

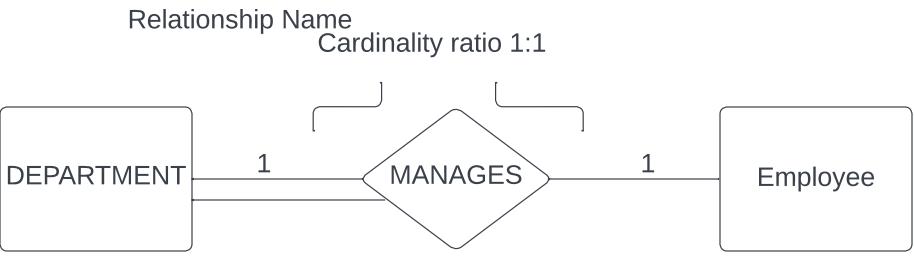
- The company is organized into **departments (entity)**. Each department has a unique name (*key attribute, simple attribute*), a unique number (*key attribute, simple attribute*), and a particular employee who manages the department. We keep track of the start date when that employee began managing the department (*composite attribute*). A department may have several locations (multivalued attribute).
- A department controls a number of projects, each of which has a unique name, a unique number, and a single location.
- The database will store each **employee's (entity) name** (*simple attribute*), Social Security number (*key attribute*), 2 address (single valued), salary (single valued simple attribute), sex (gender), and birth date (*simple attribute*). An employee is assigned to one department, but may work on several projects (*multivalued attribute, composite*), which are not necessarily controlled by the same department. It is required to keep track of the current number of hours per week that an employee works on each project, as well as the direct supervisor of each employee (who is another employee).
- The database will keep track of the dependents (multivalued, composite attribute) of each employee for insurance purposes, including each dependent's first name, sex, birth date, and relationship to the employee.

- Entities - object with an independent existence.
- Physical
 - Conceptual

Employee has a manager who is themselves an employee.
- recursive relationship (self relationship)

Structural constraints of relationships

- Cardinality i.e.
 - 1:1 i.e. manager on department
 - 1:N
 - N:1
 - M:N (N:M)
- Participation
 - Total (existence dependency) - as an entity instance ei I have to participate in at least one relationship instance ri in R to exist as an entity.
 - Partial - as an entity instance ei I don't have to participate in at least one relationship instance ri in R.



Total Participation

Partial Participation

Weak Entity

Doesn't itself have a key attribute, get's its own identity from a combination of simple attributes on the weak entity in combination with the owning entity.

Identifying relationship

