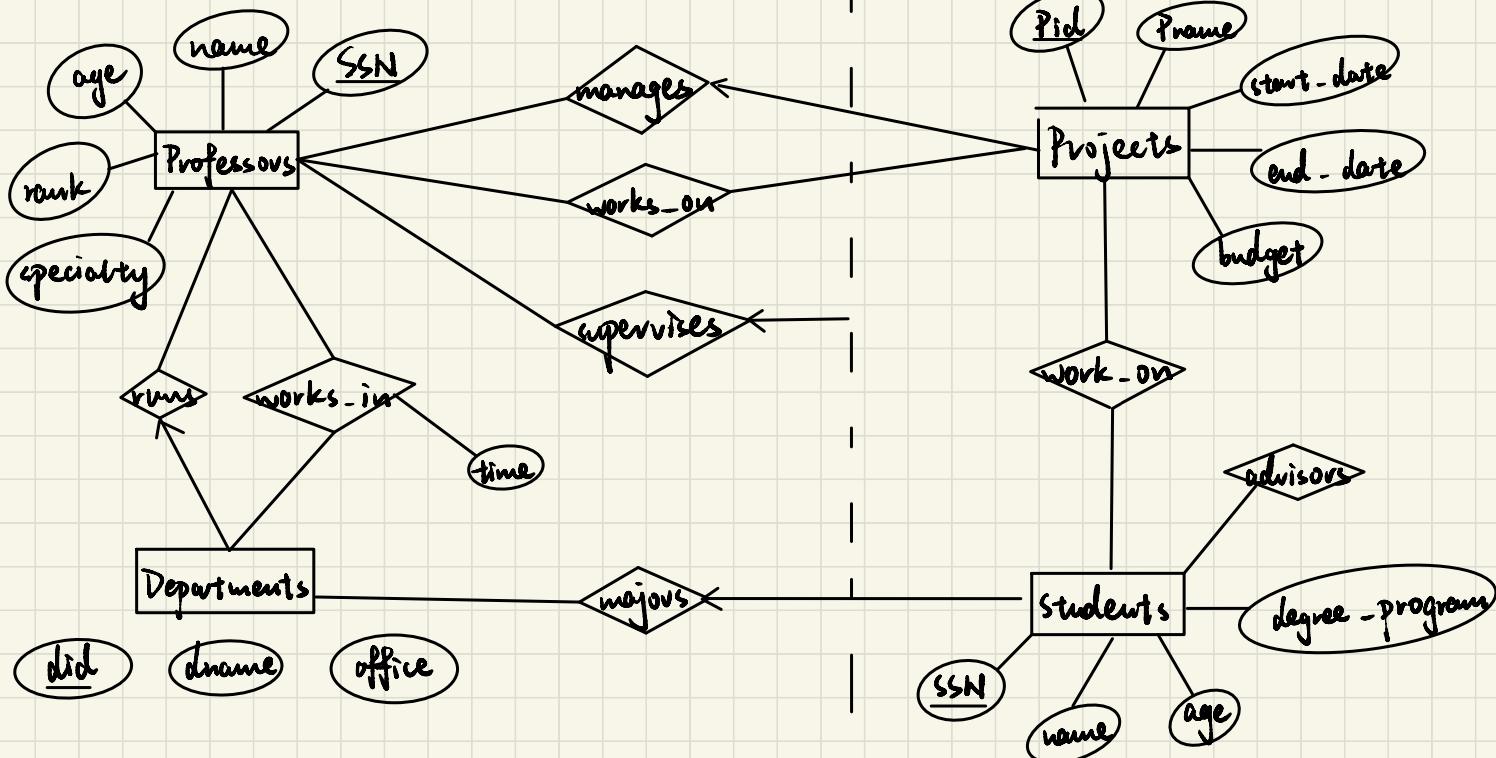


2.3



2.5

Musicians (ssn : string, name : string)

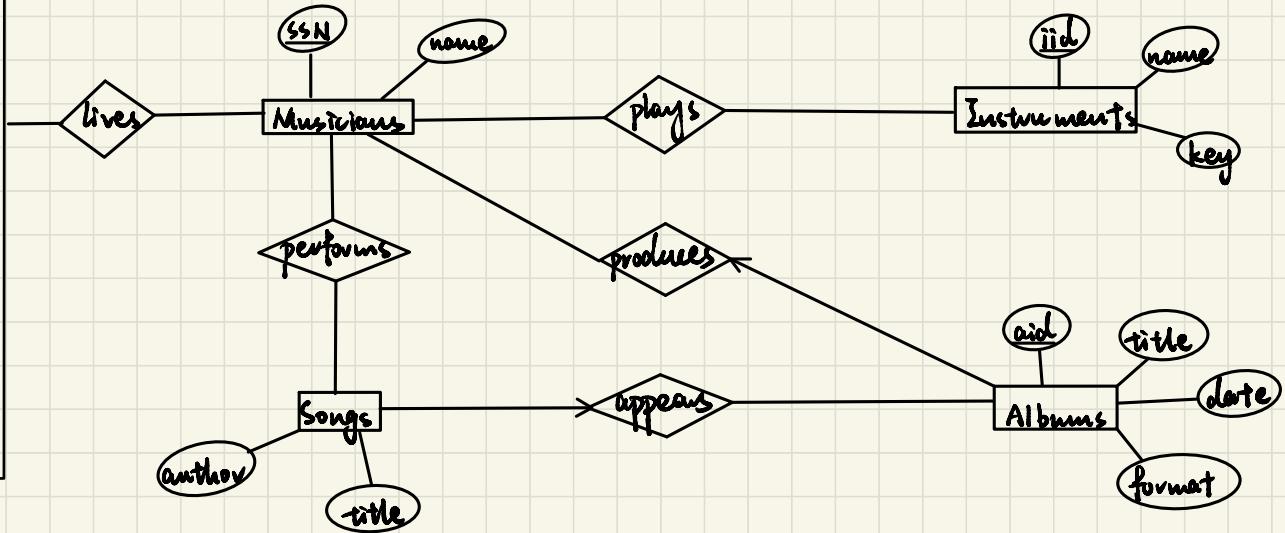
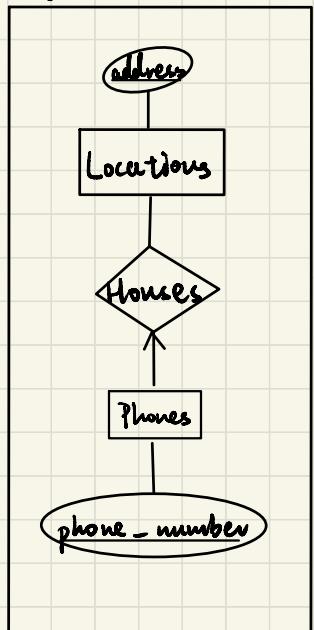
Locations (address : string)

Phones (phone_number : int)

Instruments (iid : int, name : string, key : string)

Albums : (aid : int, title : string, date : date, format : string)

Songs : (title : string, author : string)



2.b

Airplanes (aid)

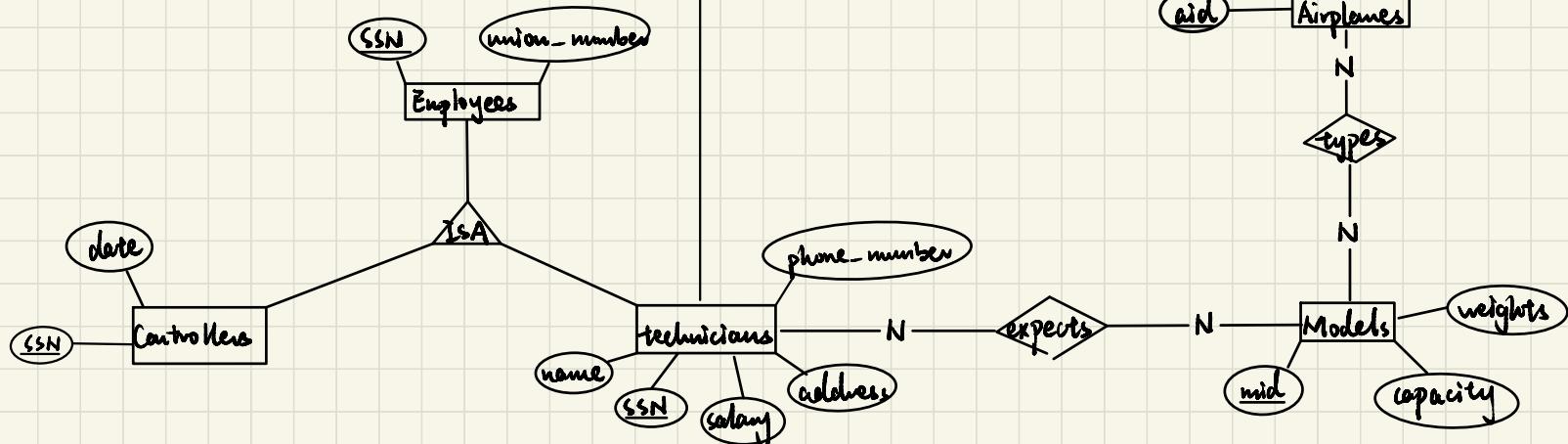
Models (mid, capacity, weight)

Technicians (name, ssn, address, phone-number, salary)

Controllers (ssn, date)

Employees (ssn, union-number)

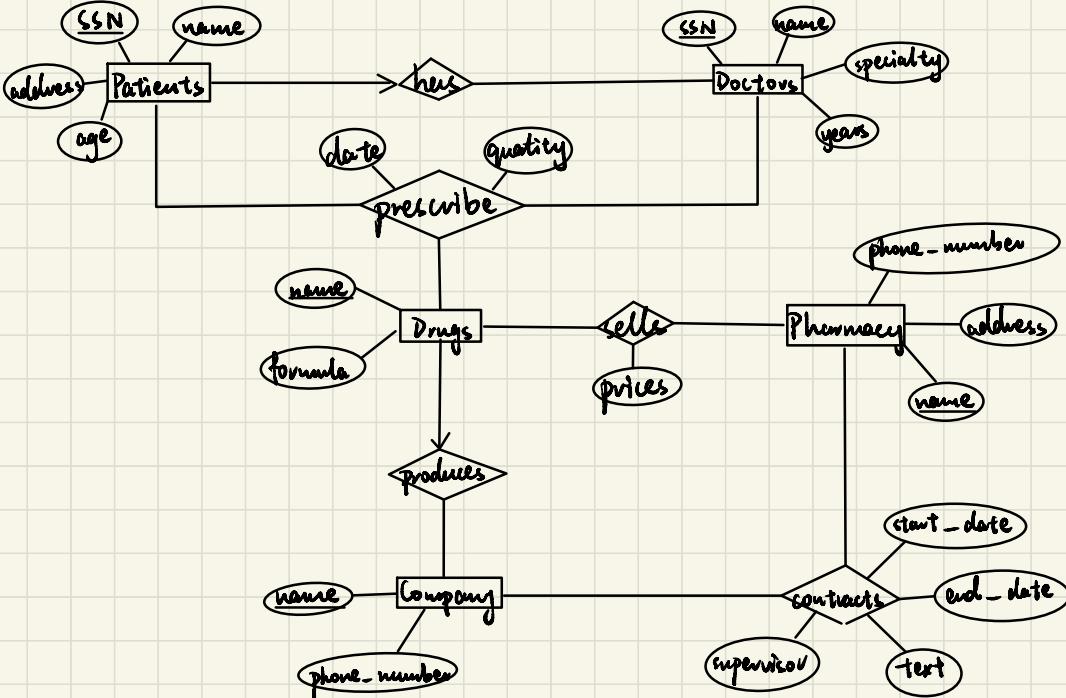
Tests (tid, name, score)



The FAA can't require technician.

All the employees belong to only one union.

2.7



- 2) The "price" attribute in "sells" should be removed and added it into "Drugs".
- 3) We should create a new "prescription", which contains "prescription's id", "date" and "quantity".

3.2

The cardinality of a relation instance is the number of tuple in it. Therefore there're 22 tuples.

3.4

A relation can have more than one candidate key, which is eligible to become a primary key.

A relation has only one primary key, which identifies records.

Superkey is a set of attributes in a relation that can identify records.

3.5

1. "name"

2. No, there isn't.

3.6

A foreign key constraint identifies the relationship between the database tables by referencing a attribute.

It's important because it can provide safeguards for insuring the integrity of data.

Referential integrity means all foreign key constraints are enforced.

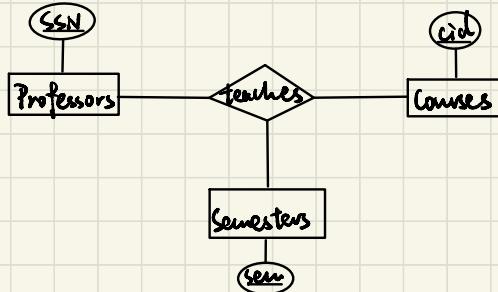
3.7

Enrolled (sid and cid) Teaches (fid and cid) Meets_In (cid and rno)

The length of fid, sid and cid could be standardized.

3.12

①



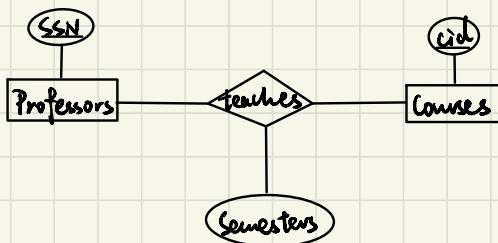
Professors (ssn = string, primary key (ssn))

Courses (cid = int, primary key (cid))

Semesters (sem = string, primary key (sem))

Teaches (ssn = string, cid = int, semester = string, primary key (ssn, cid, semester), foreign key (ssn) references Professors, foreign key (cid) references Courses, foreign key (semester) references Semesters)

②

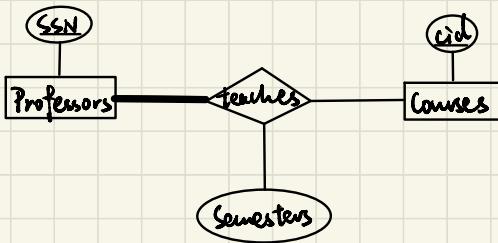


Professors (ssn = string, primary key (ssn))

Courses (cid = int, primary key (cid))

Teaches (ssn = string, cid = int, semester = string, primary key (ssn, cid), foreign key (ssn) references Professors, foreign key (cid) references Courses)

③

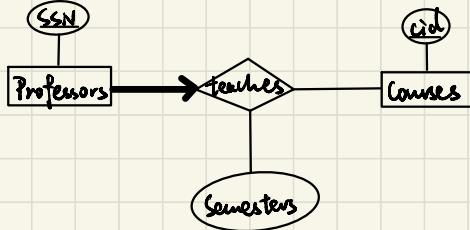


Professors (ssn = string, primary key (ssn))

Courses (cid = int, primary key (cid))

Teaches (ssn = string, cid = int, semester = string, primary key (ssn, cid), foreign key (ssn) references Professors, foreign key (cid) references Courses)

④

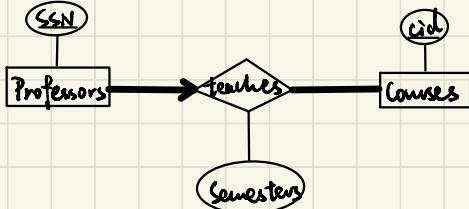


Professors (ssn : string, primary key (ssn))

Courses (cid : int, primary key (cid))

Teachers (ssn : string, cid : int, semesters : string, primary key (ssn), foreign key (cid) references Courses)

⑤

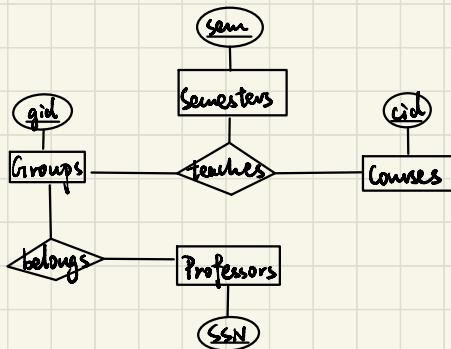


Professors (ssn : string, primary key (ssn))

Courses (cid : int, primary key (cid))

Teachers (ssn : string, cid : int, semesters : string, primary key (ssn), foreign key (cid) references Courses)

⑥



Professors (ssn : string, primary key (ssn))

Courses (cid : int, primary key (cid))

Semesters (sem : string, primary key (sem))

Groups (gid : int, primary key (gid))

belongs (gid : int, ssn : string, primary key (gid, ssn), foreign key (gid) references Groups, foreign key (ssn) references Professors)

Teachers (ssn : string, cid : int, sem : string, primary key (ssn, cid, sem), foreign key (ssn) references Professors, foreign key (cid) references Courses, foreign key (sem) references Semesters)

3.13

Musicians (ssn : string, name : string, primary key (ssn))

Instruments (iid : int, name : string, key : string, primary key (iid))

Locations (address : string, primary key (address))

Phones (phone-number : int, primary key (phone-number))

Phones Locations (address : string, phone-number : int, primary key (phone-number), foreign key (address) references Locations)

Lives (ssn : string, phone-number : int, address : string, primary key (ssn), foreign key (phone-number, address) references Phones Locations, foreign key (ssn) references Musicians)

Plays (ssn : string, iid : int, primary key (ssn, iid), foreign key (ssn) references Musicians, foreign key (iid) references Instruments)

Songs (title : string, author : string)

Albums (aid : int, title : string, date : date, format : string, primary key (aid))

Appears (aid : int, foreign key (aid) references Albums)

Produces (ssn : string, aid : int, primary key (aid), foreign key (ssn) references Musicians)

Performs (ssn : string, foreign key (ssn) references Musicians)

3.16

Employees (ssn = string, union-number = int, primary key (ssn))

Technicians (name = string, ssn = string, address = string, phone-number = int, salary = int, primary key (ssn), foreign key (ssn) references Employees)

Carwalkers (ssn = string, date = date, primary key (ssn), foreign key (ssn) references Employees)

Models (mid = int, capacity = int, weight = int, primary key (mid))

Airplanes (aid = int, primary key (aid))

Tests (name = string, tid = int, score = int, primary key (tid))

Experts (ssn = string, mid = int, primary key (ssn, mid), foreign key (ssn) references Employees, foreign key (mid) references Models)

Types (aid = int, mid = int, primary key (aid, mid), foreign key (aid) references Airplanes, foreign key (mid) references Models)

Test_info (ssn = string, mid = int, tid = int, date = date, score = int, hours = int, primary key (ssn, mid, tid), foreign key (tid) references Tests, foreign key (ssn) references Employees, foreign key (mid) references Models)