. The relation for Hourly\_Emps includes the *hourly\_wages* and *hours\_worked* attributes of Hourly\_Emps. Similarly, the relation for Contract\_Emps includes *contractid* as attributes.

## Part 2 (20 minutes)

Based on the sample solution for the ER model from part 1, translate the Employees, Departments, and Dependents entities along with the manages and works\_in relationships, into a relational tables using SQL commands. Specification of the data types is given below:

Attributes	Data Type
ssn	CHAR(11)
name	CHAR(30)
lot	INTEGER
pname	CHAR(20)
age	INTEGER
cost	REAL
did	INTEGER
dname	CHAR(20)
budget	REAL
since	DATE

General Syntax of the CREATE TABLE statement used in data definition language CREATE TABLE *tablename* (column\_declare1, column\_declare2,

constraint\_declare1, ... )