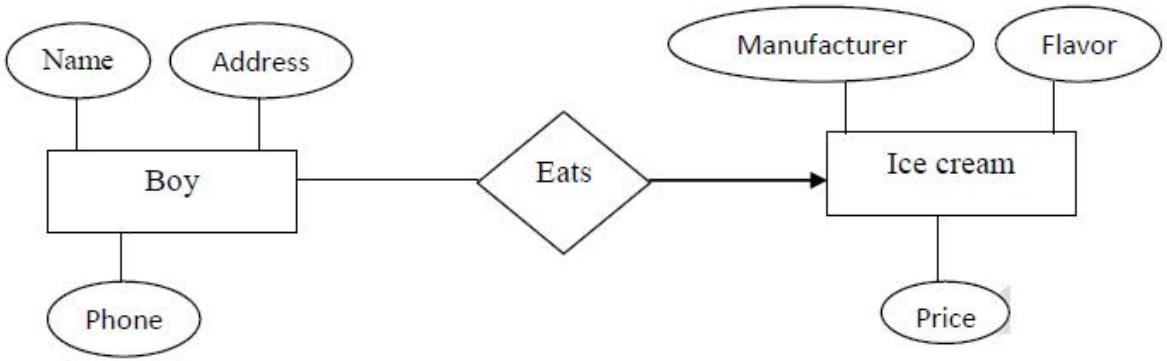
TDA357 Databases

Design recap quiz

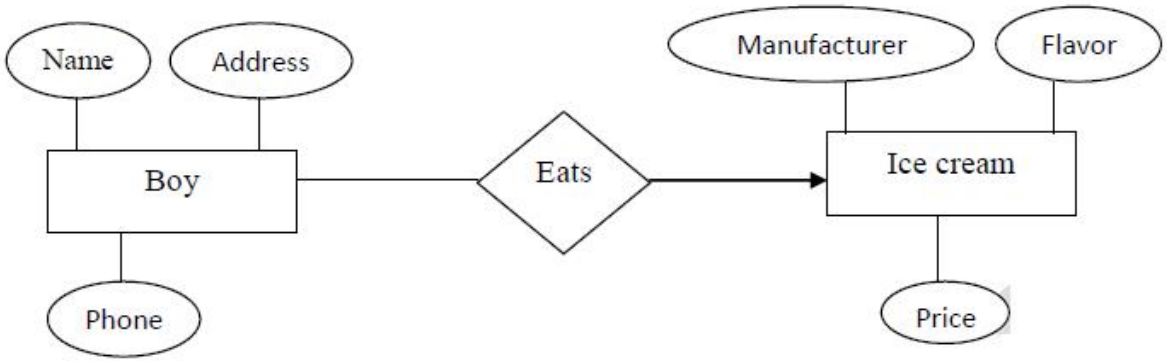
What is this?

- This quiz was used in the TDA357/DIT620 lecture on Wednesday 2016-11-09 8:00-10:00
- Students participated using kahoot
  - Part 1 (Questions 1-14 from this slide-deck, Questions 1–14 in kahoot)
    - https://goo.gl/NsKEmt
  - Part 2 (Questions 15-21 from this slide-desk, Questions 1-7 in kahoot):
    - https://goo.gl/syOy36

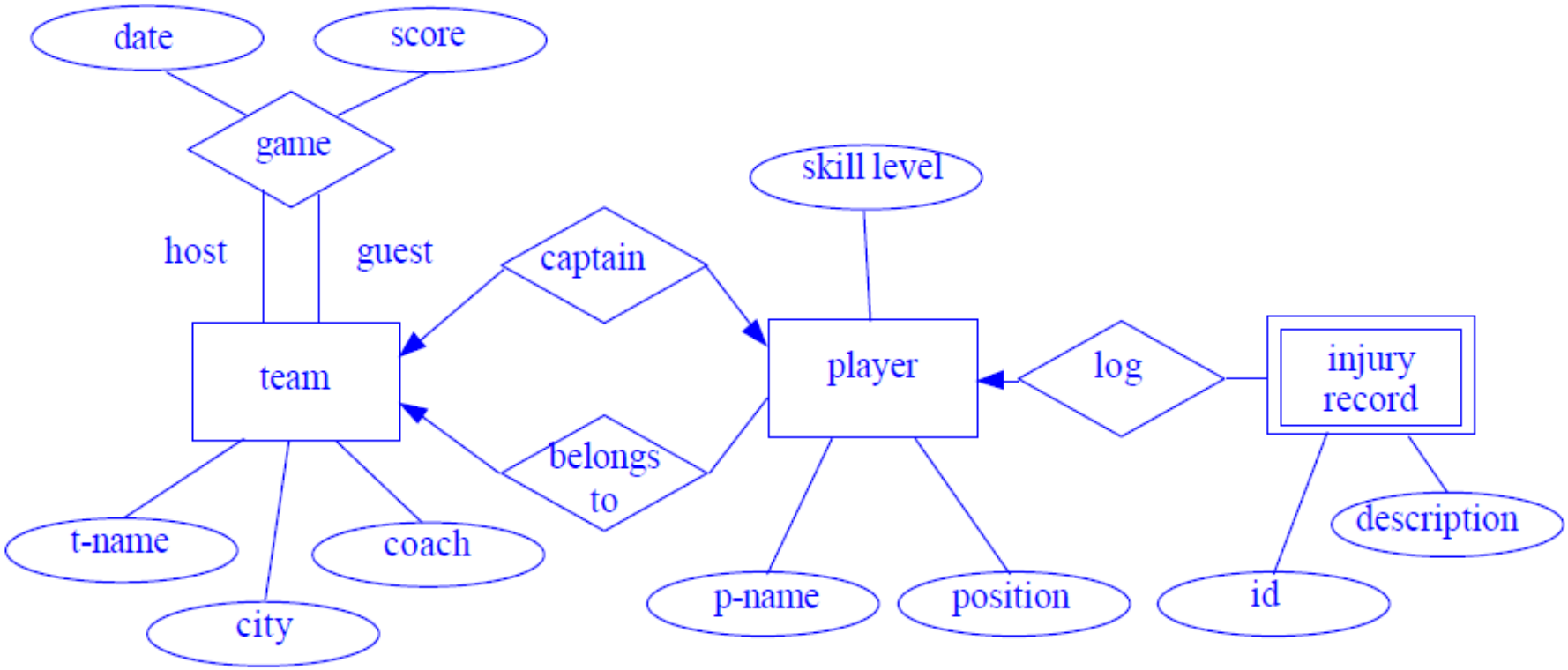
Q1: How many icecreams does one boy eat?



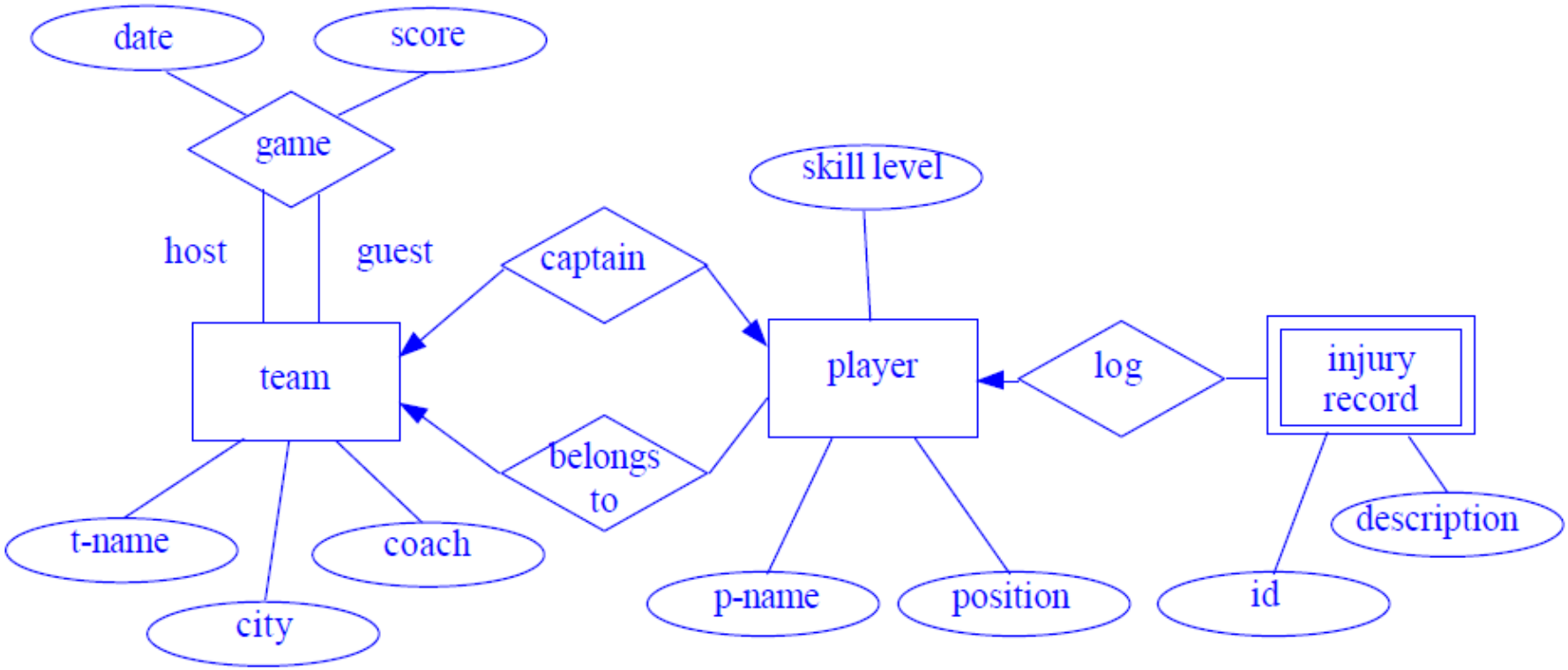
Q2: How many boys can eat one ice cream?



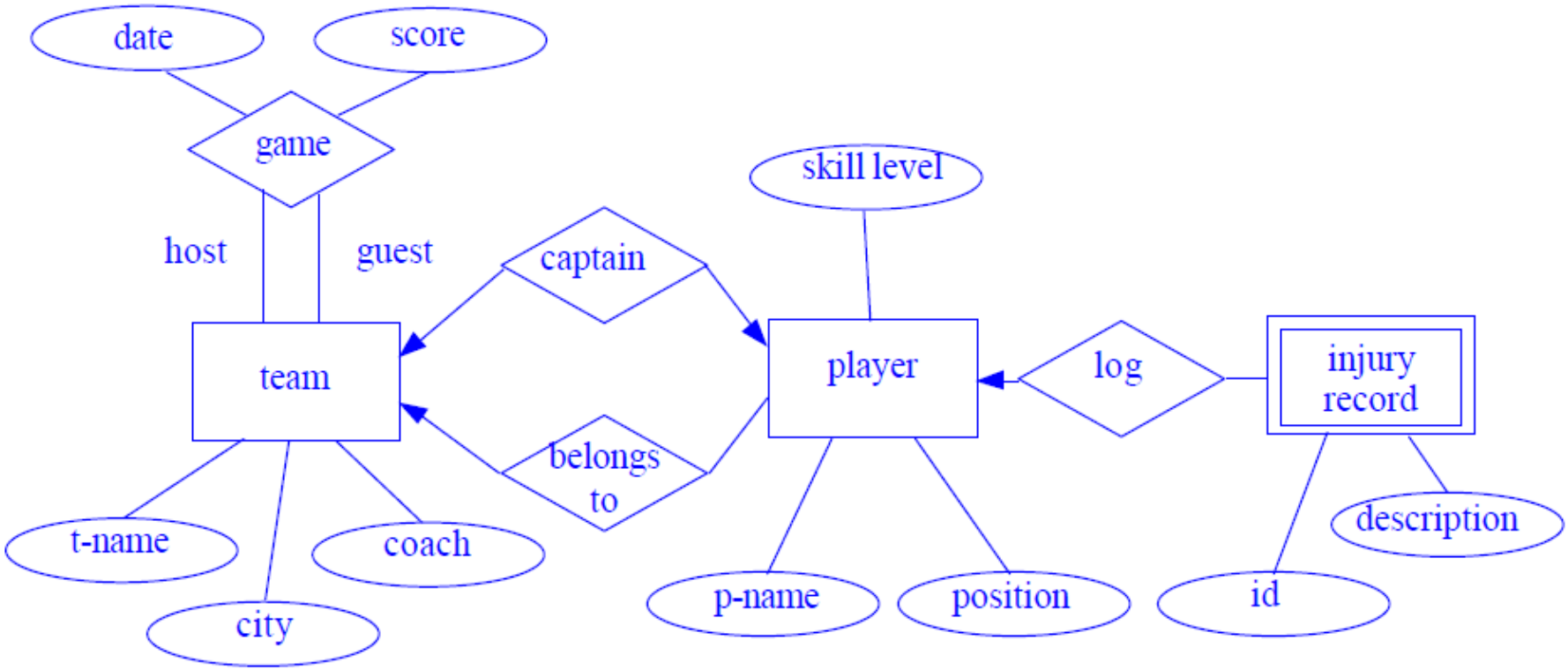
Q3: How many captains can a team have?



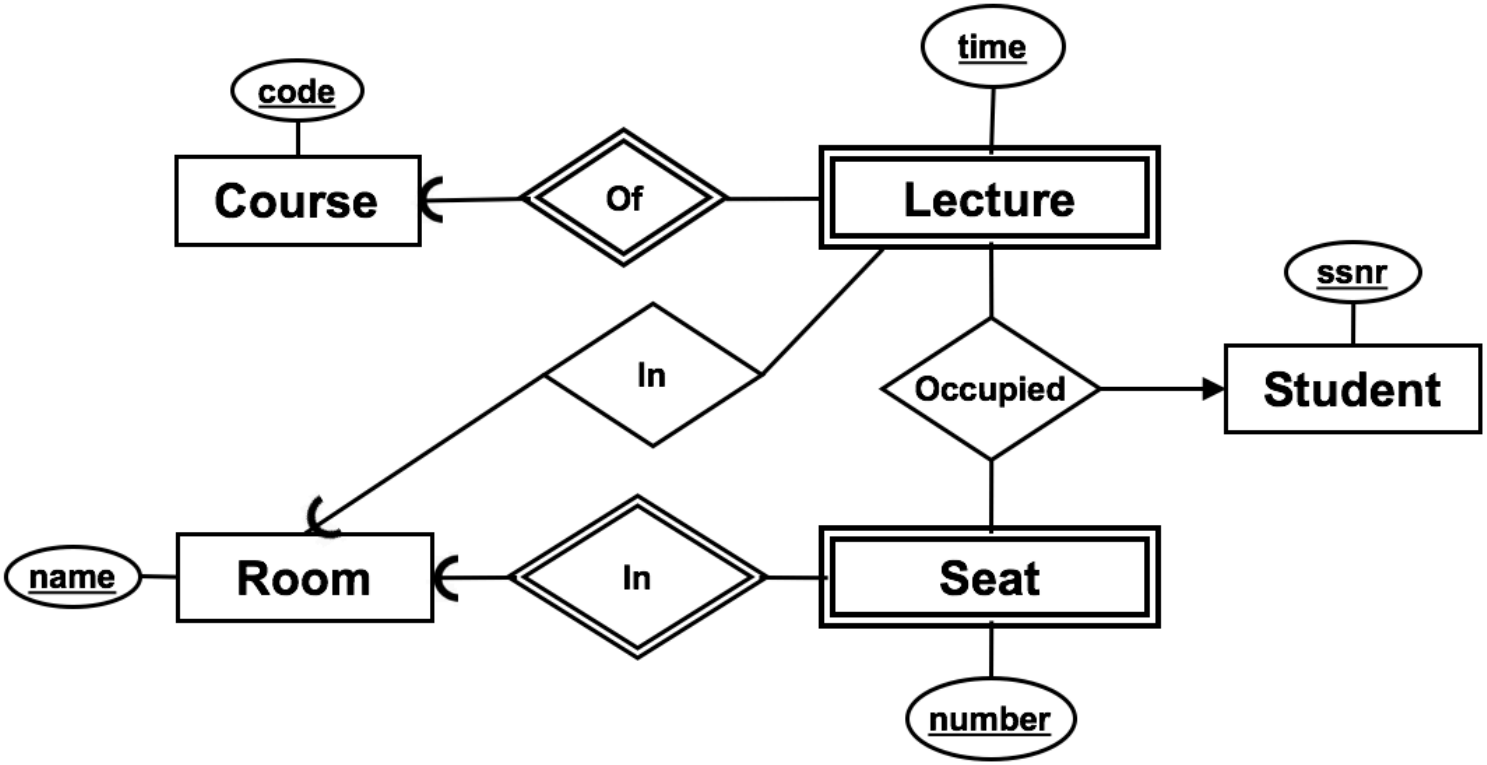
Q4: How many teams can a player be captain of?



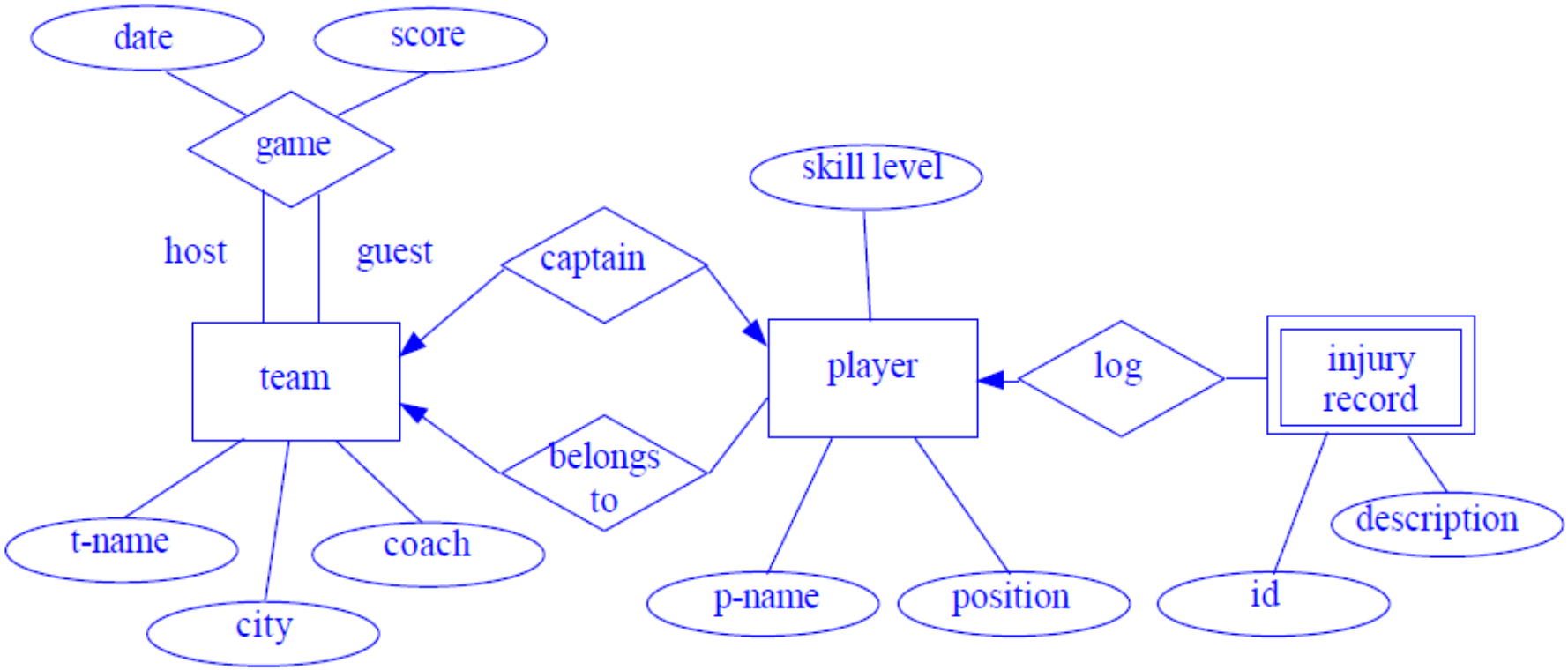
Q5: Can a player be a captain without belonging to that team?



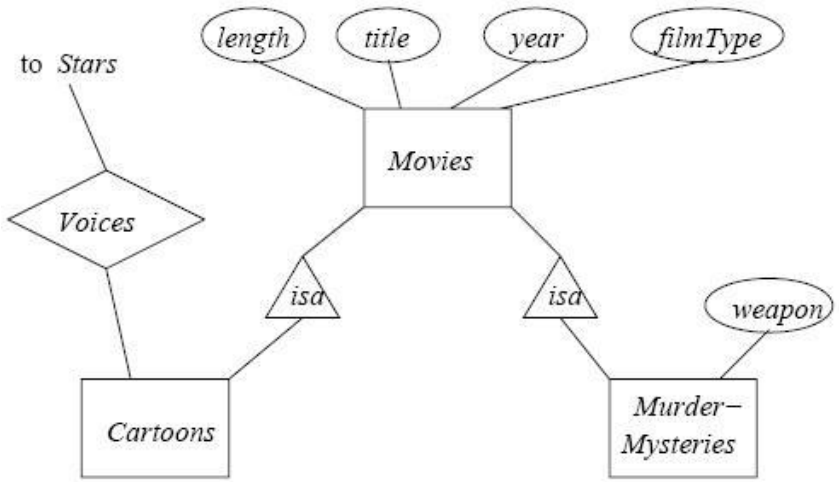
Q6: How many lectures can be held in a room?



Q7: what is “injury record”?



Q8: what is “cartoons”?

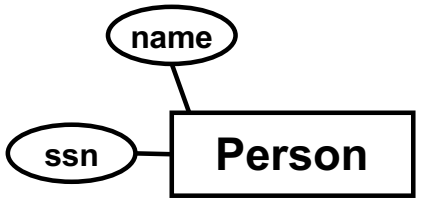


Isa relationships in an E/R diagram

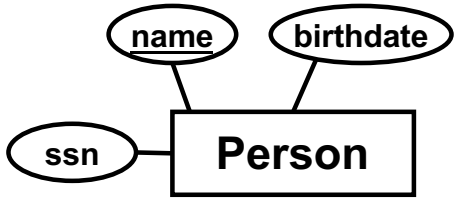
Q9: Draw the ER diagram

- A person has a name, birthday and SSN.
- Names and birthdays are not unique

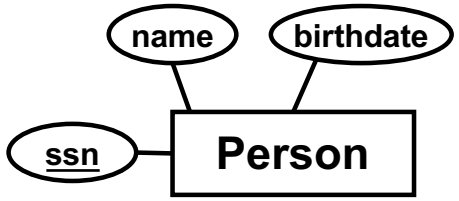
A9


name
ssn
Person

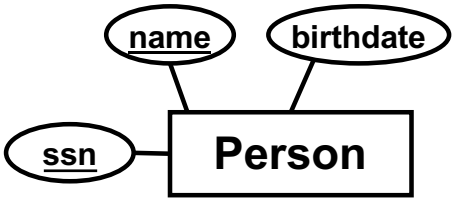
(A)


name
birthdate
ssn
Person

(B)


name
birthdate
ssn
Person

(C)


name
birthdate
ssn
Person

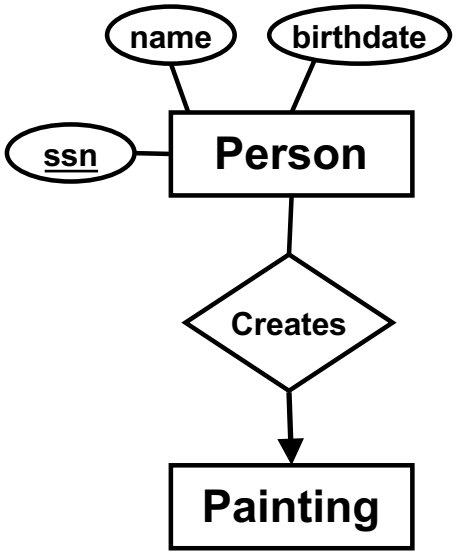
(D)

Q10: Draw the ER diagram

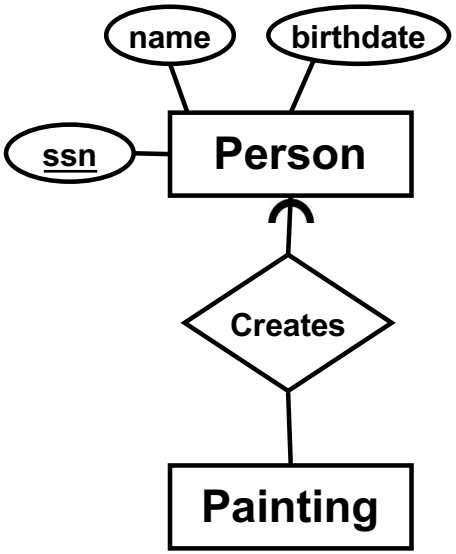
- A person has a name, birthday and SSN.
- Names and birthdays are not unique

- A person can create many paintings
- but paintings are created by exactly one person

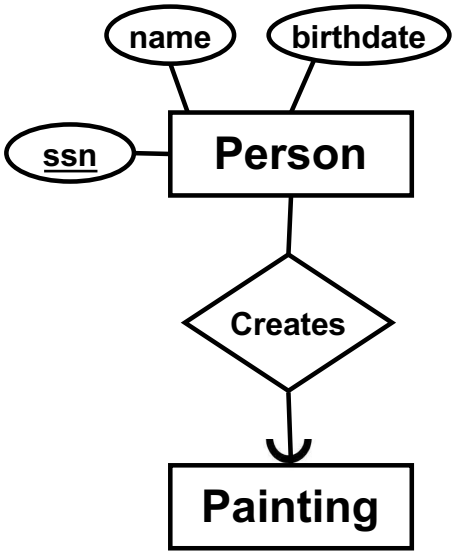
A10


name
birthdate
ssn
Person
Creates
Painting

(A)


name
birthdate
ssn
Person
Creates
Painting

(B)


name
birthdate
ssn
Person
Creates
Painting

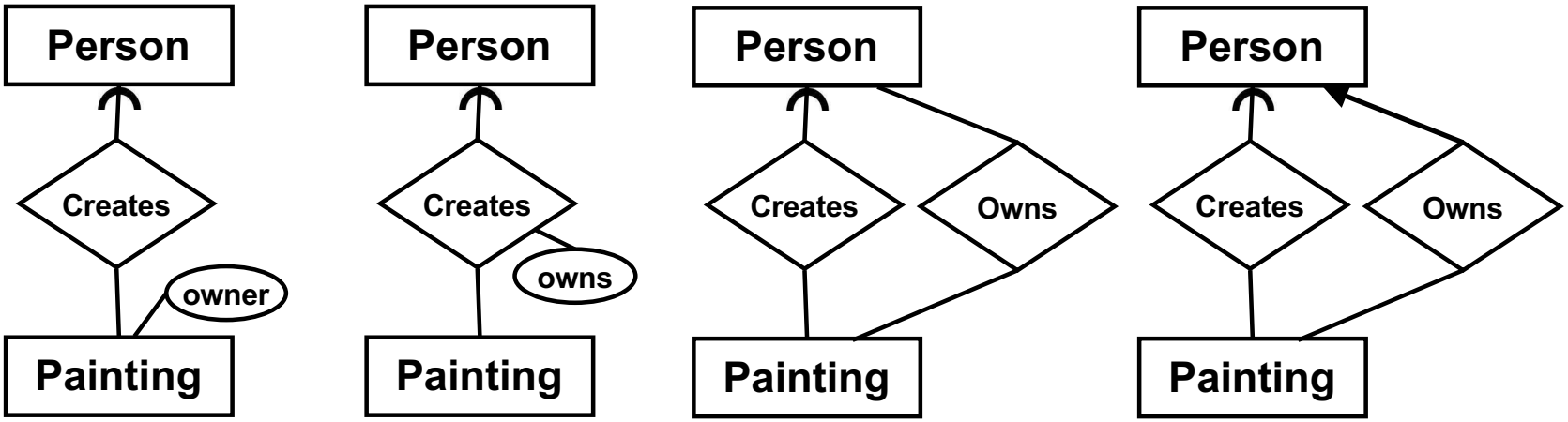
(C)

Q11: Draw the ER diagram

- A person has a name, birthday and SSN.
- Names and birthdays are not unique
- A person can create many paintings
- but paintings are created by exactly one person

- People (a group of persons) can also own paintings

A11


Person
Creates
owner
Painting
Person
Creates
owns
Painting
Person
Creates
Owns
Painting
Person
Creates
Owns
Painting

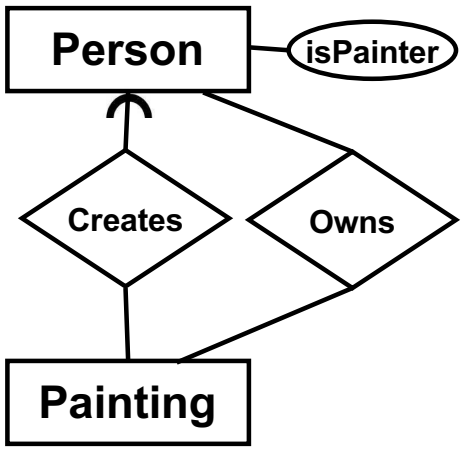
(A) (B) (C) (D)

Q12: Draw the ER diagram

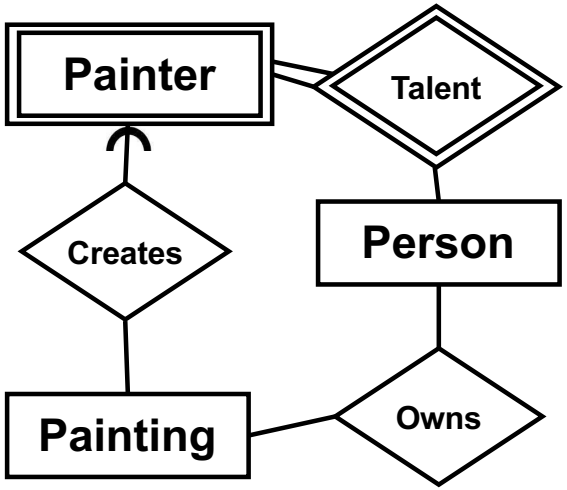
- A person has a name, birthday and SSN.
- Names and birthdays are not unique
- A person can create many paintings
- but paintings are created by exactly one person
- People (a group of persons) can also own paintings

- Only painters create paintings. Painters are people.

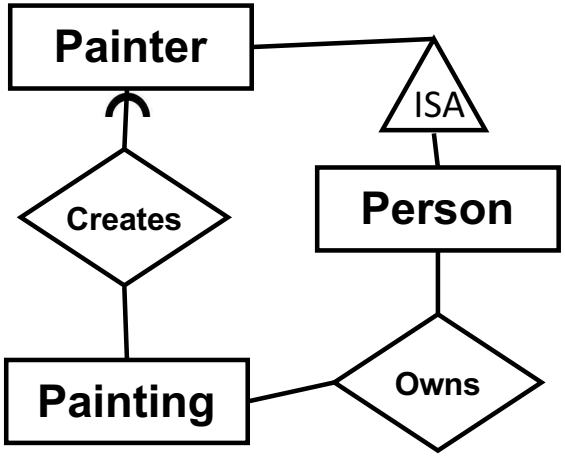
A12


Person
isPainter
Creates
Owns
Painting

(A)

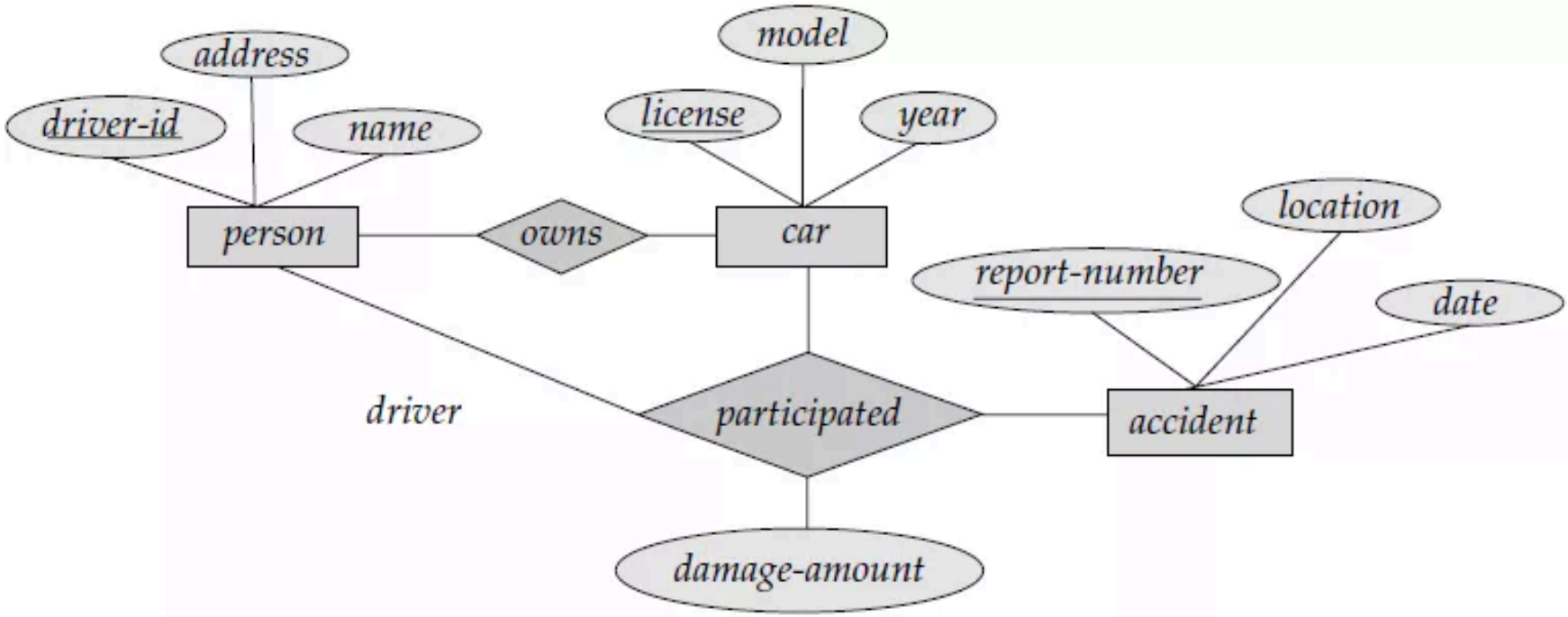

Painter
Talent
Creates
Person
Painting
Owns

(B)


Painter
ISA
Creates
Person
Painting
Owns

(C)

Q13: Create the relational scheme for the entities only



A13

person (id, name, address)
car (license, year, model)
accident (reportnum, date, location, personid, car)

(A)

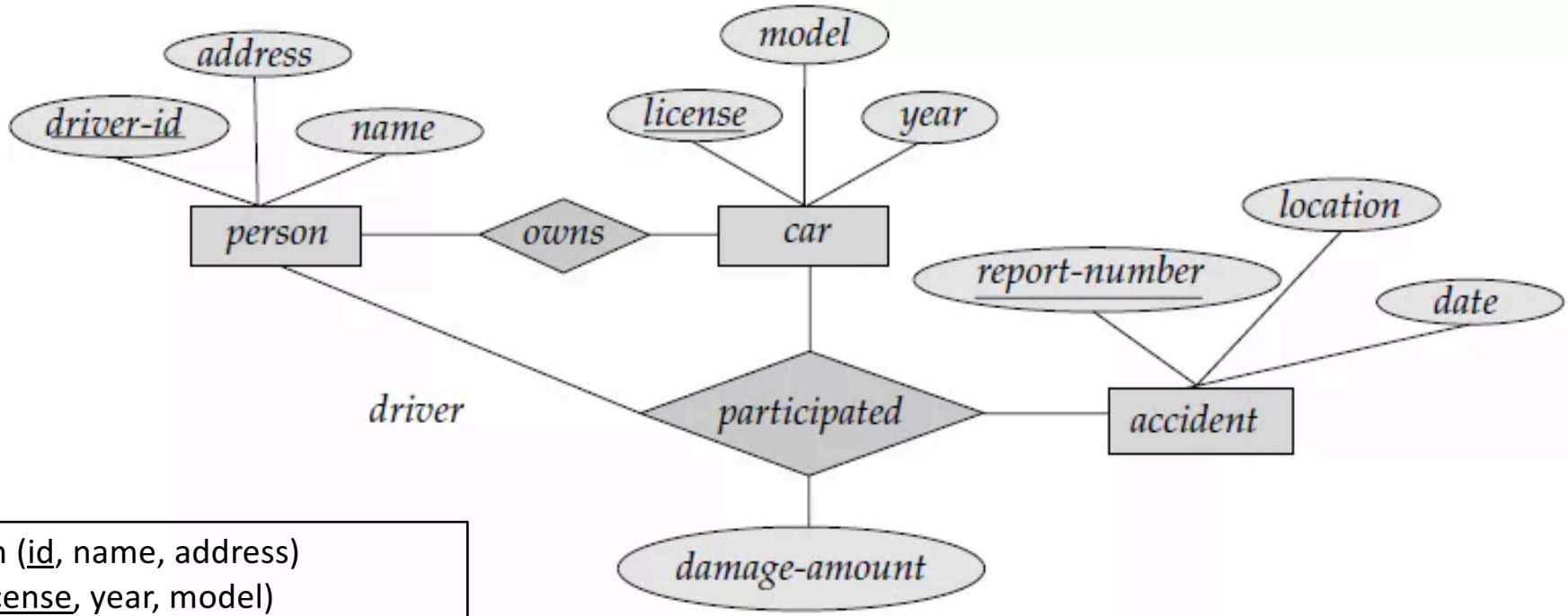
person (id, name, address)
car (license, year, model)
accident (reportnum, date, location)

(B)

person (id, name, address)
car (license, year, model, owner)
accident (reportnum, date, location, personid, car)

(C)

Q14: Create the relational scheme for the relationships only



person (<u>id</u>, name, address)
car (<u>license</u>, year, model)
accident (<u>reportnum</u>, date, location)

A14

ownedBy(person, car)
person -> Person.id
car -> Car.license
participated(person, car, accident, amount)
person -> Person.id
car -> Car.license
accident -> Accident.reportnum

(A)

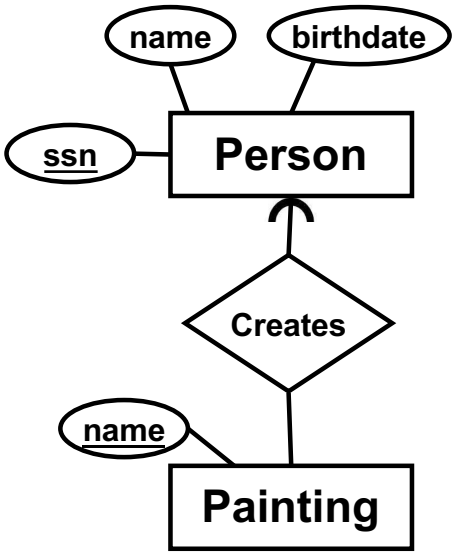
ownedBy(person, car)
person -> Person.id
car -> Car.license
participated(person, car, accident)
person -> Person.id
car -> Car.license
accident -> Accident.reportnum

(B)

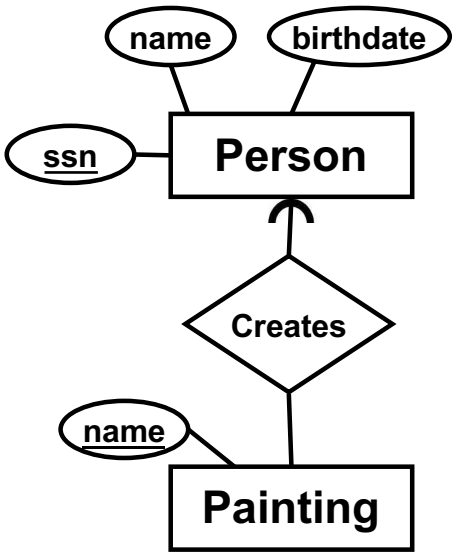
ownedBy(person, car)
person -> Person.id
car -> Car.license
participated(person, car, accident, amount)
(person, car) -> ownedBy.(person, car)
accident -> Accident.reportnum

(C)

Q15: Create the relational scheme



A15



Person(<u>ssn</u>, name, birthdate)
Painting(<u>name</u>, painter)
  painter -> Person.ssn

(A)

Person(<u>ssn</u>, name, birthdate)
Painting(<u>name</u>)
createdBy(<u>work</u>, painter)
  work -> Painting.name
  painter -> Person.ssn

(B)

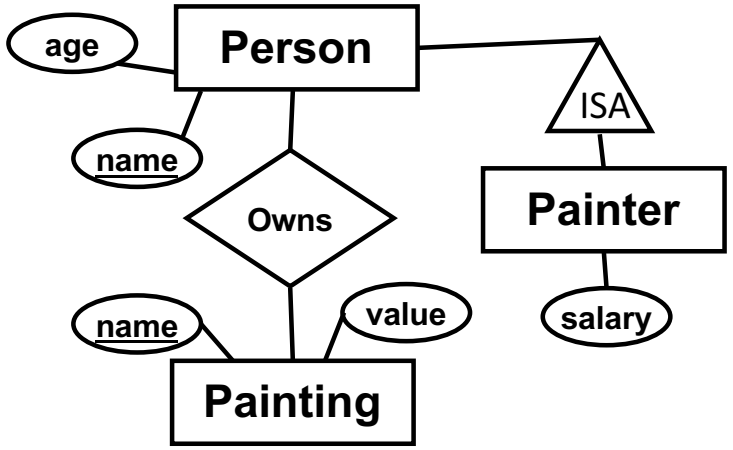
Person(<u>ssn</u>, name, birthdate)
Painting(<u>name</u>)
createdBy(<u>work, painter</u>)
  work -> Painting.name
  painter -> Person.ssn

(C)

Person(<u>ssn</u>, name, birthdate)
Painting(<u>name</u>)
createdBy(work, <u>painter</u>)
  work -> Painting.name
  painter -> Person.ssn

(D)

Q16: Create the relational scheme

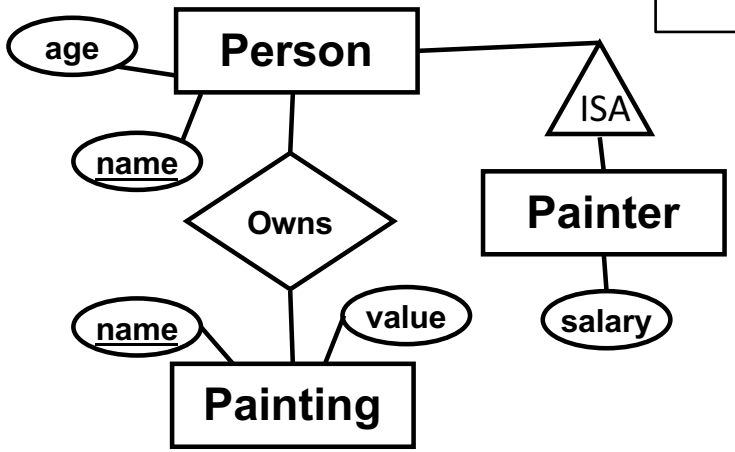


A16

Person(<u>name</u>, age)
Painter(<u>name</u>, age, salary)
Painting(<u>name</u>, value)
ownedBy(<u>work</u>, <u>painter</u>)
work -> Painting.name
painter -> Person.name
(A)

Person(<u>name</u>, age, salary)
salary can be NULL
Painting(<u>name</u>, value)
ownedBy(<u>work</u>, <u>painter</u>)
work -> Painting.name
painter -> Person.name
(B)

Person(<u>name</u>, age)
Painter(<u>name</u>, salary)
name -> Person.name
Painting(<u>name</u>, value)
ownedBy(<u>work</u>, <u>painter</u>)
work -> Painting.name
painter -> Person.name
(C)



Q17: calculate the closure of {a}

R(a, b, c, d, e, f)

a → b

a → c

c, d → e, f

b → e

$\{a\}^+$ = ?

Q18: which of these are superkeys of R?

R(a, b, c, d, e, f)

- **a → b**
- **a → c**
- **c, d → e, f**
- **b → e**

1. **{a}**
2. **{a, d}**
3. **{c, b, d}**
4. **{a, b, c, d, e, f}**

Q19: what are the keys of R?

R(a, b, c, d, e, f)

- **a → b**
- **a → c**
- **c, d → e, f**
- **b → e**
- **c → a, b**

1. **{a, d}**
2. **{a, c}**
3. **{a, d, c}**
4. **{c, d}**

Q20: after splitting, how many non-trivial FDs in F^+?

R(a, b, c, d, e)

a → b, c

b → d

d → e

Q21: How many FDs or R are in BCNF?

R(a, b, c, d)

a → b, c, d

b, c → a, d

d → b

Q22: Which FDs of R are in BCNF?

R(a, b, c, d, e)

a → b, c **(1)**

c → d, e **(2)**

Q23: which BCNF decomposition is correct?

R(a, b, c, d, e)

a → b, c

c → d, e

R1(a, b, c)
a → b, c
R2(d, e)
d → e
(A)

R1(a, b, c, d, e)
a → b, c
R2(c)
c -> R1.c
(B)

R1(a, b, c)
a → b, c
R2(c, d, e)
c → d, e
c -> R1.c
(C)

Q24: which attribute of R is not prime?

R(a, b, c, d)

a, b → c

b → d

c → a

Q25: Which FDs of R violate 3NF?

R(a, b, c, d, e)

a → b, c, d, e **(1)**

b, c → a, d **(2)**

d → e **(3)**