# CS 4400: Introduction to Database Systems

- Translating Your Entity-Relationship (EER) Diagram to Relational Schema
- It's all about "the algorithm"...
- See Chapter 9 of the 7th Edition textbook
- This is the Entity-Relationship Diagram from Chapter 3 for the Company Database

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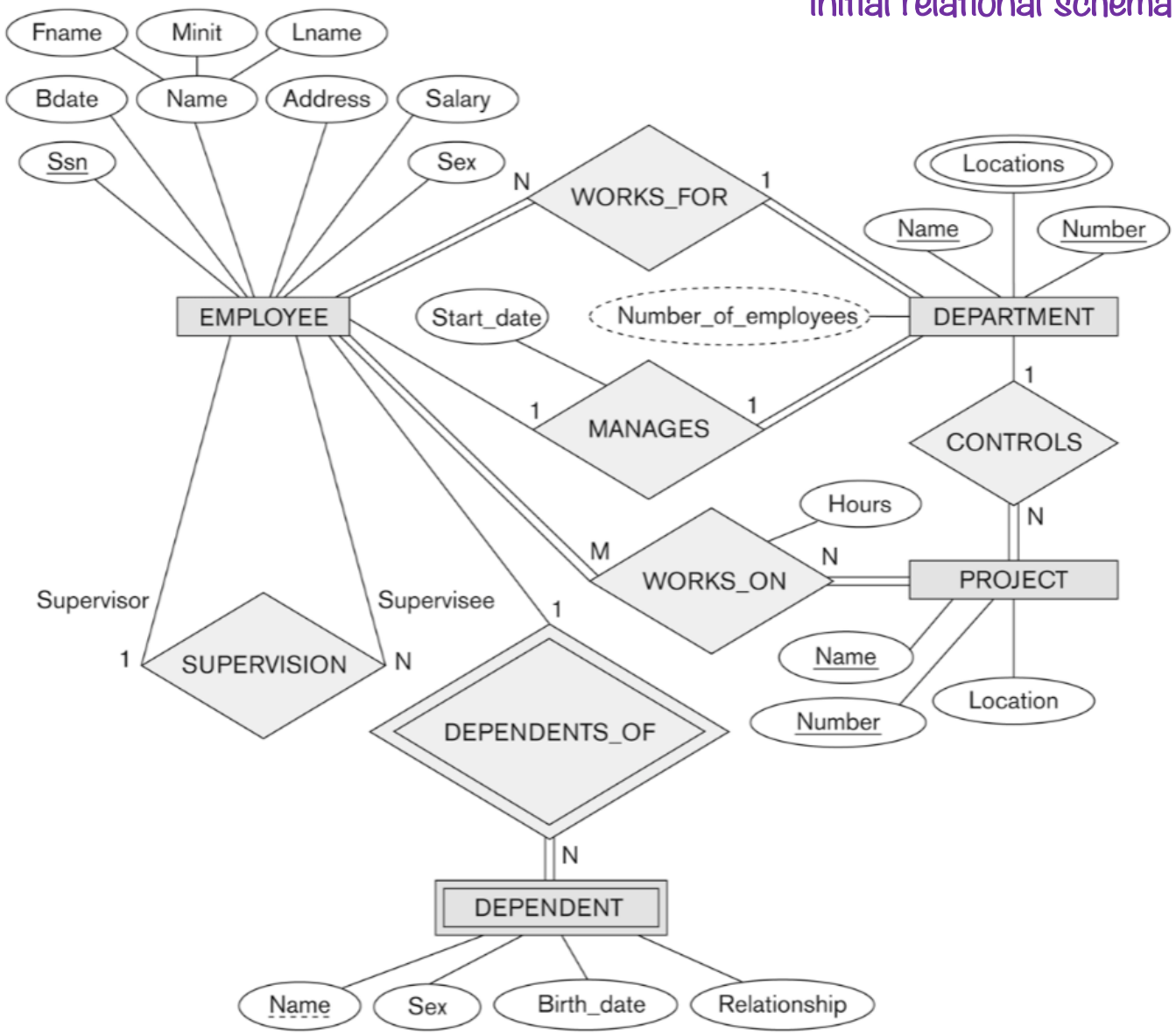
initial relational schema



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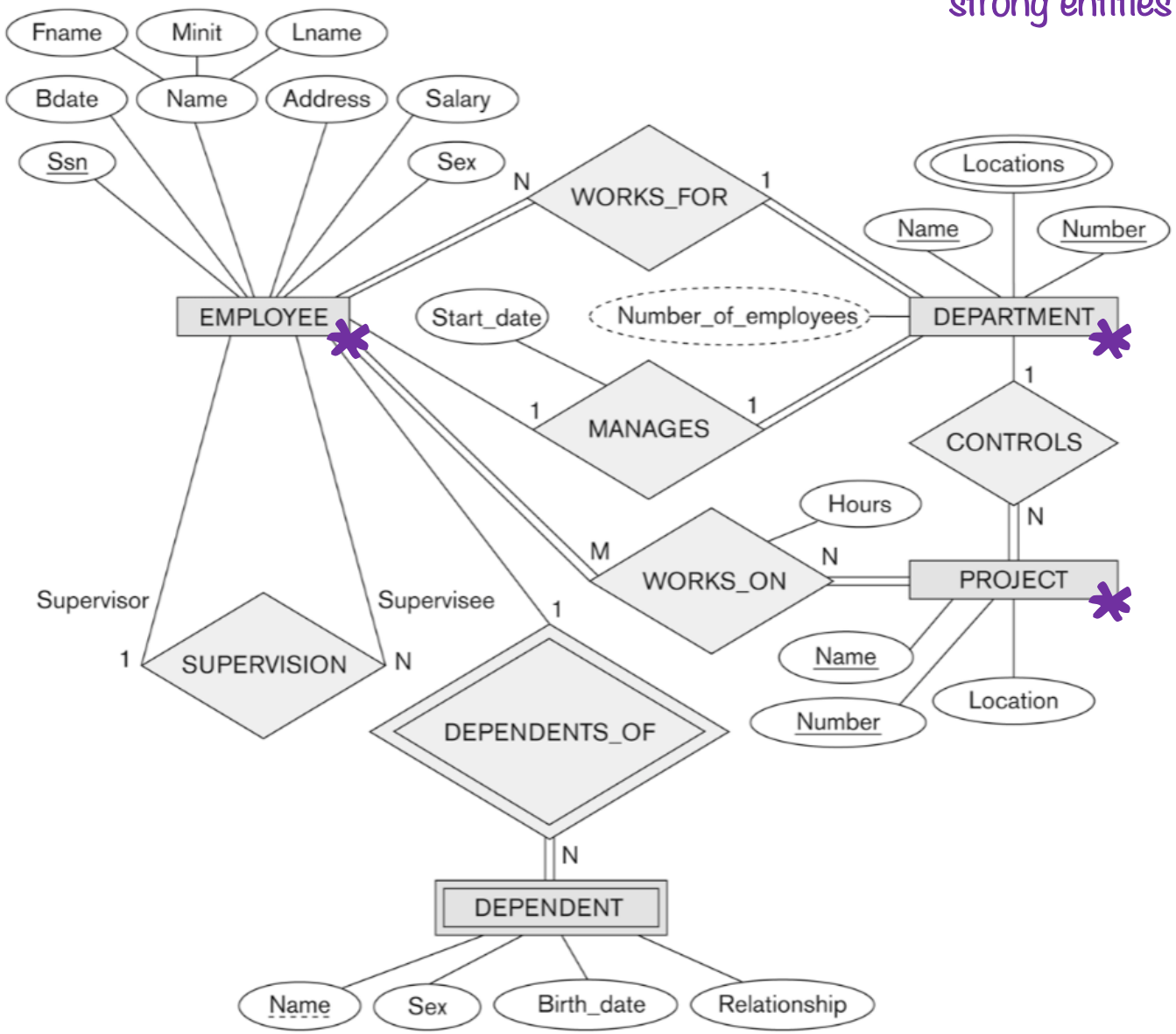


strong entities

employee = (ssn, fname, minit, lname, bdate, address, salary, sex)

department = (number, name)

project = (number, name, location)

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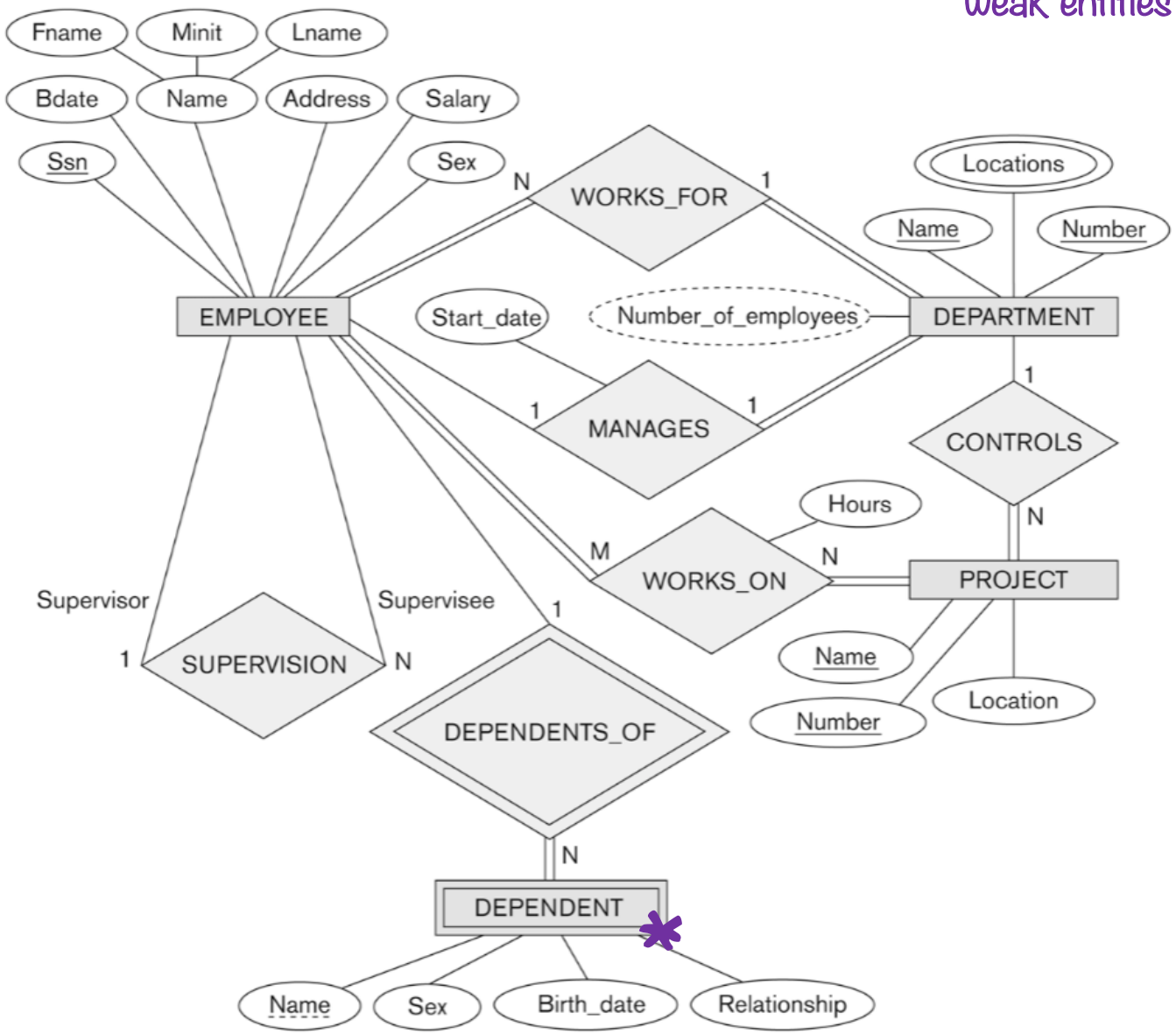


weak entities

**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex)

**department** = (number, name)

**project** = (number, name, location)

**dependent** = (ssn [fk!], name, sex, birth_date, relationship)
fk!: ssn --> **employee** (ssn)

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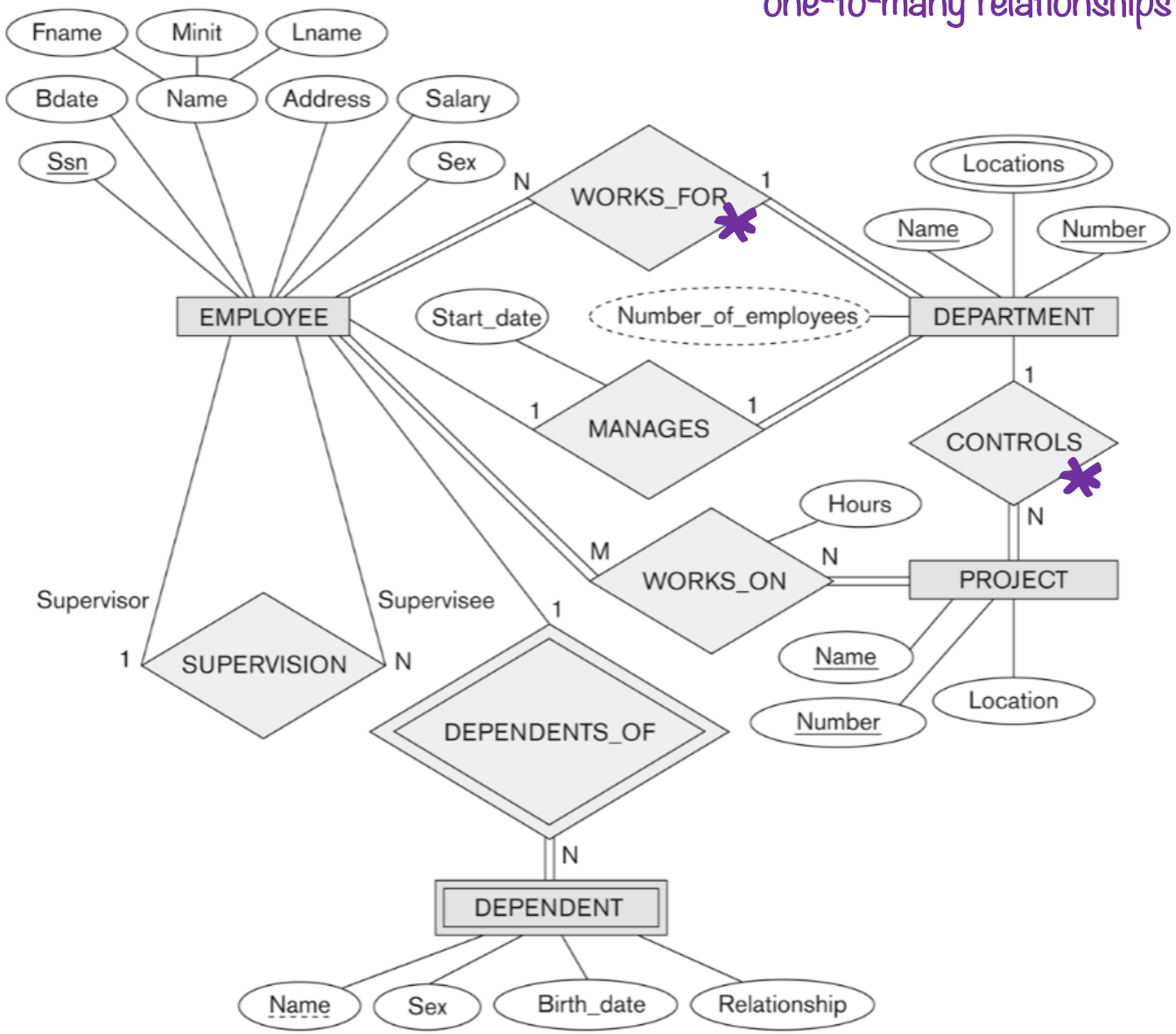
one-to-many relationships




**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex, dept_number [fk2])
fk2: dept_number → **department** (number)

**department** = (number, name)

**project** = (number, name, location, controlling_dept [fk3])
fk3: controlling_dept → **department** (number)

**dependent** = (ssn [fk1], name, sex, birth_date, relationship)
fk1: ssn --> **employee** (ssn)

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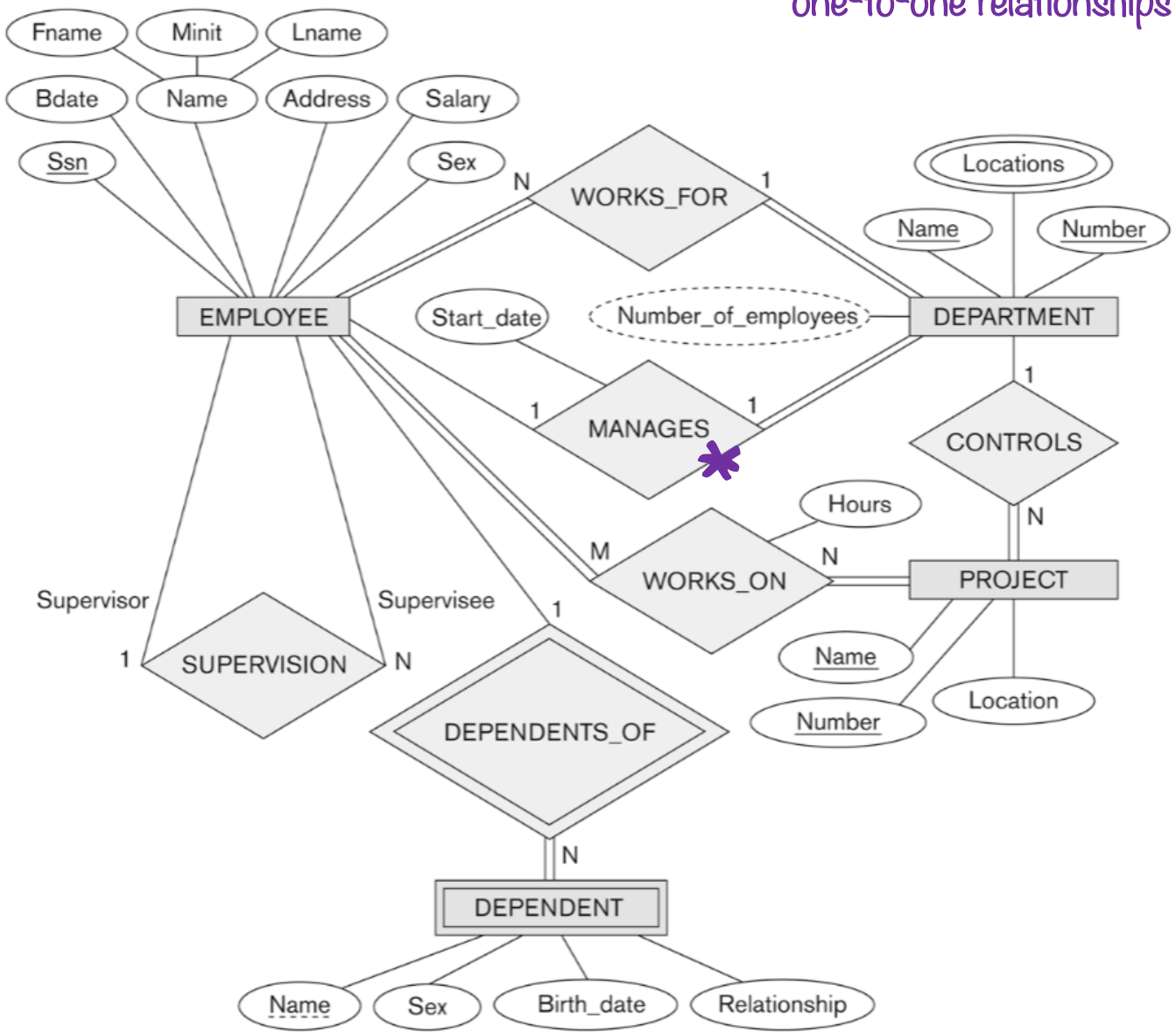
one-to-one relationships




**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex, dept_number [fk2])
fk2: dept_number → **department** (number)

**department** = (number, name, manager_ssn [fk4], start_date)
fk4: manager_ssn → **employee** (ssn)

**project** = (number, name, location, controlling_dept [fk3])
fk3: controlling_dept → **department** (number)

**dependent** = (ssn [fk1], name, sex, birth_date, relationship)
fk1: ssn --> **employee** (ssn)

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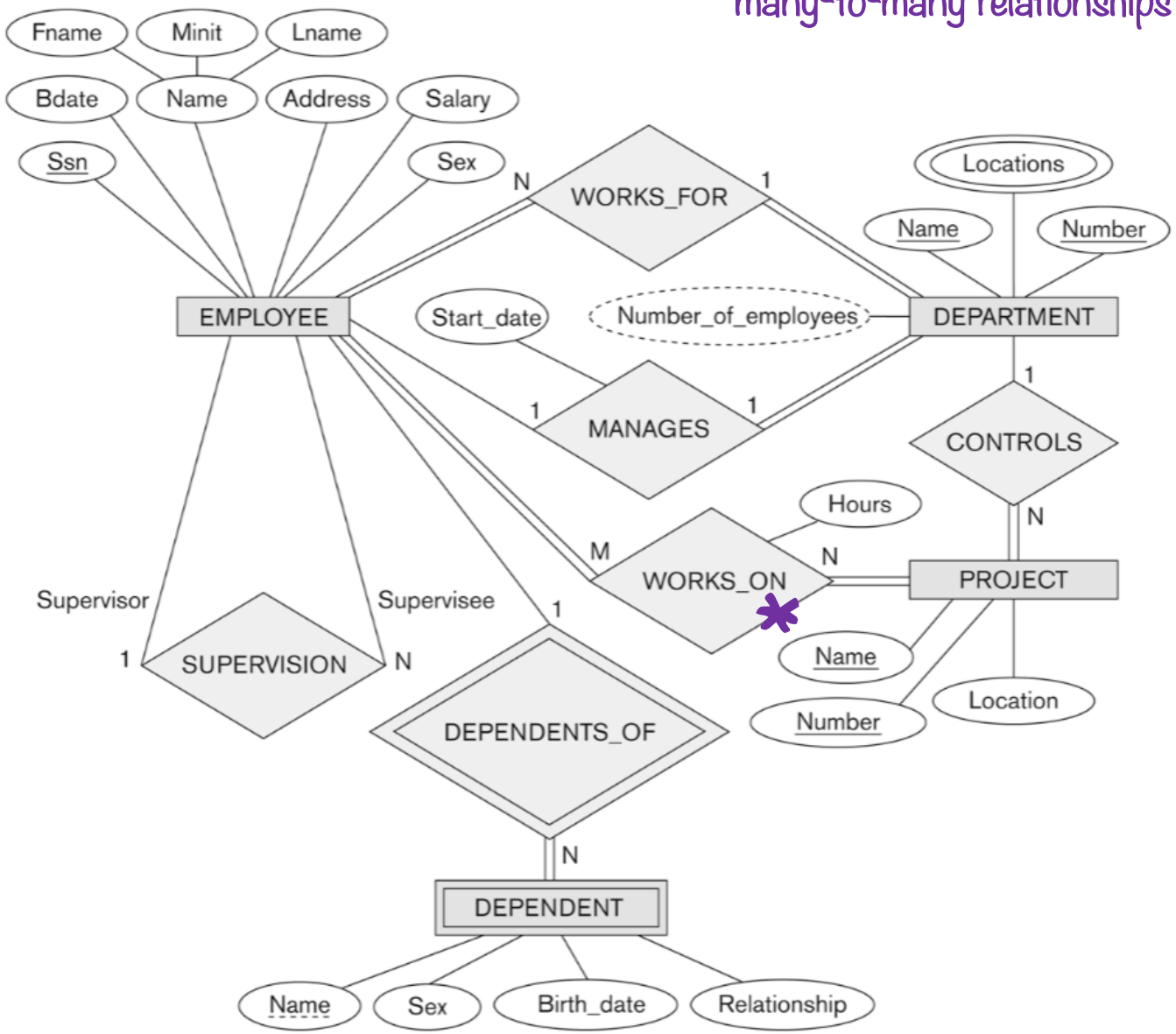


**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex, dept_number [fk2])
fk2: dept_number → **department** (number)

**department** = (number, name, manager_ssn [fk4], start_date)
fk4: manager_ssn → **employee** (ssn)

**project** = (number, name, location, controlling_dept [fk3])
fk3: controlling_dept → **department** (number)

**dependent** = (ssn [fk1], name, sex, birth_date, relationship)
fk1: ssn --> **employee** (ssn)

**works_on** = (employee_ssn [fk5], project_number [fk6], hours)
fk5: employee_ssn → **employee** (ssn)
fk6: project_number → **project** (number)

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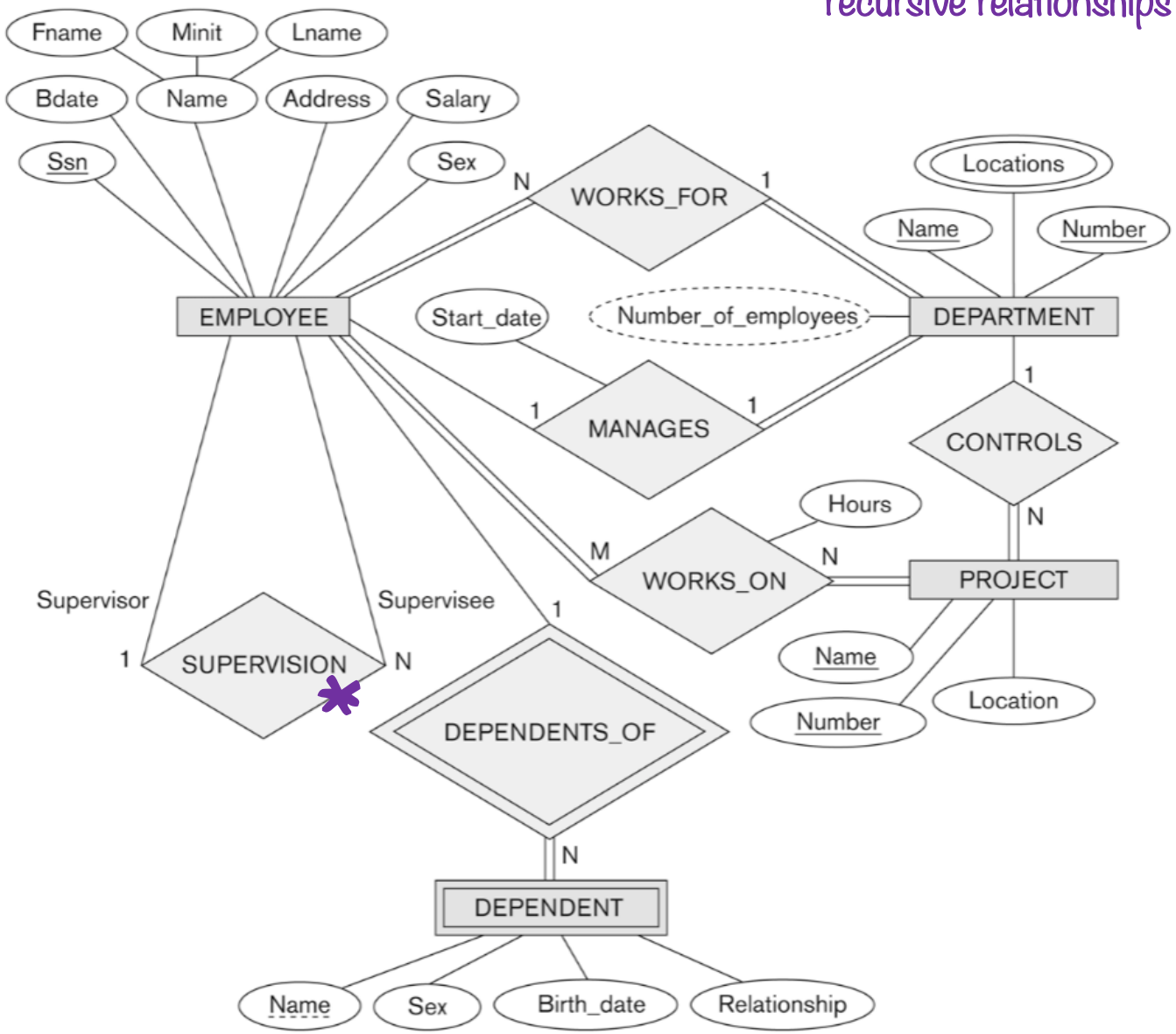


**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex, dept_number [fk2], supervisor_ssn [fk7])
fk2: dept_number → **department** (number)
fk7: supervisor_ssn → **employee** (ssn)

**department** = (number, name, manager_ssn [fk4], start_date)
fk4: manager_ssn → **employee** (ssn)

**project** = (number, name, location, controlling_dept [fk3])
fk3: controlling_dept → **department** (number)

**dependent** = (ssn [fk1], name, sex, birth_date, relationship)
fk1: ssn --> **employee** (ssn)

**works_on** = (employee_ssn [fk5], project_number [fk6], hours)
fk5: employee_ssn → **employee** (ssn)
fk6: project_number → **project** (number)

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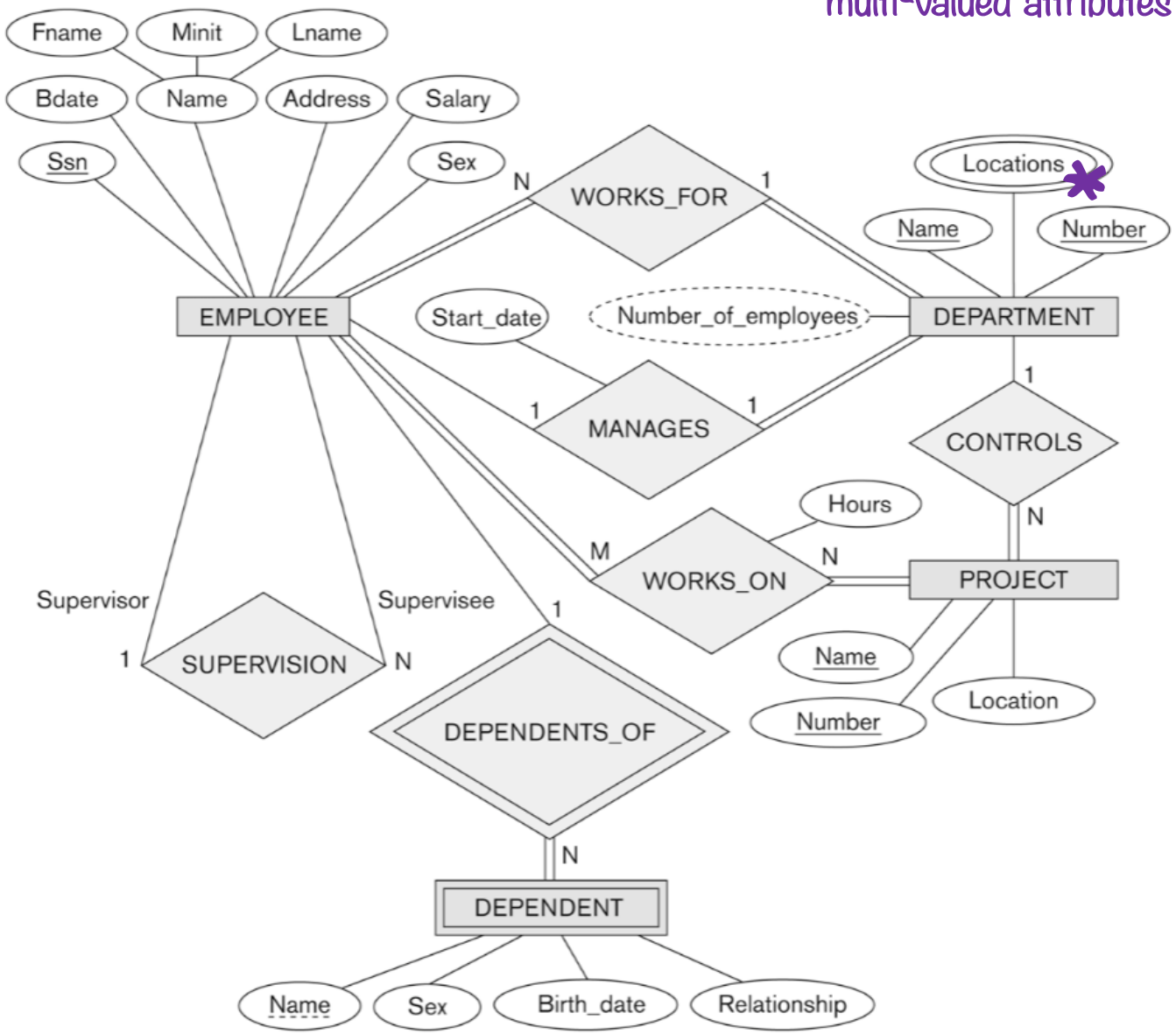


**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex, dept_number [fk2], supervisor_ssn [fk7])
fk2: dept_number → **department** (number)
fk7: supervisor_ssn → **employee** (ssn)

**department** = (number, name, manager_ssn [fk4], start_date)
fk4: manager_ssn → **employee** (ssn)

**project** = (number, name, location, controlling_dept [fk3])
fk3: controlling_dept → **department** (number)

**dependent** = (ssn [fk1], name, sex, birth_date, relationship)
fk1: ssn --> **employee** (ssn)

**works_on** = (employee_ssn [fk5], project_number [fk6], hours)
fk5: employee_ssn → **employee** (ssn)
fk6: project_number → **project** (number)

**dept_locations** = (dept_number [fk8], location_name)
fk8: dept_number → **department** (number)

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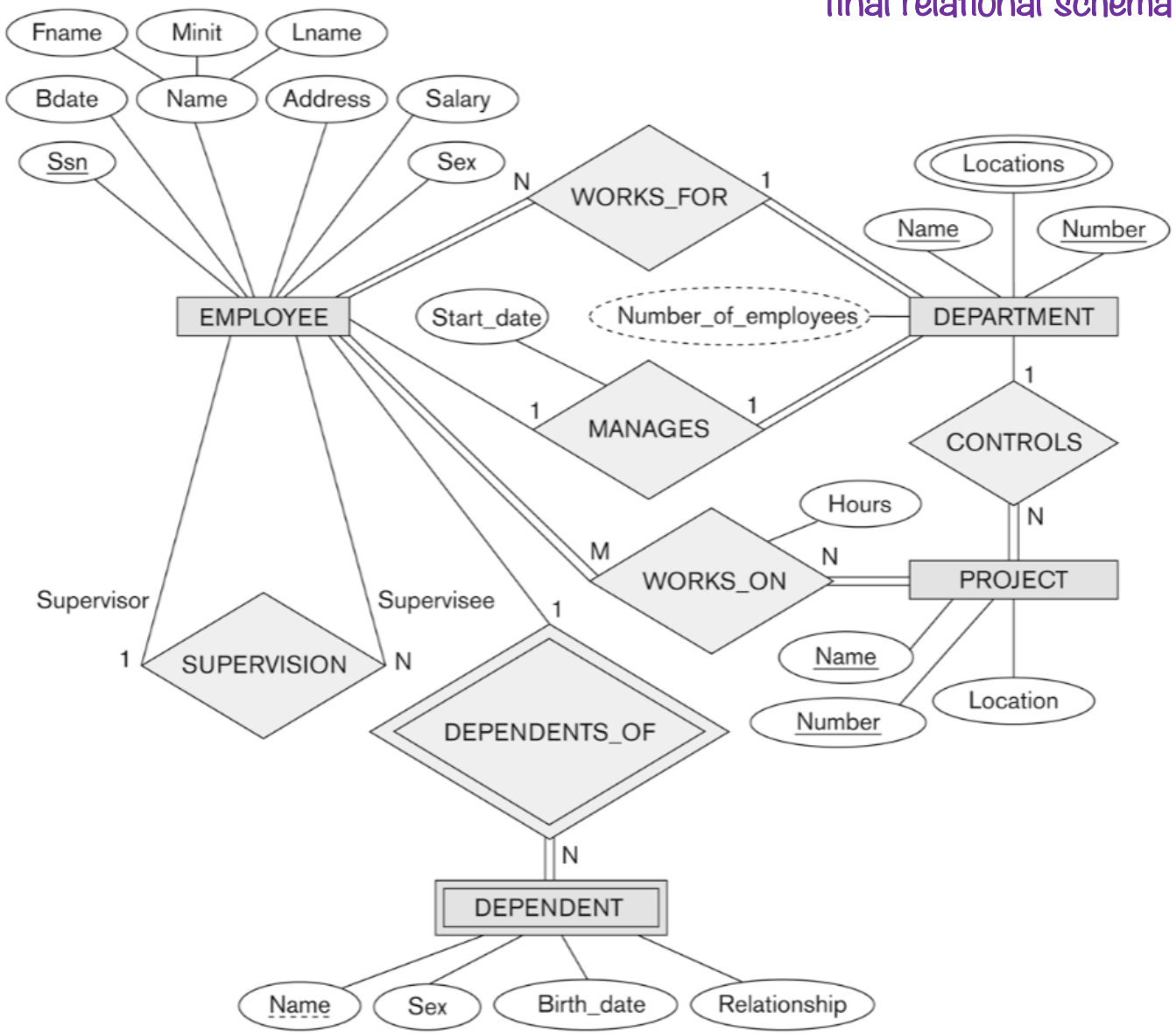


final relational schema

**employee** = (ssn, fname, minit, lname, bdate, address, salary, sex, dept_number [fk2], supervisor_ssn [fk7])
fk2: dept_number → **department** (number)
fk7: supervisor_ssn → **employee** (ssn)

**department** = (number, name, manager_ssn [fk4], start_date)
fk4: manager_ssn → **employee** (ssn)

**project** = (number, name, location, controlling_dept [fk3])
fk3: controlling_dept → **department** (number)

**dependent** = (ssn [fk1], name, sex, birth_date, relationship)
fk1: ssn --> **employee** (ssn)

**works_on** = (employee_ssn [fk5], project_number [fk6], hours)
fk5: employee_ssn → **employee** (ssn)
fk6: project_number → **project** (number)

**dept_locations** = (dept_number [fk8], location_name)
fk8: dept_number → **department** (number)