Figure 3.1 A simplified diagram to illustrate the main phases of database design.

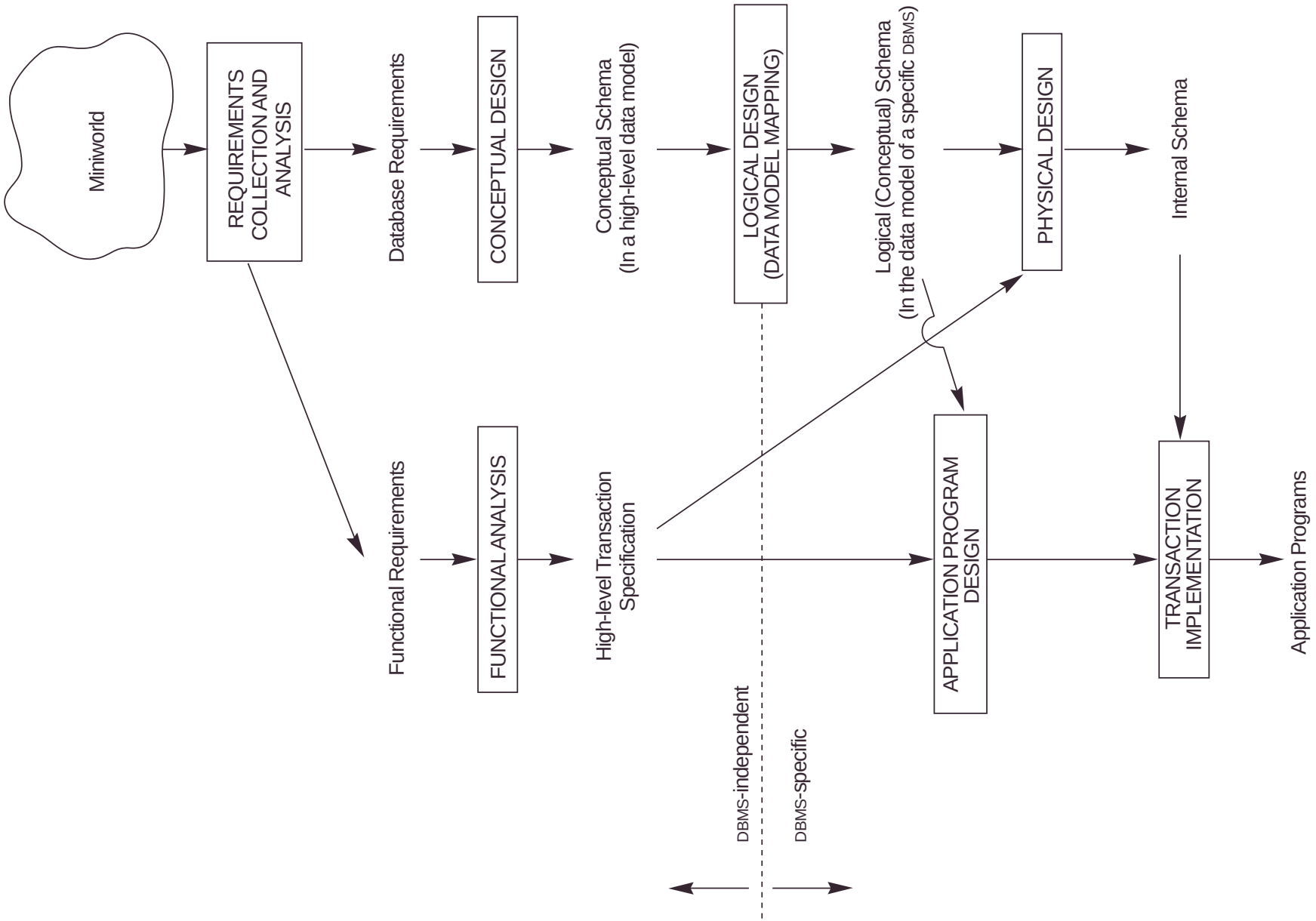

Figure 3.2 ER schema diagram for the company database.

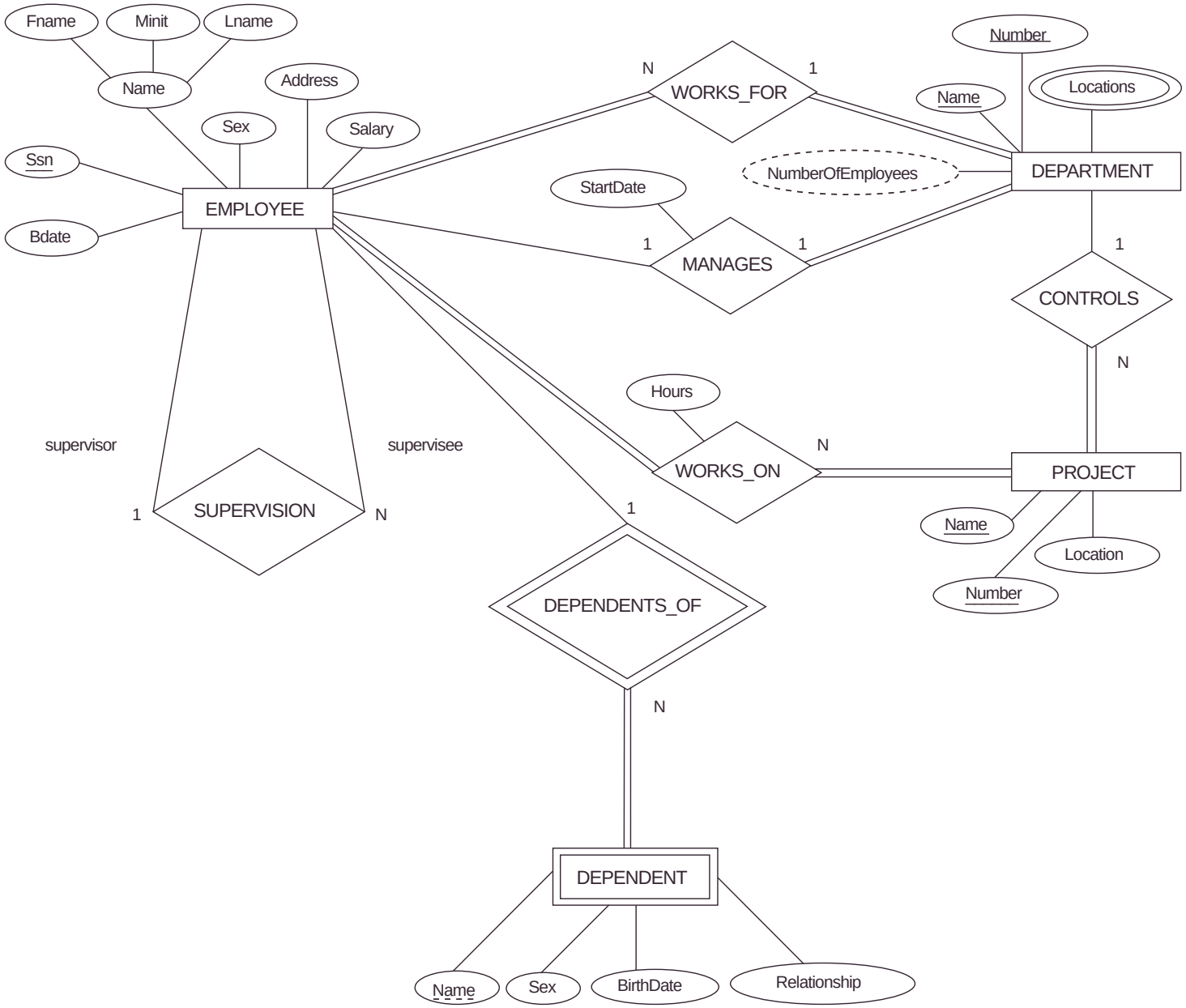

Figure 3.3 Two entities, an employee e_1 and a company c_1, and their attribute values.

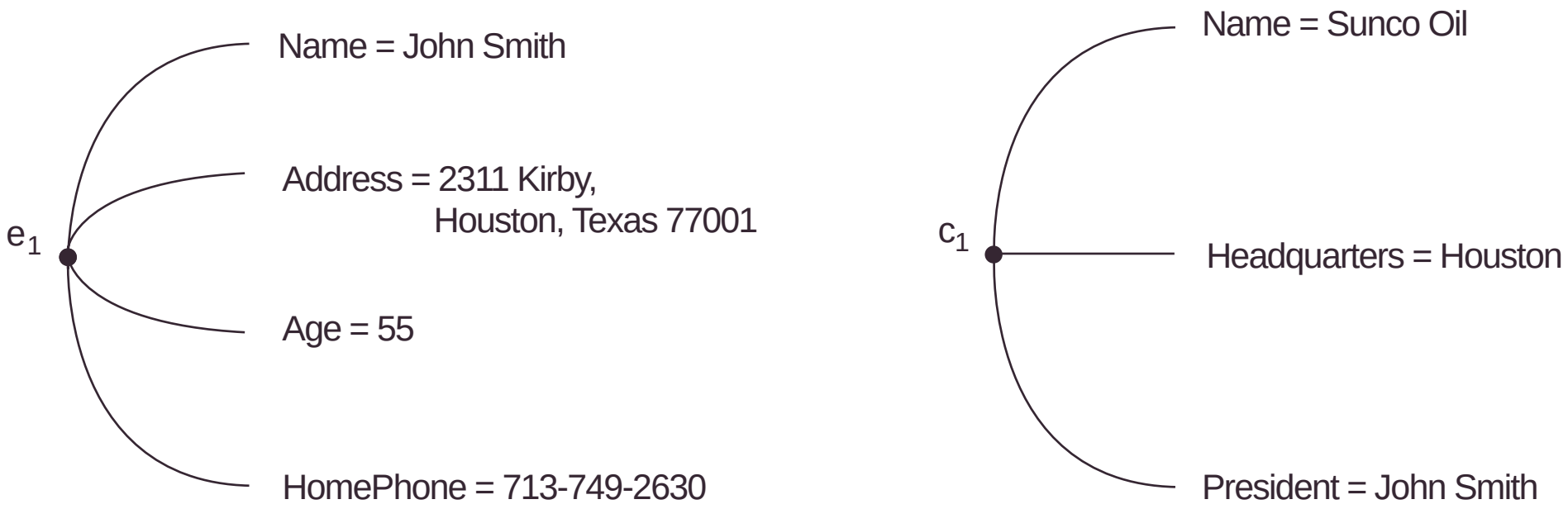

Figure 3.4 A hierarchy of composite attributes; the StreetAddress component of an Address is further composed of Number, Street, and ApartmentNumber.

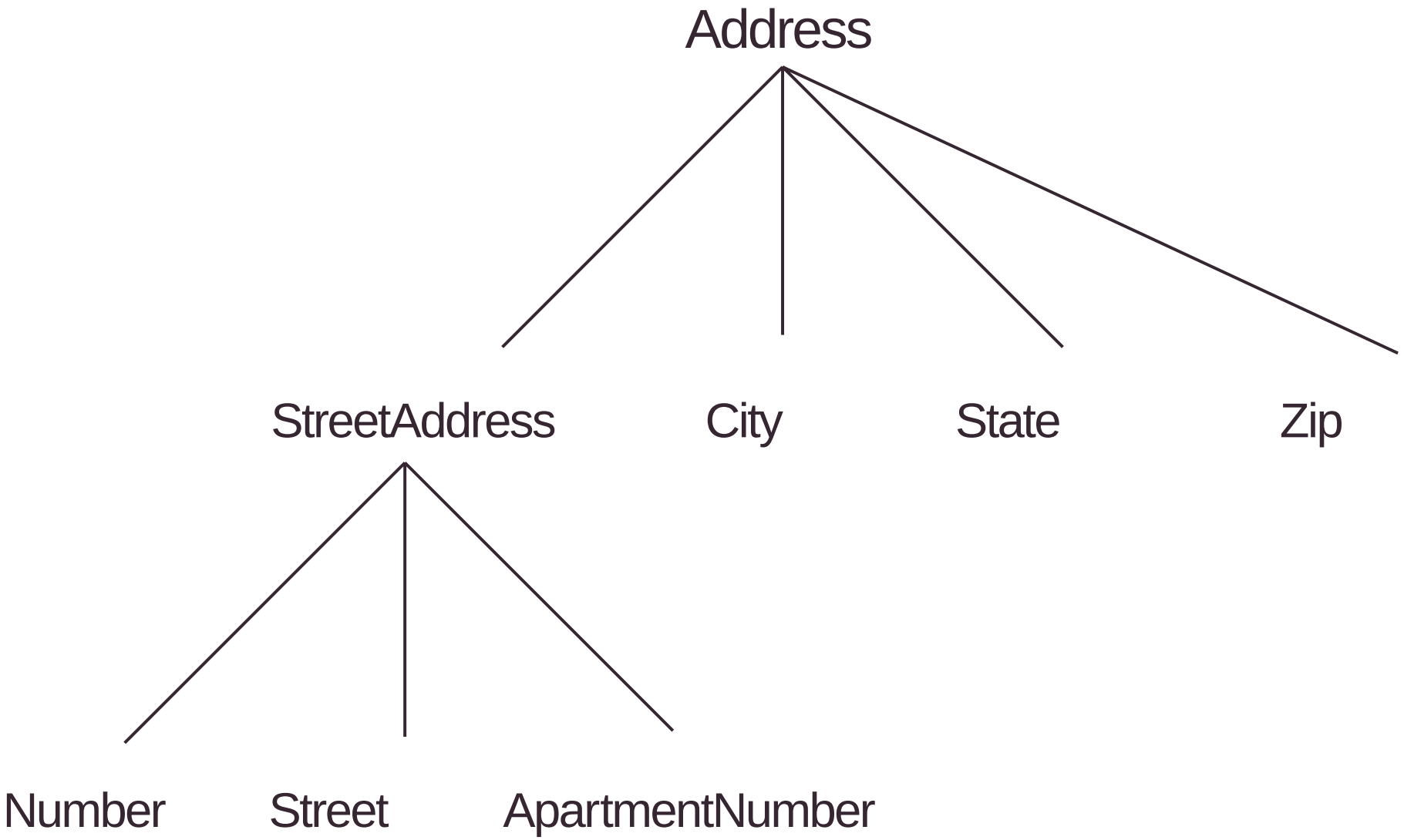

Figure 3.5 A complex attribute AddressPhone with multivalued and composite components.

{AddressPhone({Phone(AreaCode,PhoneNumber)},
Address(StreetAddress(Number,Street,ApartmentNumber),
City,State,Zip)) }

Figure 3.6 Two entity types named EMPLOYEE and COMPANY, and some of the member entities in the collection of entities (or entity set) of each type.

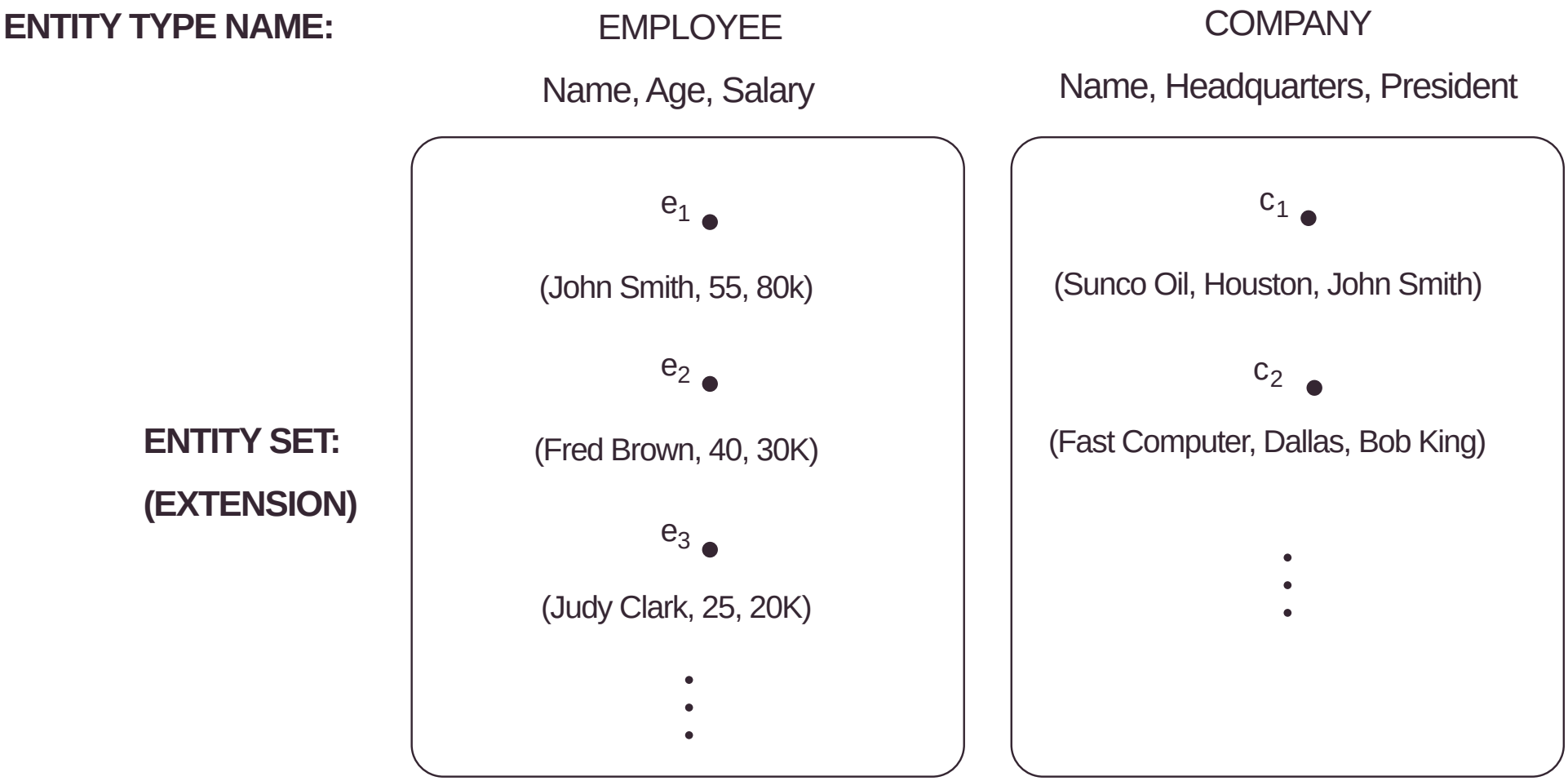

Figure 3.7 The CAR entity type, with two key attributes Registration and VehicleID. Multivalued attributes are shown between set braces {}. Components of a composite attribute are shown between parentheses ().

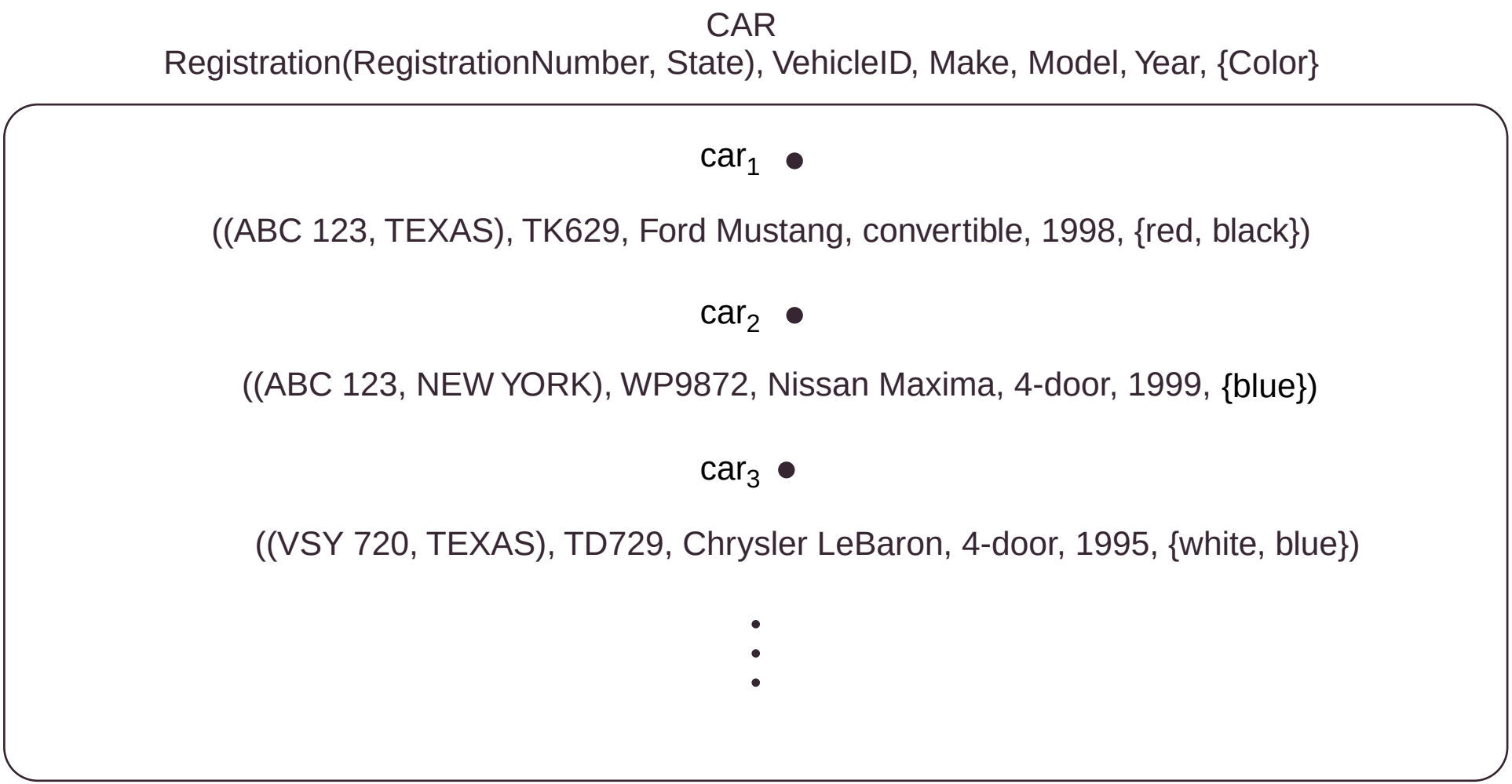

Figure 3.8 Preliminary design of entity types for the COMPANY database whose requirements are described in Section 3.2.

DEPARTMENT
Name, Number, {Locations}, Manager, ManagerStartDate

PROJECT
Name, Number, Location, ControllingDepartment

EMPLOYEE
Name (FName, MInit, LName), SSN, Sex, Address, Salary,
BirthDate, Department, Supervisor, {WorksOn (Project, Hours)}

DEPENDENT
Employee, DependentName, Sex, BirthDate, Relationship

Figure 3.9 Some instances of the WORKS_FOR relationship between EMPLOYEE and DEPARTMENT.

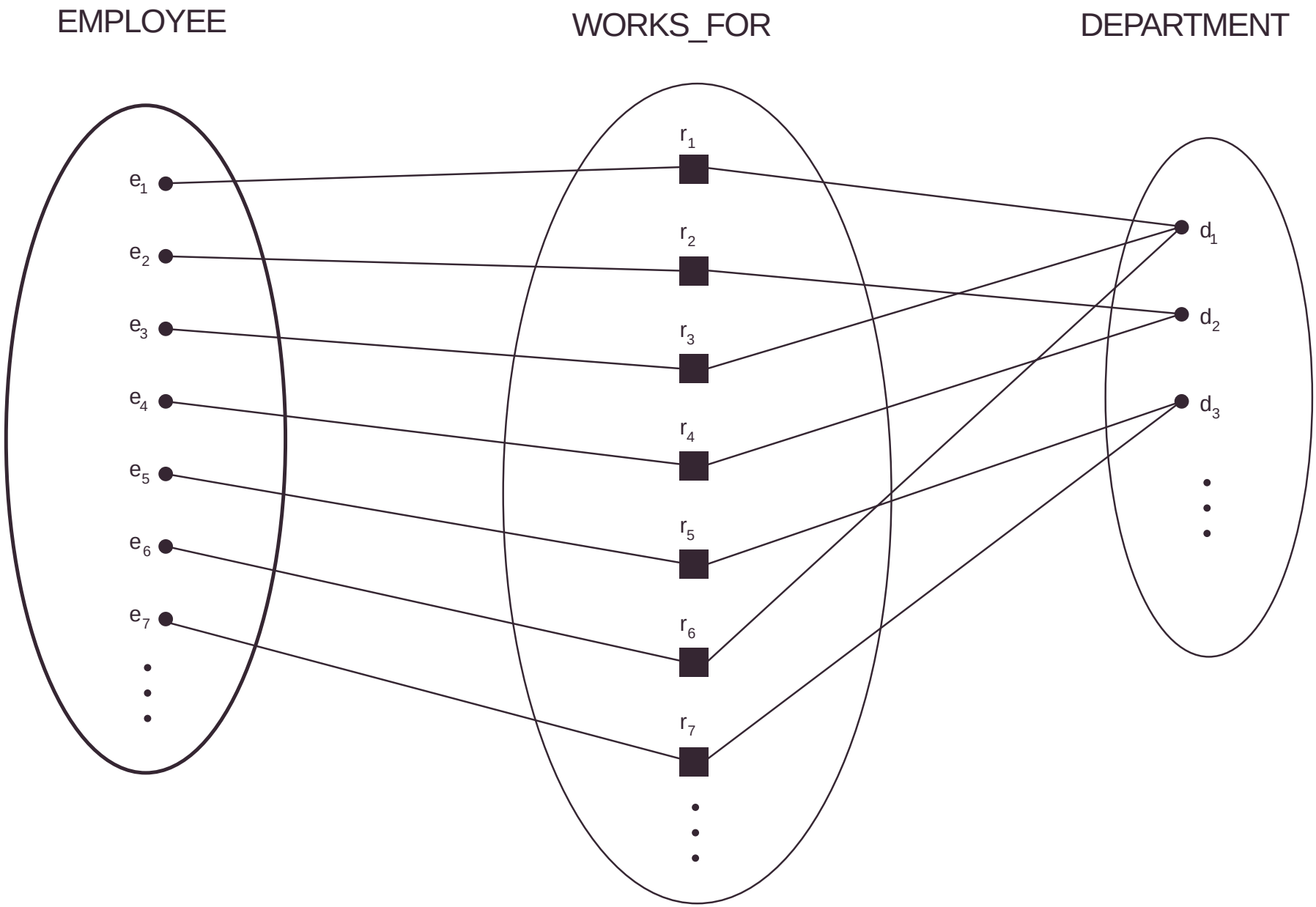

Figure 3.10 Some relationship instances of a ternary relationship SUPPLY.

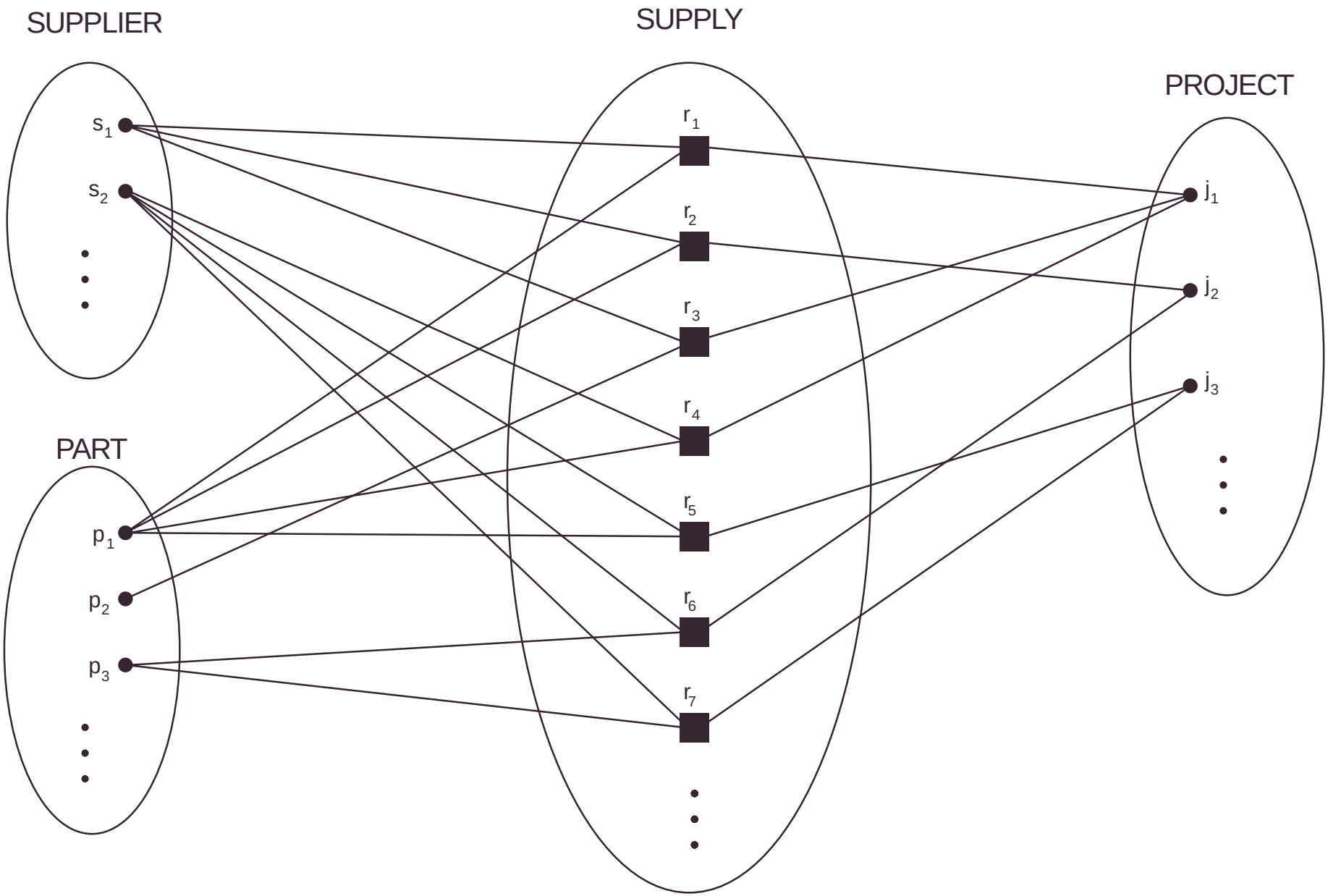

Figure 3.11 The recursive relationship SUPERVISION, where the EMPLOYEE entity type plays the two roles of supervisor (1) and supervisee (2).

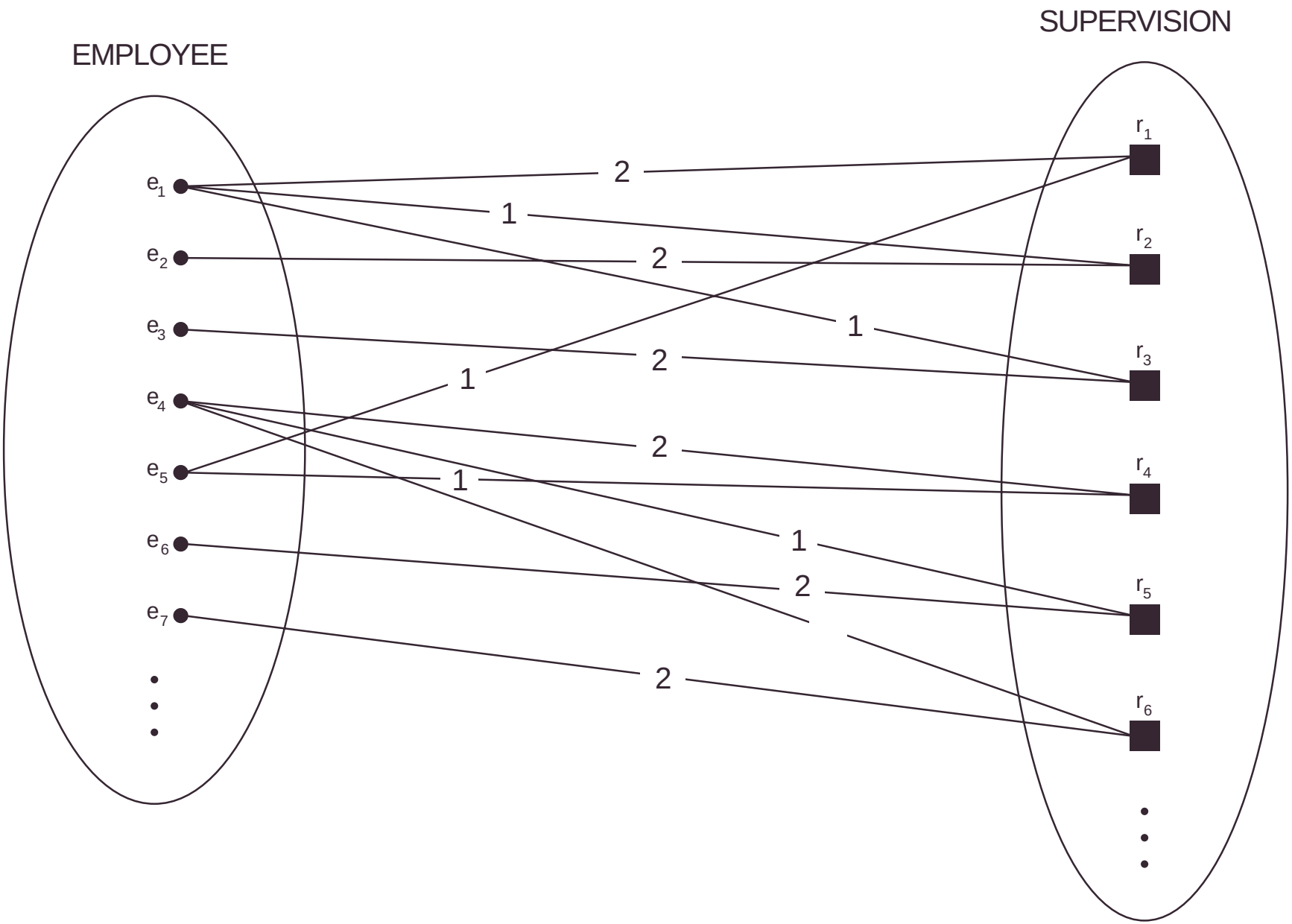

Figure 3.12 The 1:1 relationship MANAGES, with partial participation of employee and total participation of DEPARTMENT.

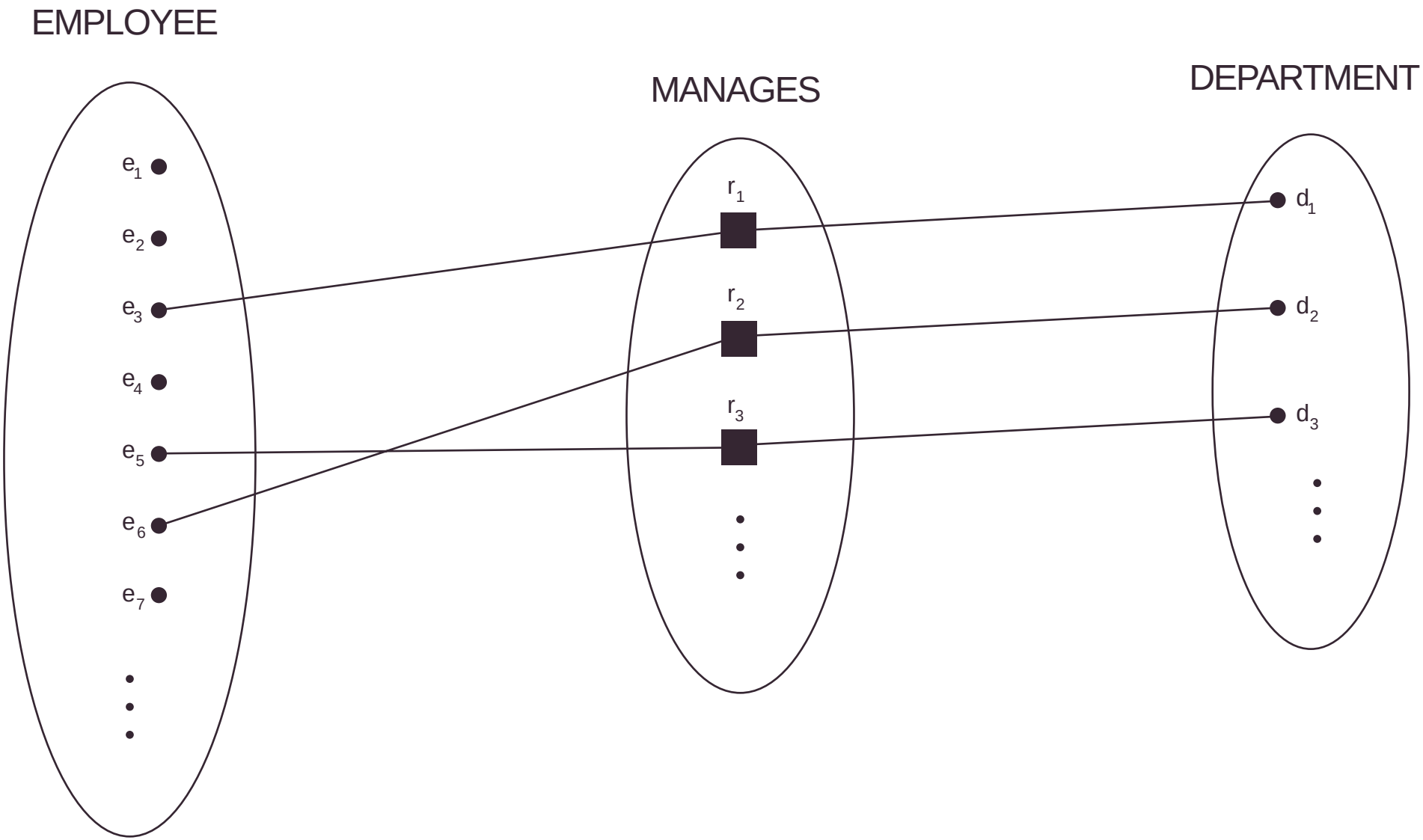

Figure 3.13 The M:N relationship WORKS_ON between EMPLOYEE and PROJECT.

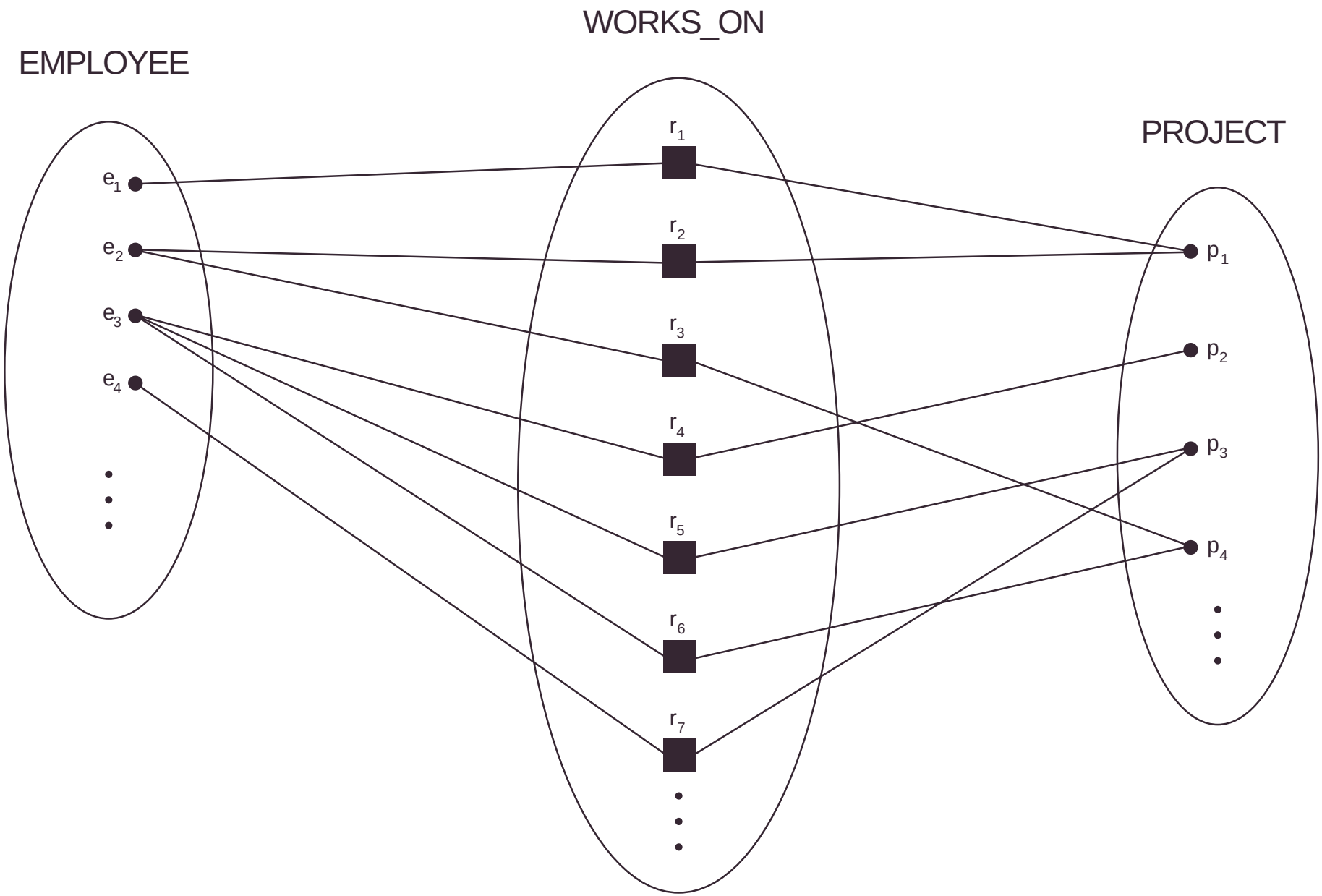

Figure 3.14 Summary of ER diagram notation.

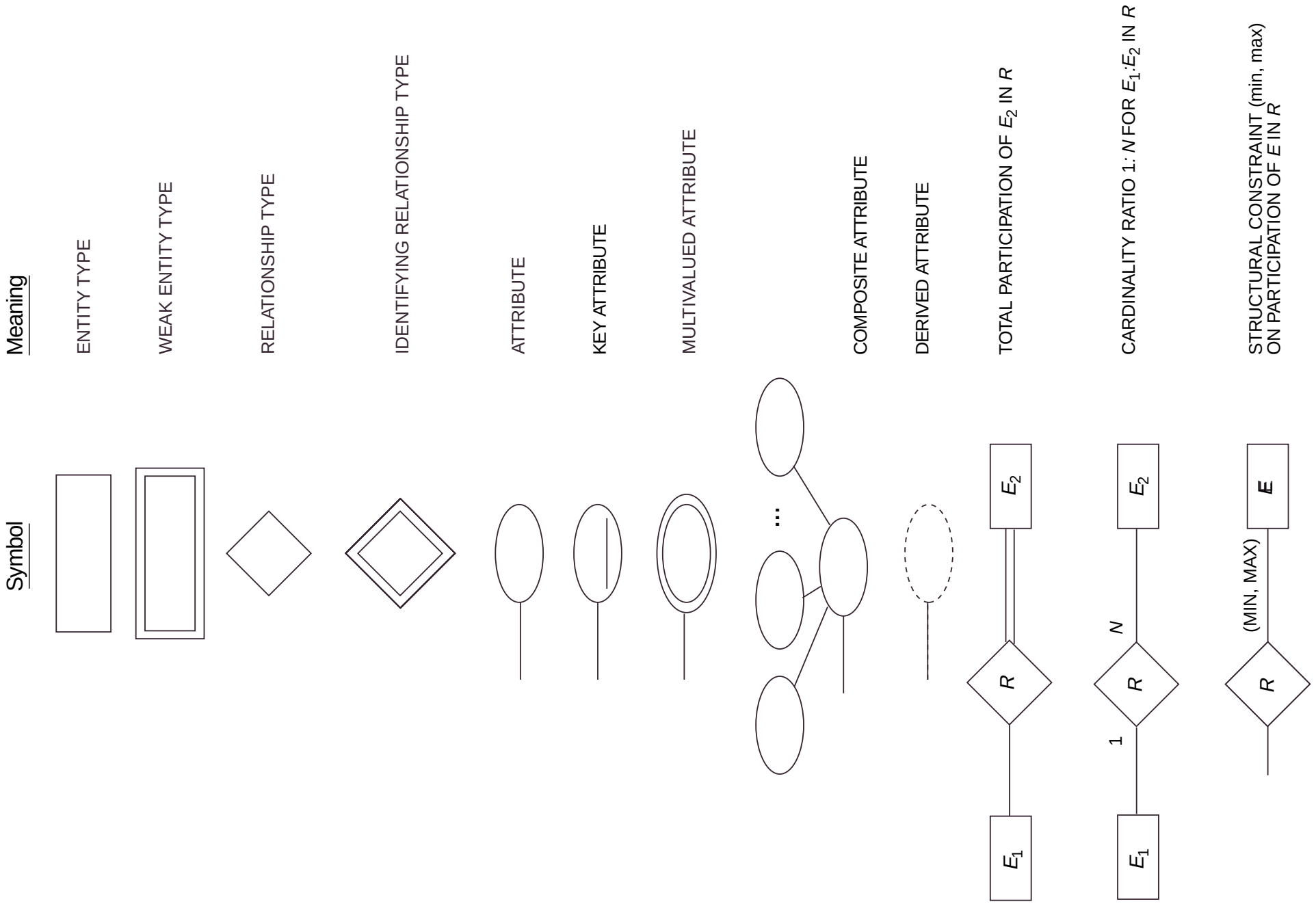

Figure 3.15 ER diagram for the COMPANY schema, with all role names included and with structural constraints on relationships specified using the alternate notation (min, max).

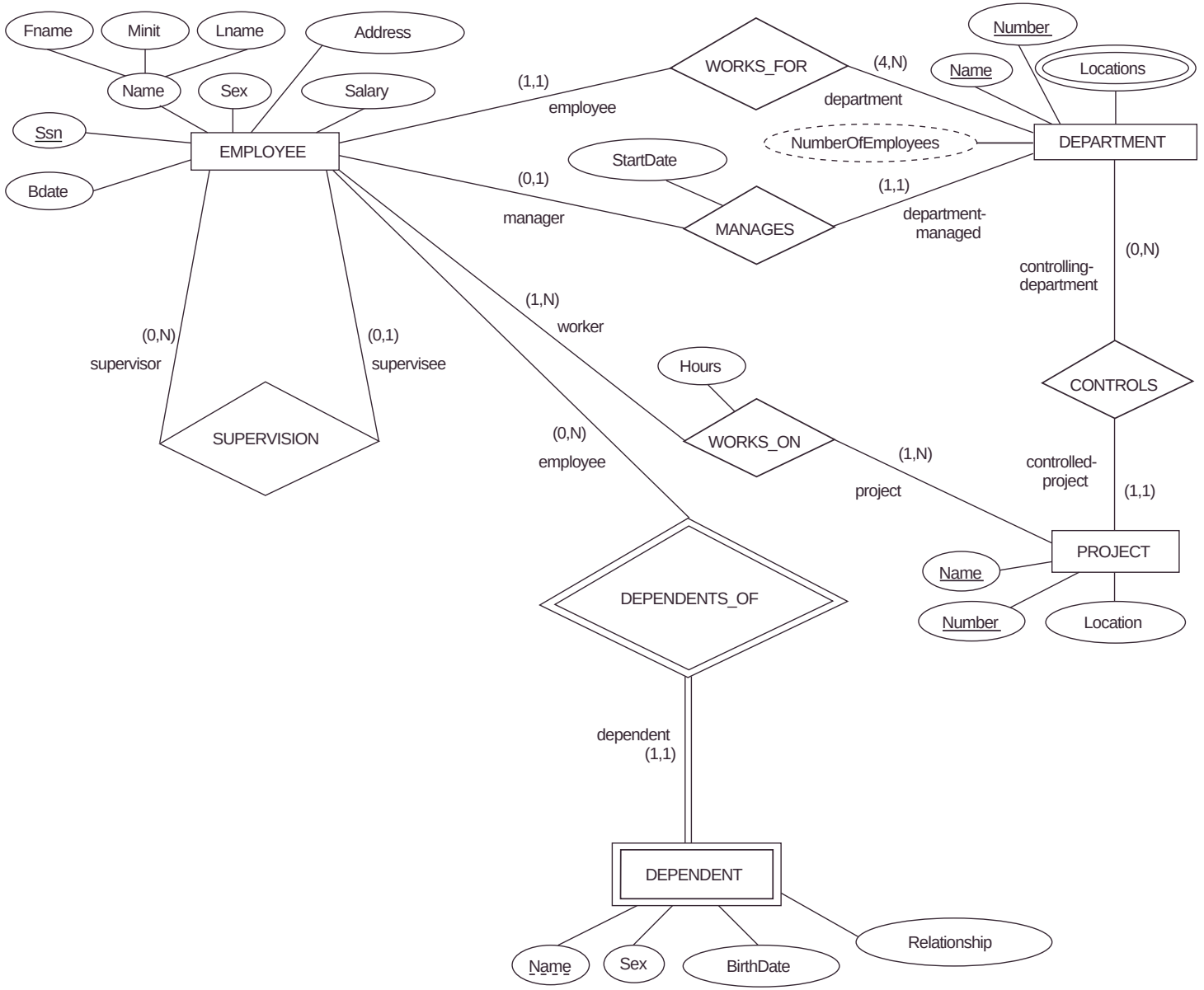

Figure 3.16 An ER diagram for an airline database.

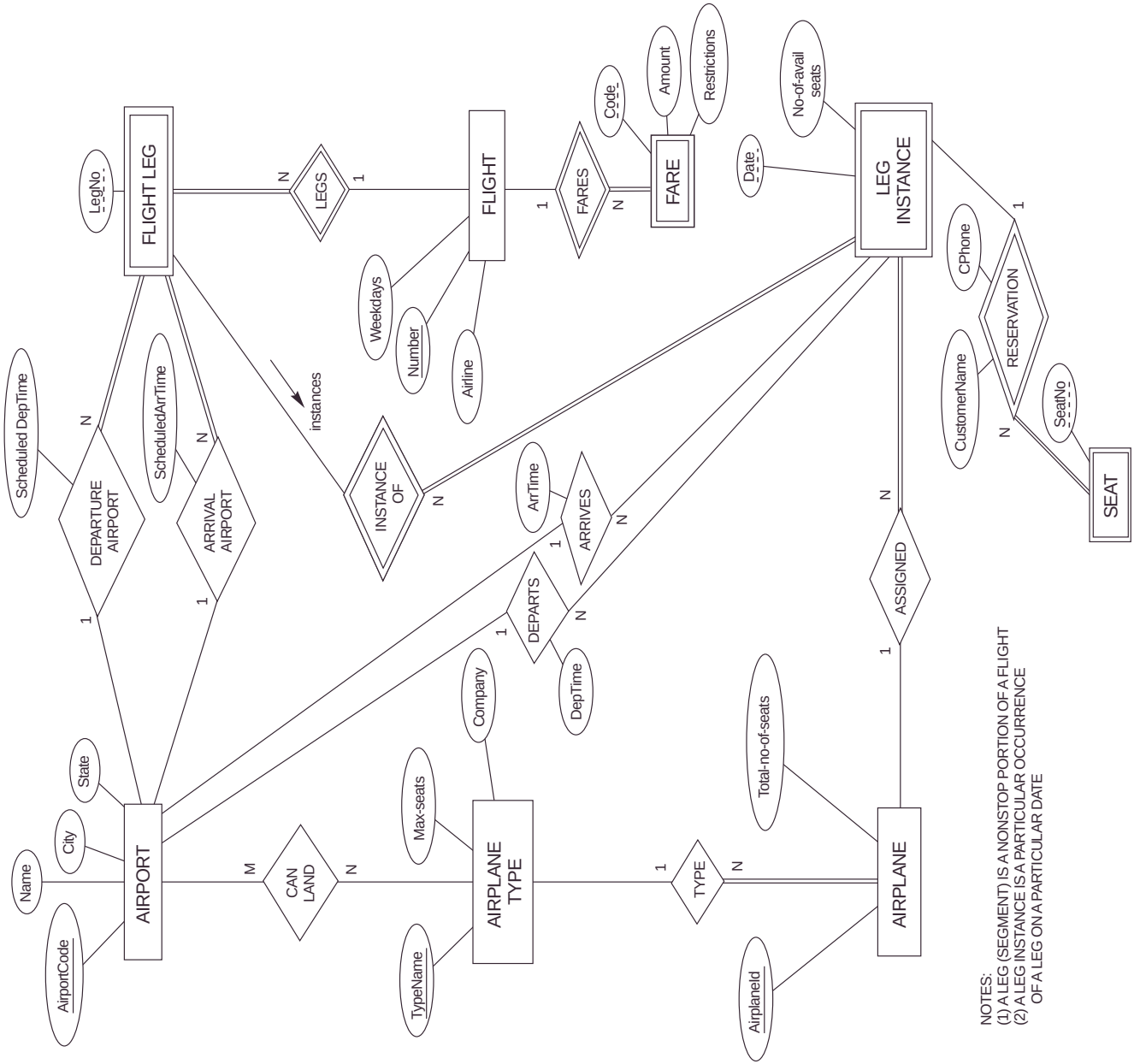

Figure 3.17 An ER diagram for a BANK database.

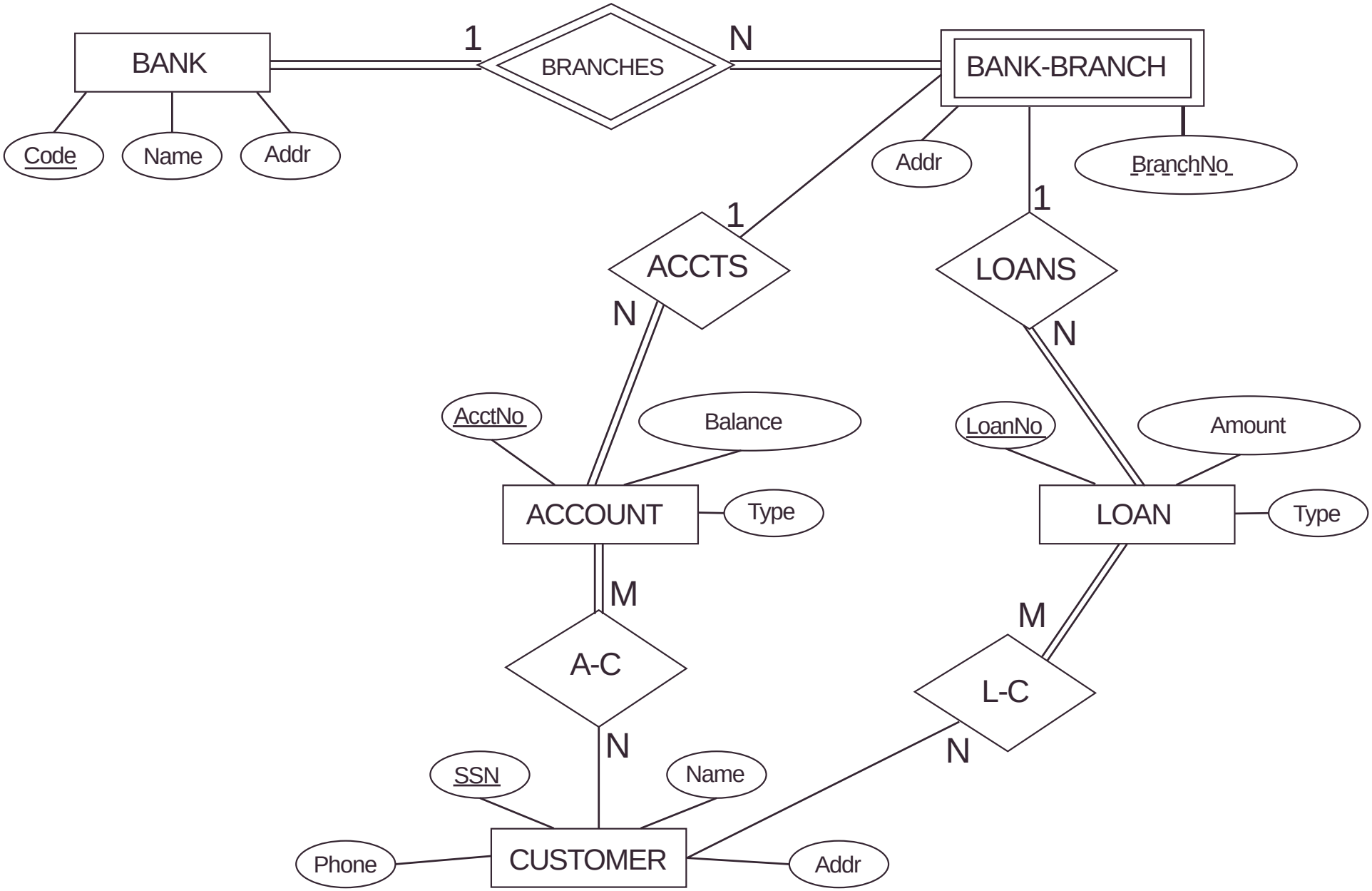

Figure 3.18 An ER diagram for a database that keeps track of company and employee phones.

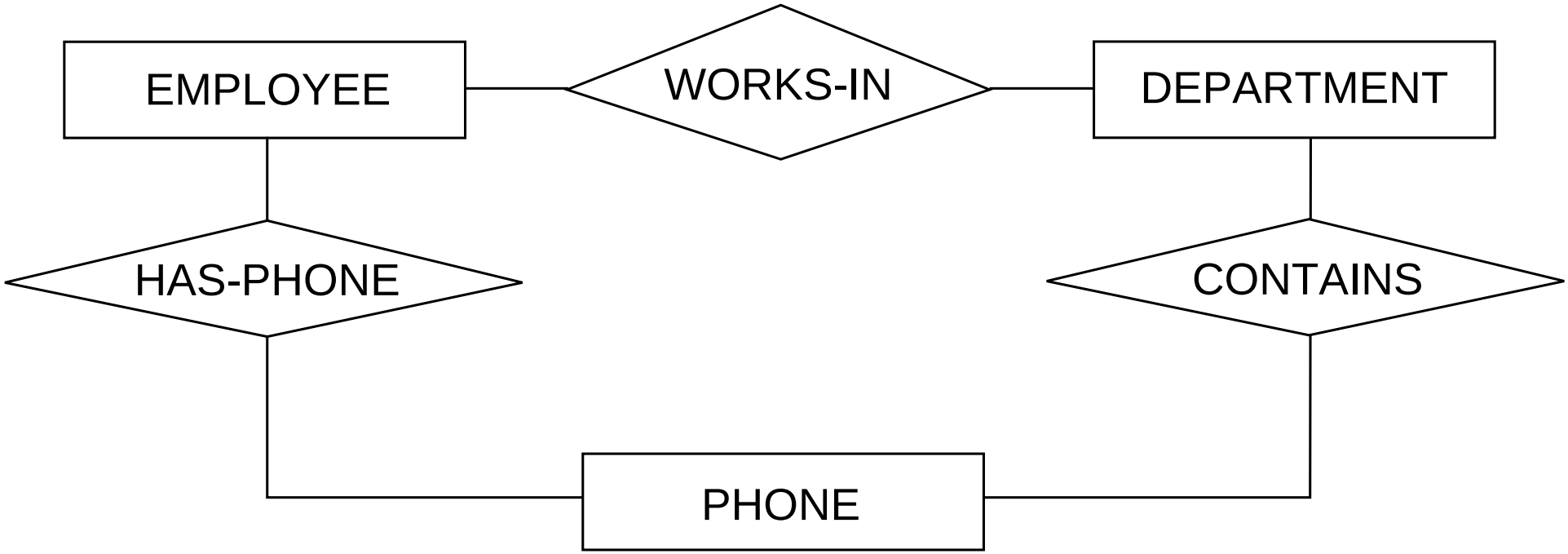

Figure 3.19 An ER diagram for a database that keeps track of textbooks used in courses.