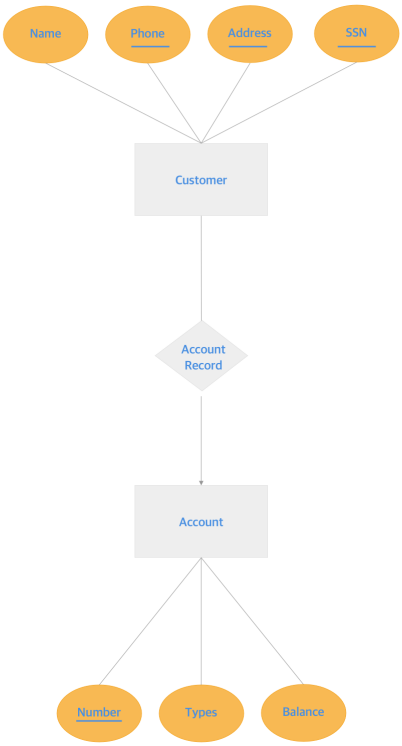
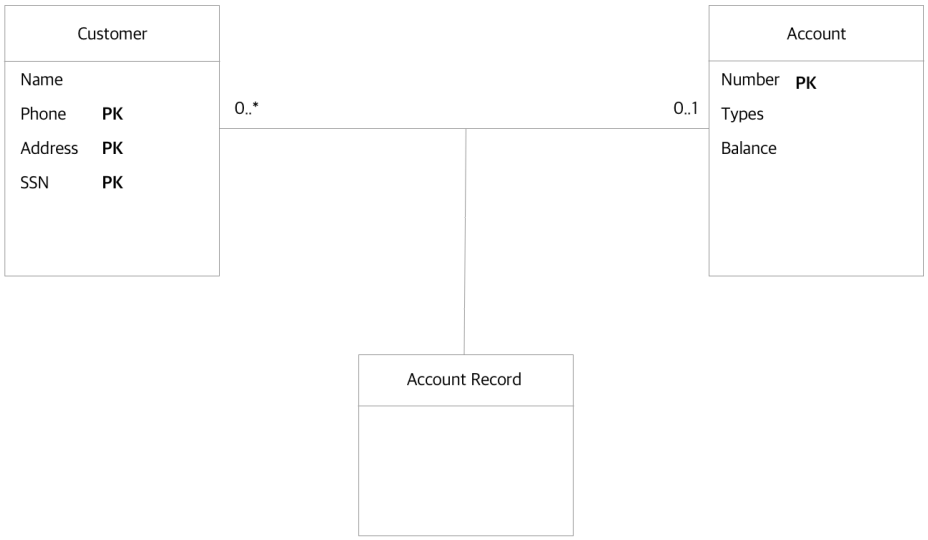
CSC343 Worksheet 15 Solution (Final)

July 15, 2020

1. • E/R Diagram



• UML

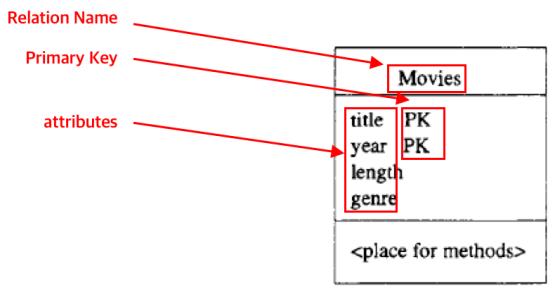


Notes:

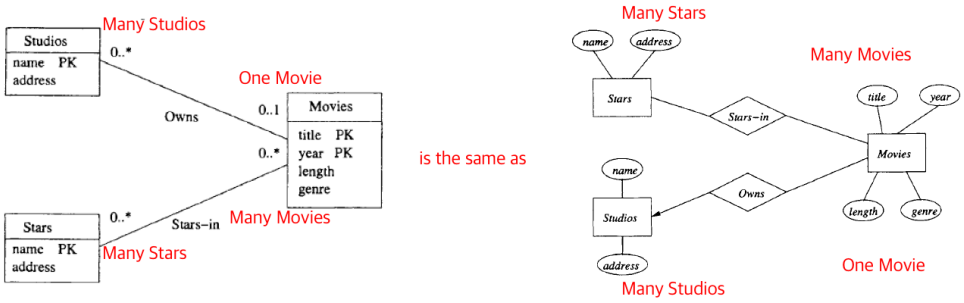
- UML
  - Was developed originally as a graphical notation for describing software designs in an object-oriented style
  - Offers the same as E/R model, with the exception of multiway relationship

UML	E/R Model
Class	Entity set
Association	Binary relationship
Association Class	Attributes on a relationship
Subclass	Isa hierarchy
Aggregation	Many-one relationship
Composition	Many-one relationship with referential integrity

- UML Class



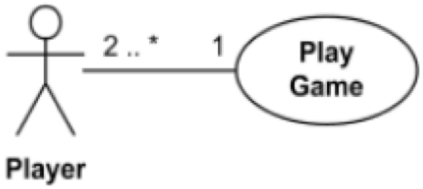
- Associations



Multiplicity in UML

Multiplicity	Option	Cardinality
0..0	0	Collection must be empty
0..1		No instances or one instance
1..1	1	Exactly one instance
0..*	*	Zero or more instance
5..5	5	Exactly 5 instances
$m..n$		At least m but no more than n instances

Example:

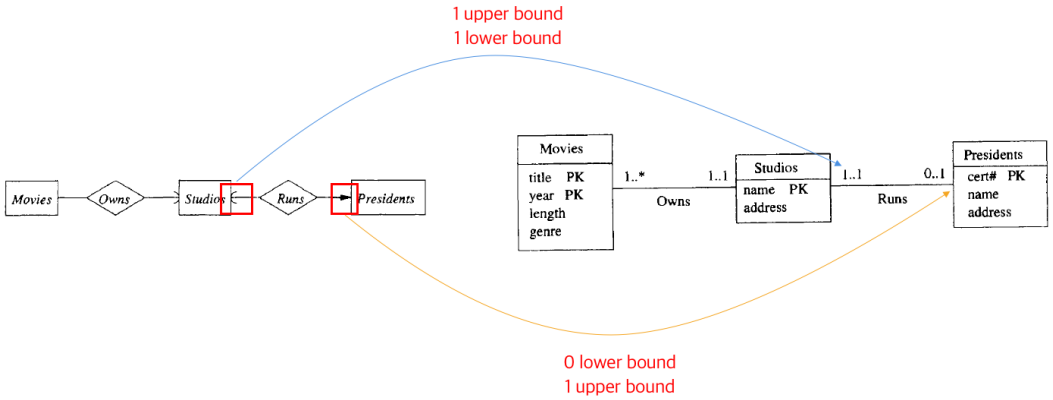


Two or more Player actors are required to initiate **one** Play Game use case.

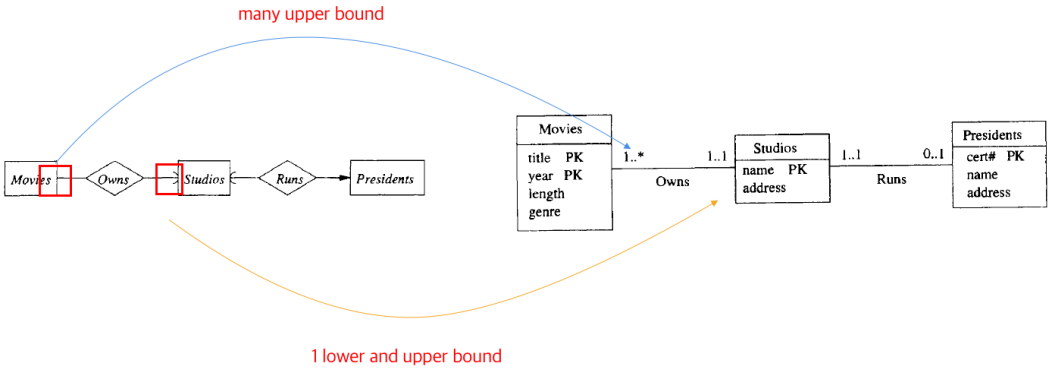
References:

1) uml-diagrams, UML Multiplicity and Collections, link

- Referential Integrity
  - Means that a value appearing in one context must also appear in another

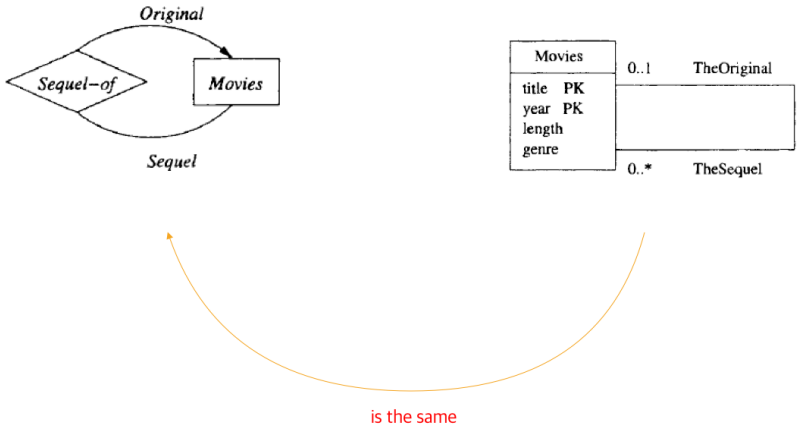


Means studio can have **at most one** president
but it could not have a president at some time

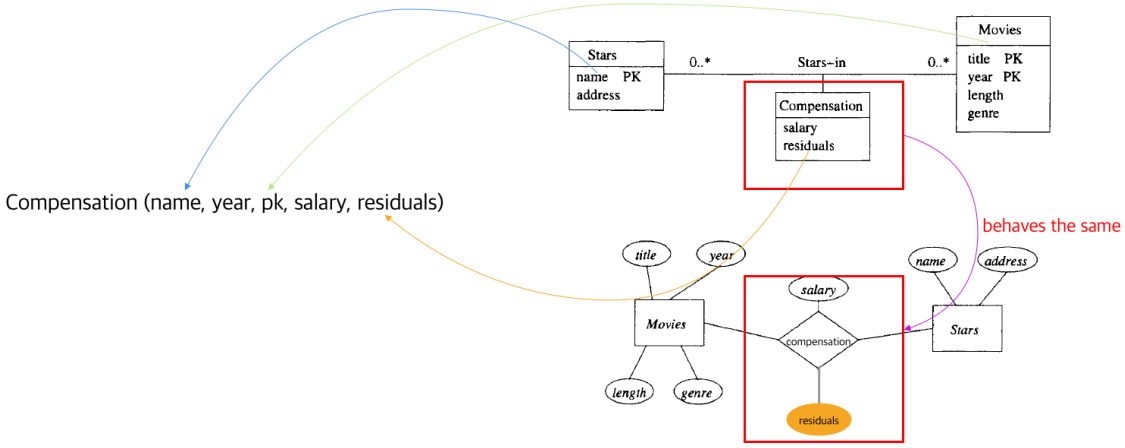


Means one studio can have **at least one** movies
and there could have many more (to infinity!)

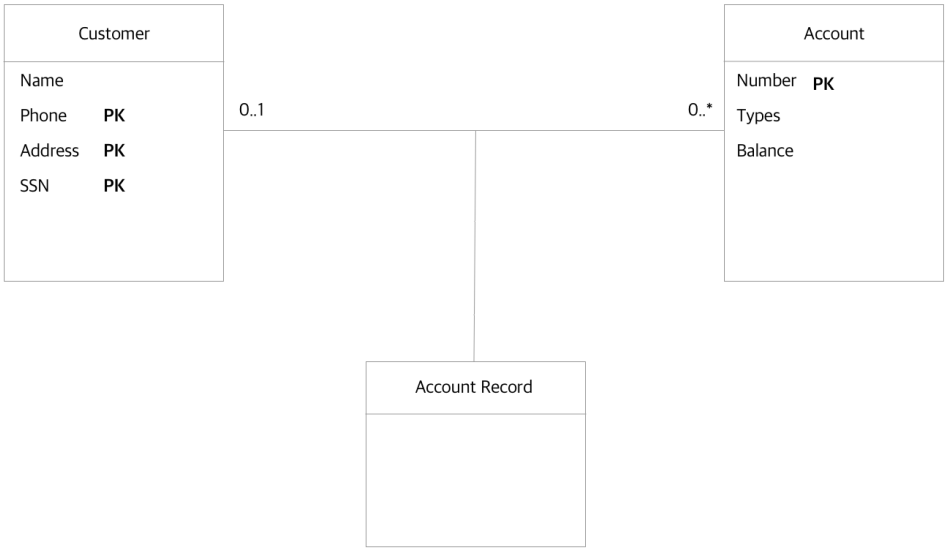
- Self-Assoiations



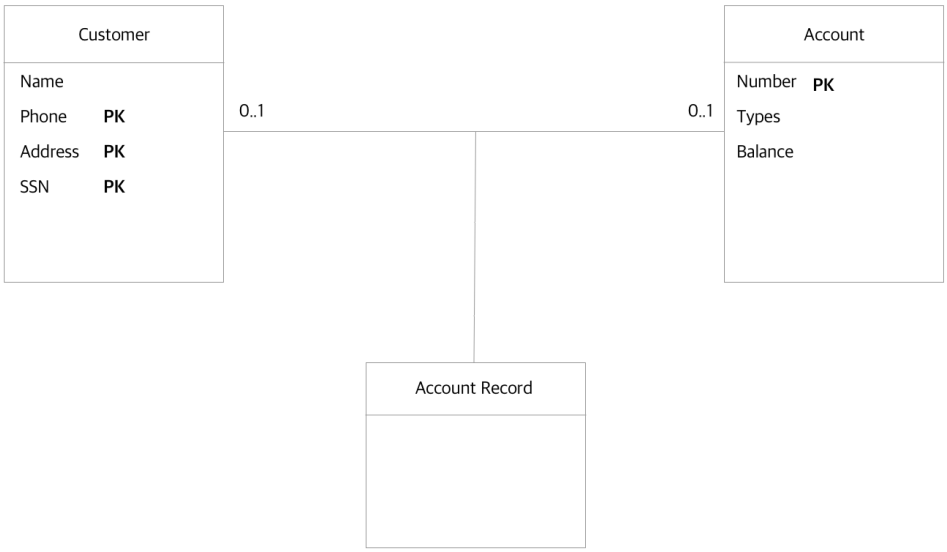
- Assoiations



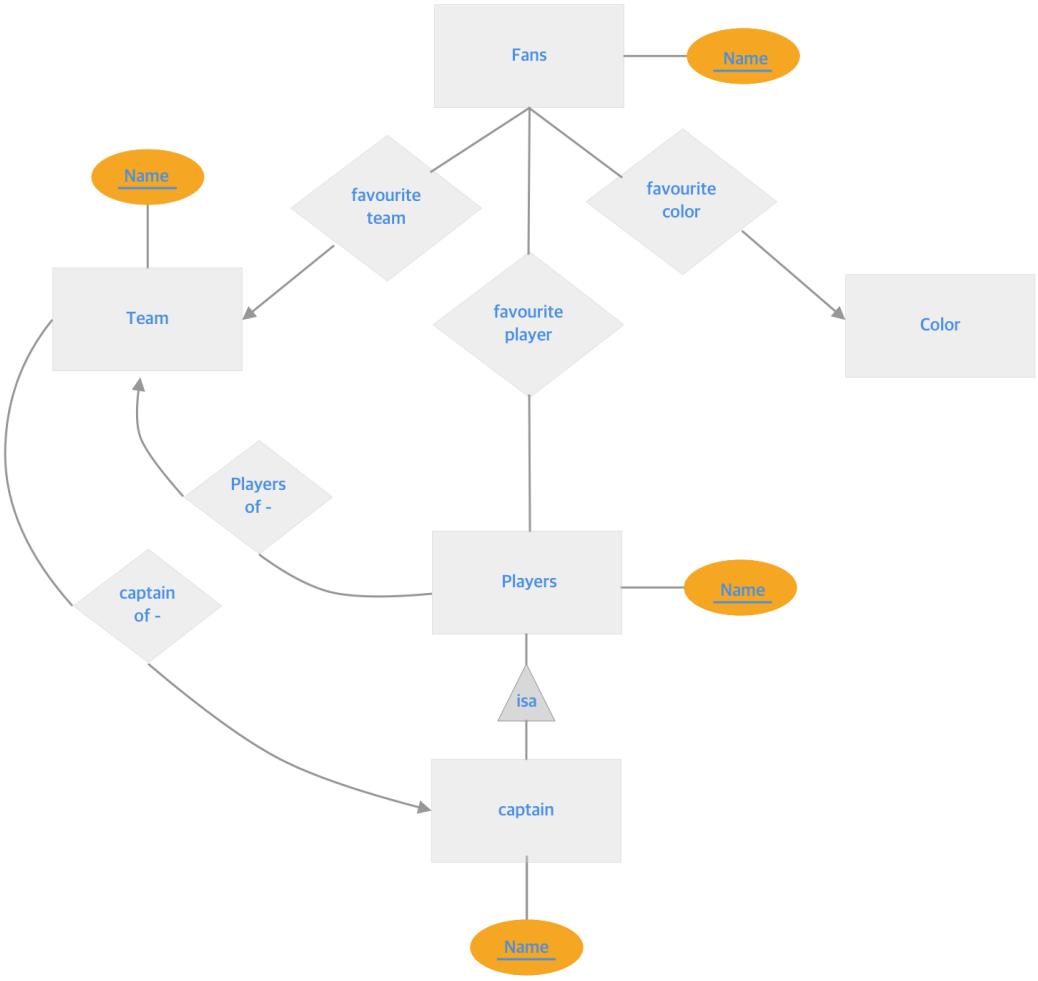
2. a) **Solution:**



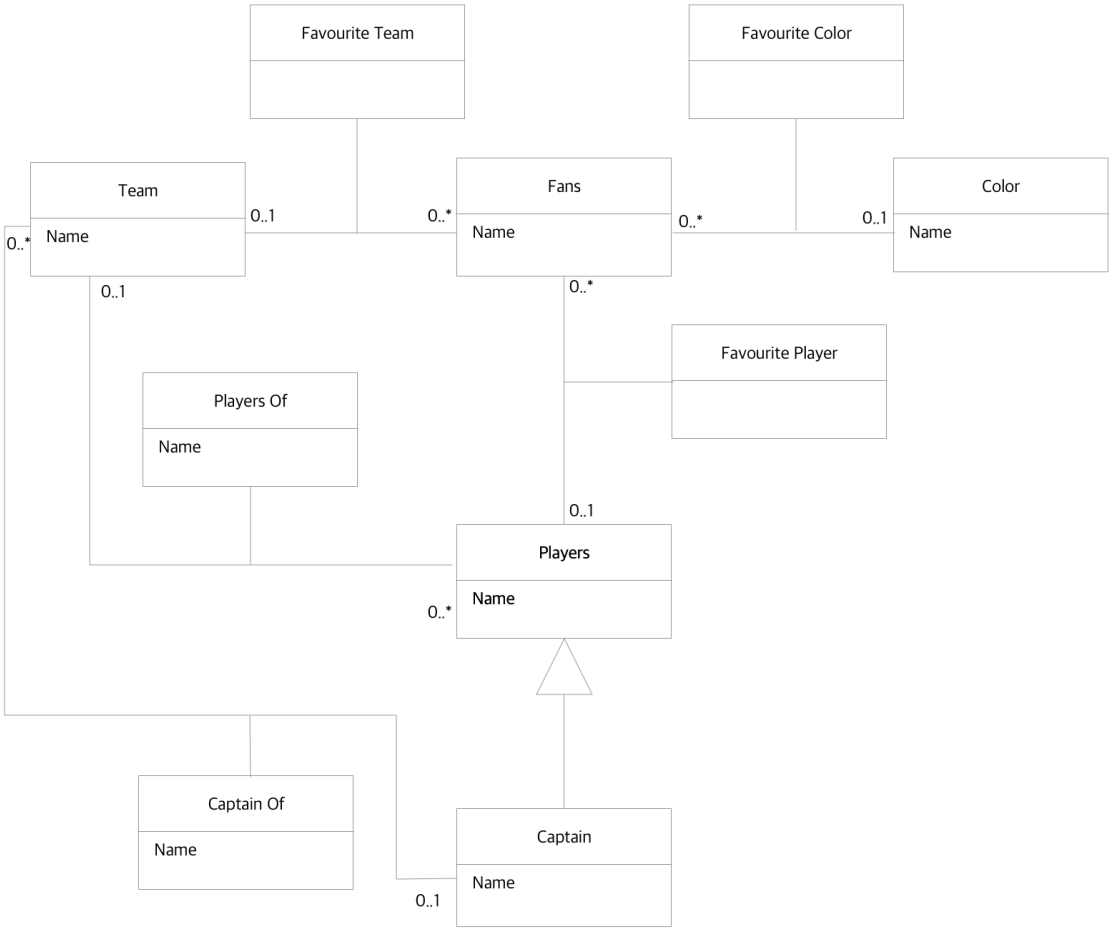
b) **Solution:**



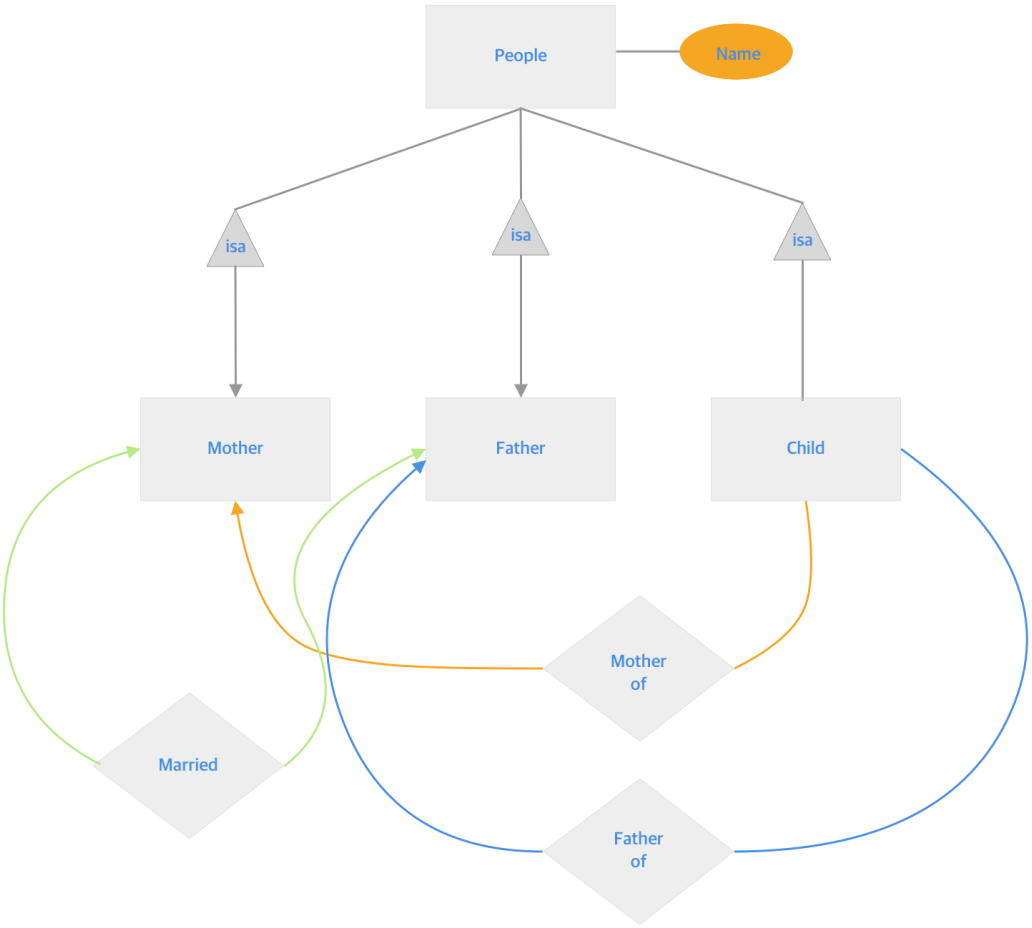
3. • E/R Diagram


Fans
Name
Name
favourite team
favourite color
Team
favourite player
Color
Players of -
Players
Name
captain of -
isa
captain
Name

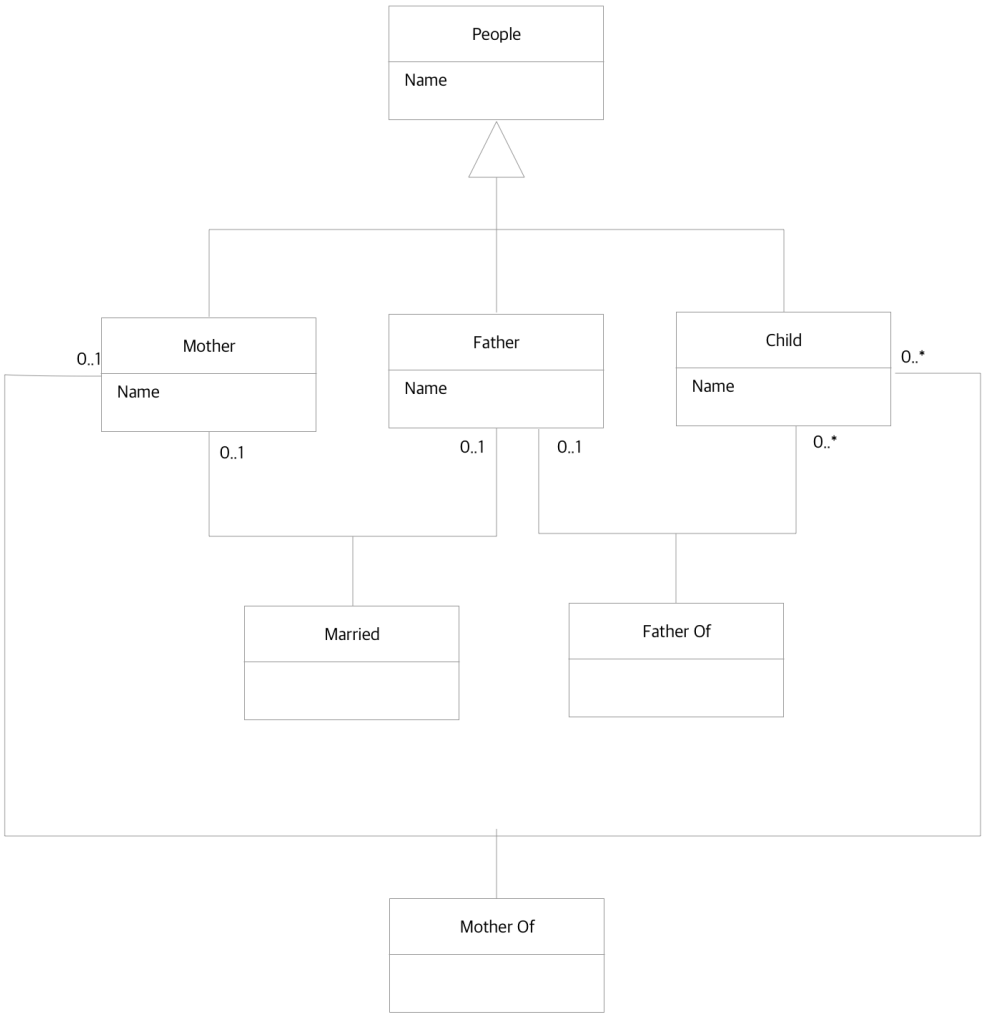
- UML


Favourite Team
Favourite Color
Team
Name
Fans
Name
Color
Name
0..1
0..*
0..*
0..*
0..1
0..1
0..*
Favourite Player
Players Of
Name
0..1
Players
Name
0..*
Captain Of
Name
Captain
Name
0..1

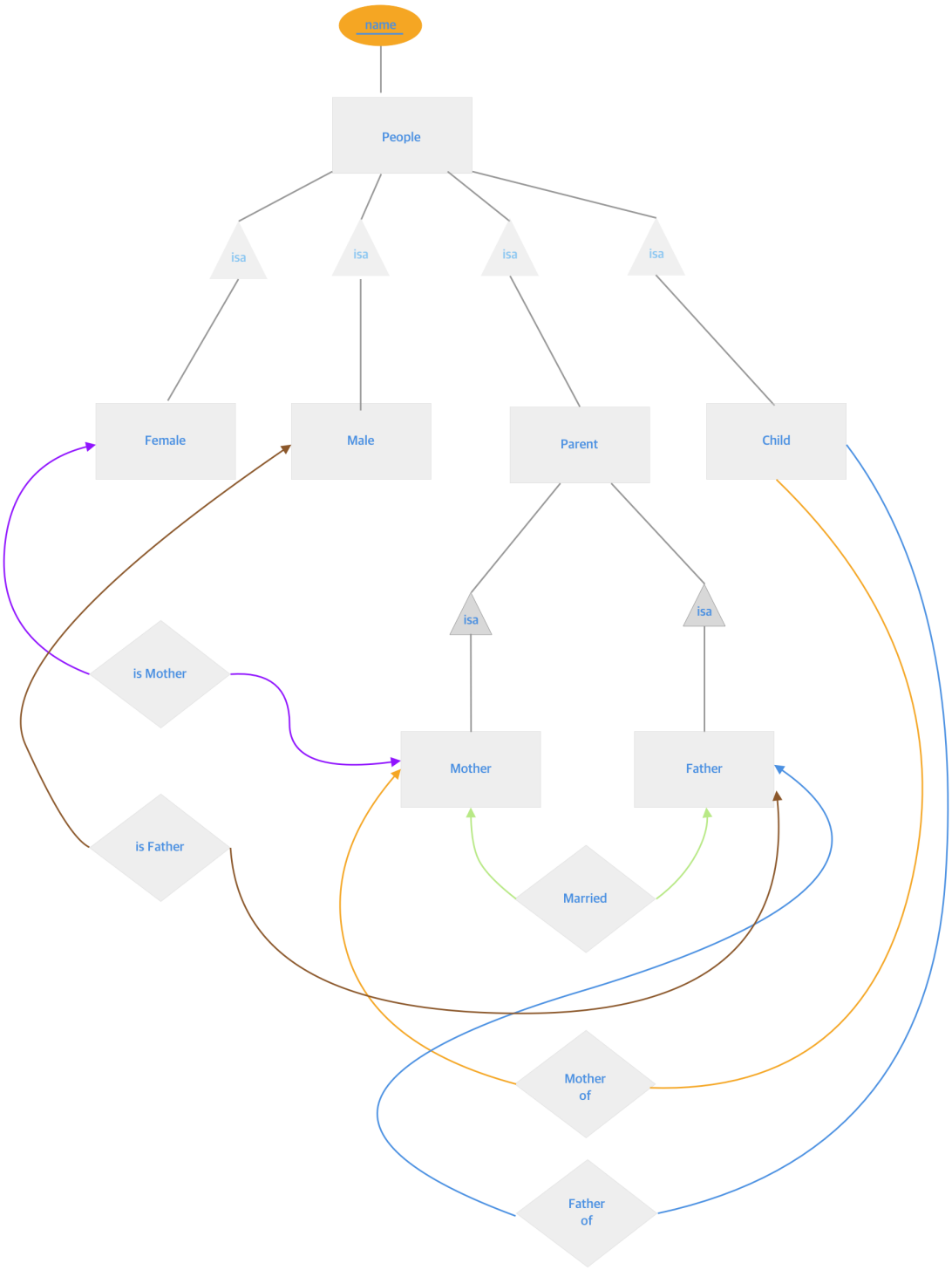
4. • E/R Diagram


People
Name
isa
isa
isa
Mother
Father
Child
Mother of
Married
Father of

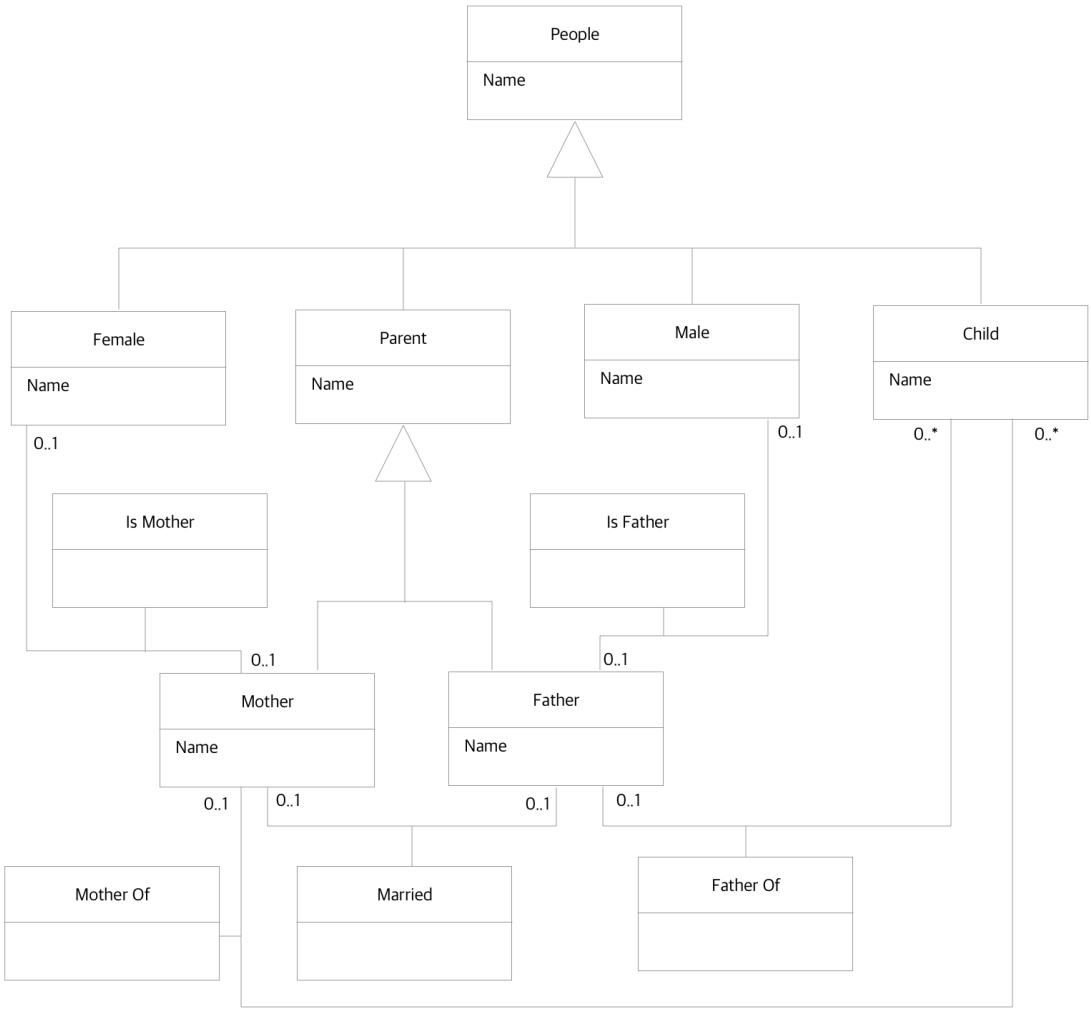
- UML


People
Name
Mother
Name
Father
Name
Child
Name
0..1
0..*
0..1
0..1
0..1
0..*
Married
Father Of
Mother Of

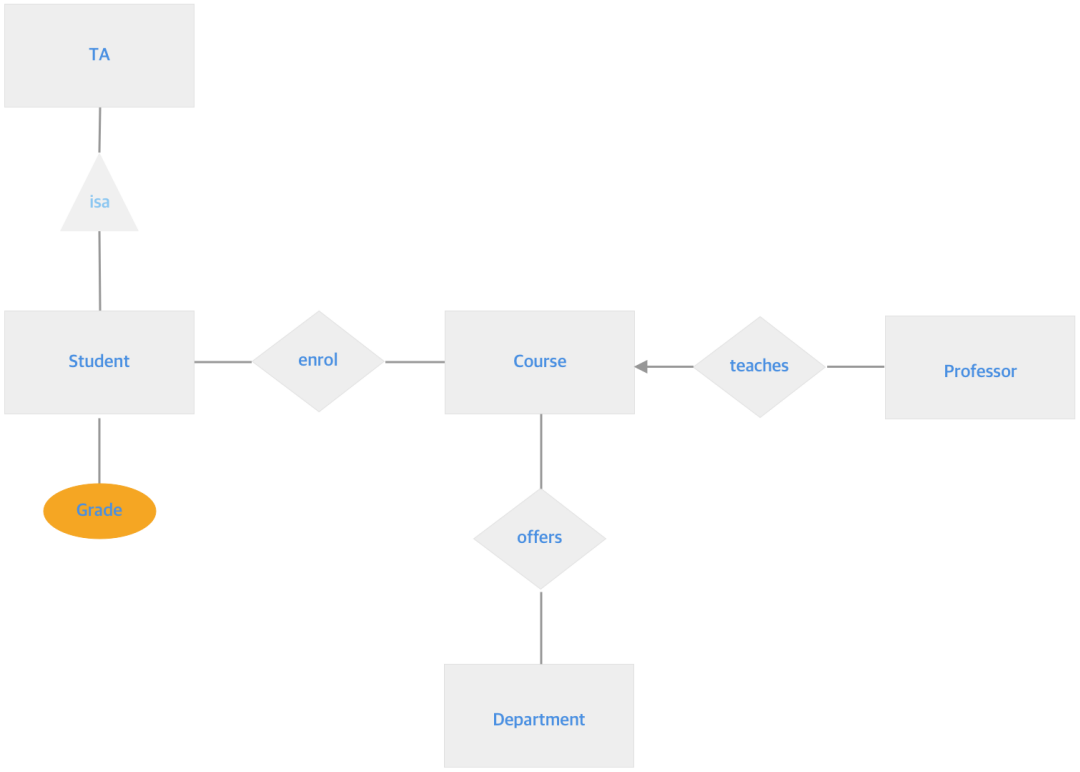
5. • E/R Diagram


name
People
isa
isa
isa
isa
Female
Male
Parent
Child
isa
isa
is Mother
Mother
Father
is Father
Married
Mother
of
Father
of

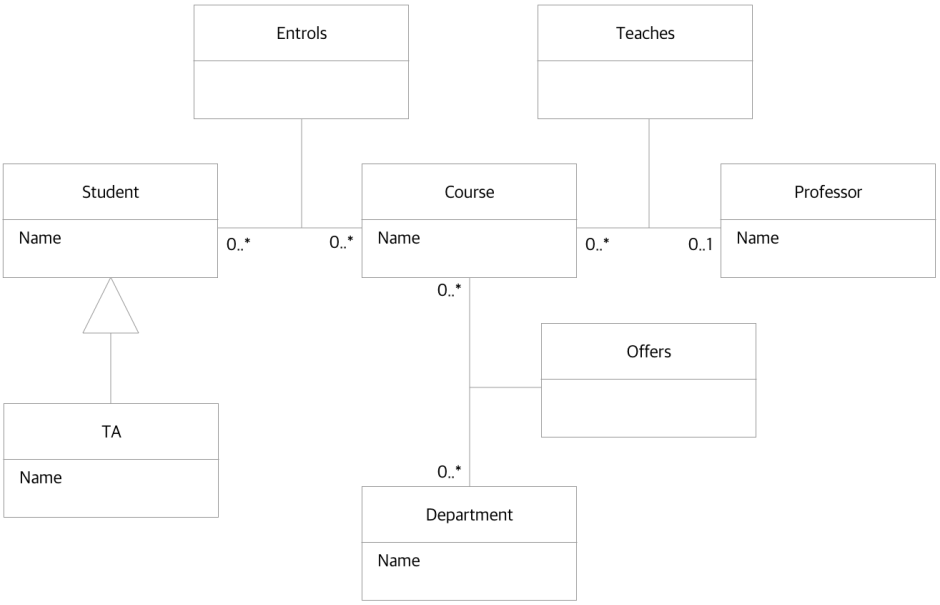
- UML


People
Name
Female
Name
Parent
Name
Male
Name
Child
Name
0..1
0..1
0..*
0..*
Is Mother
Is Father
0..1
0..1
Mother
Name
Father
Name
0..1
0..1
0..1
0..1
Mother Of
Married
Father Of

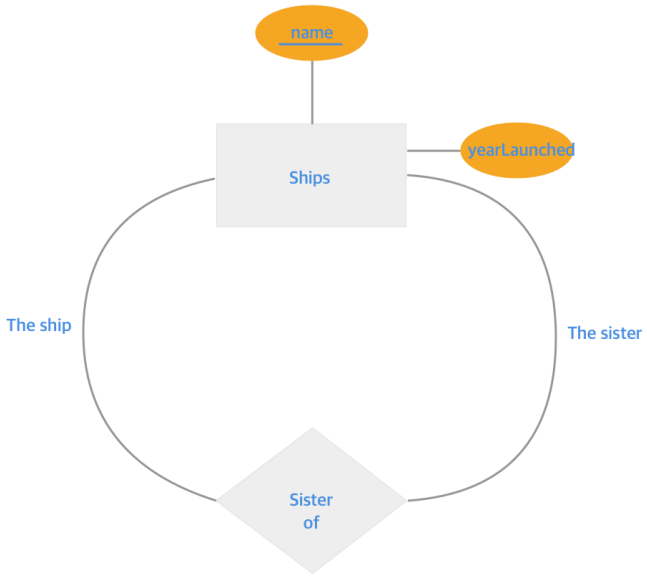
6. • E/R Diagram


TA
isa
Student
enrol
Course
teaches
Professor
Grade
offers
Department

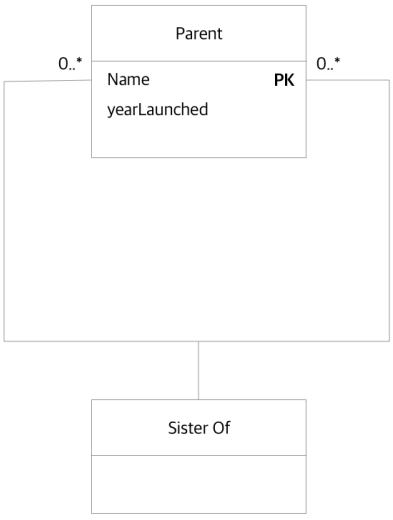
- UML



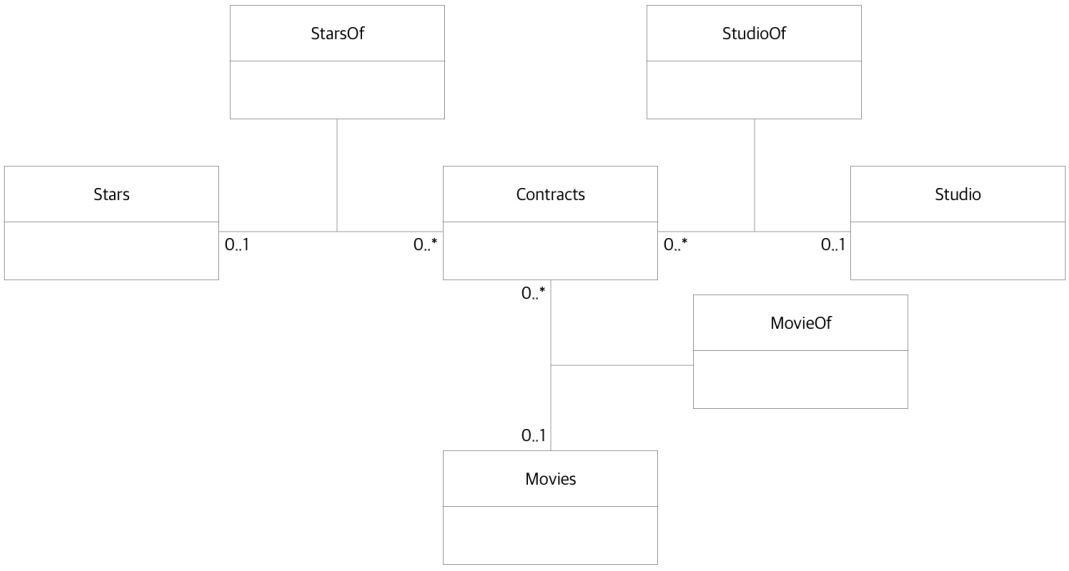
7. • E/R Diagram

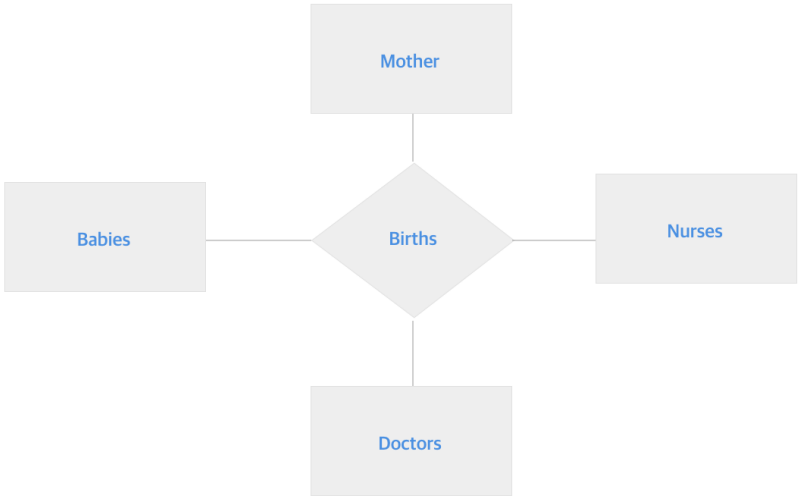


• UML


Parent
0..*
0..*
Name
PK
yearLaunched
Sister Of

8. • UML

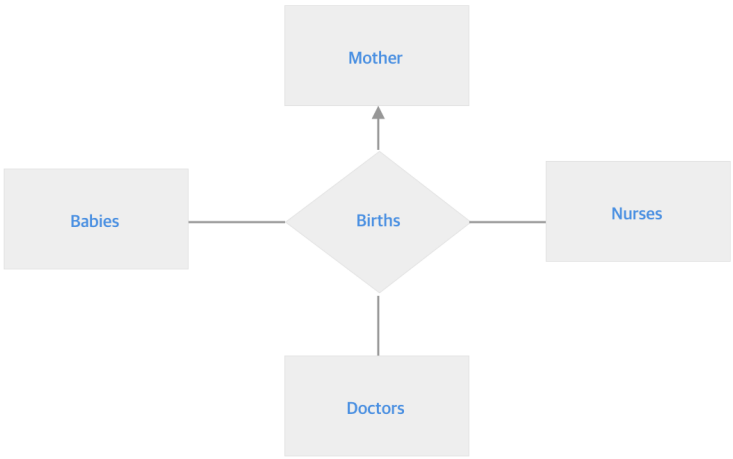

StarsOf
StudioOf
Stars
Contracts
Studio
0..1
0..*
0..*
0..1
0..*
MovieOf
0..1
Movies



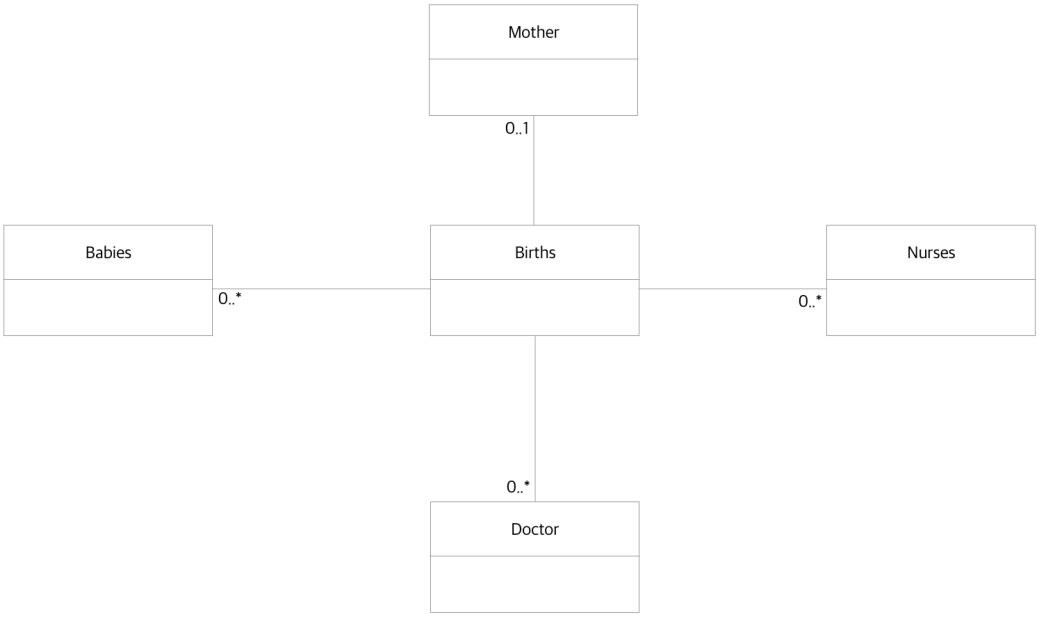
9.

a) **Solution:**

- E/R Model

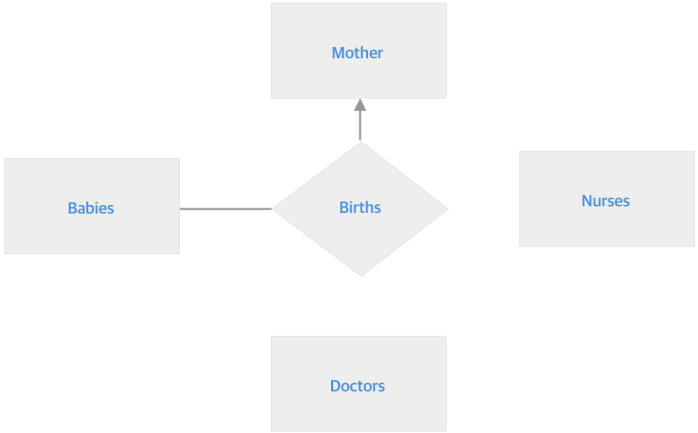


- UML

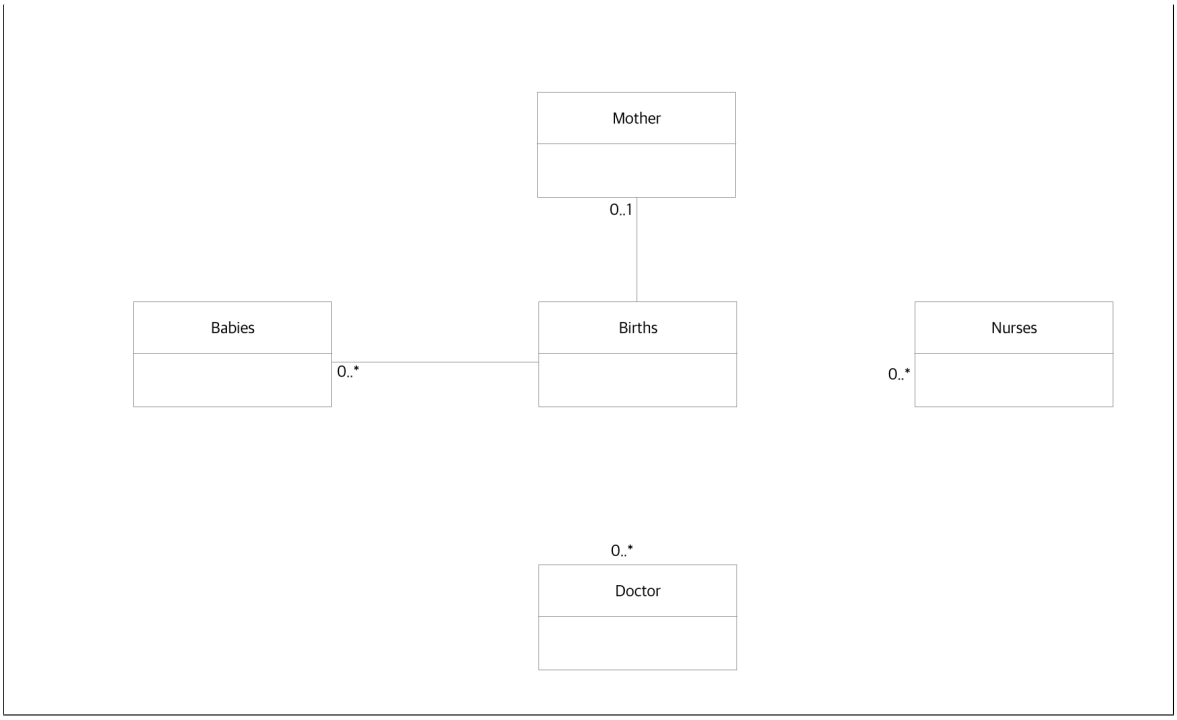


Correct Solution:

- E/R Model

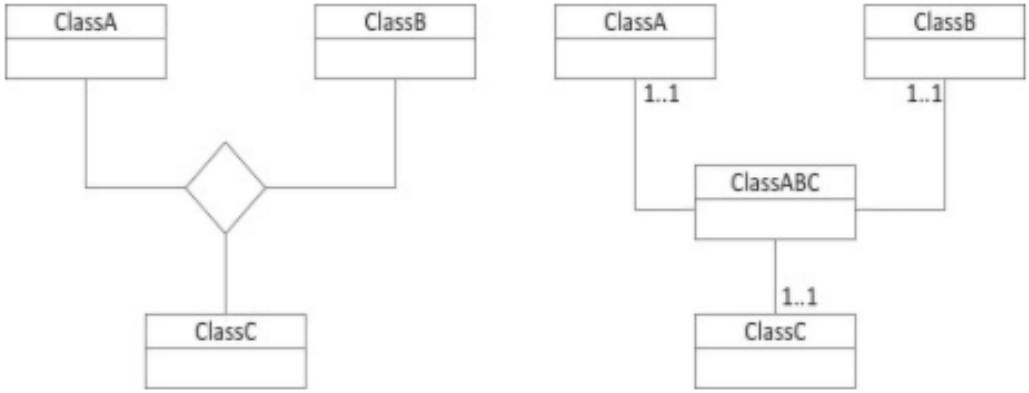


- UML



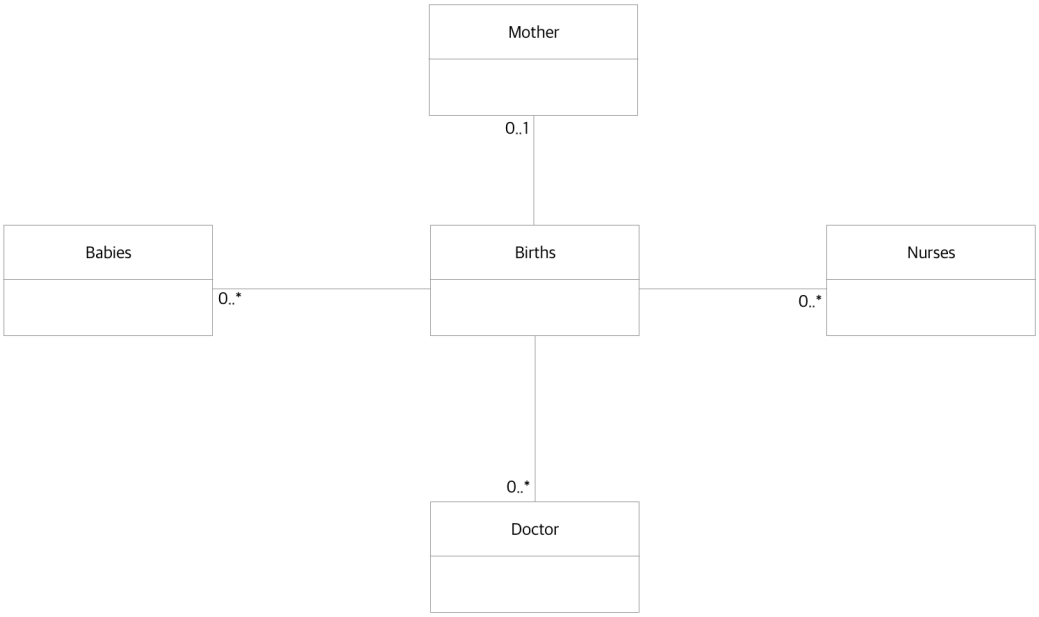
Notes:

- An N-ary association is equivalent to one "central" class and N binary associations connecting the central class to the participant classes of the N-ary association

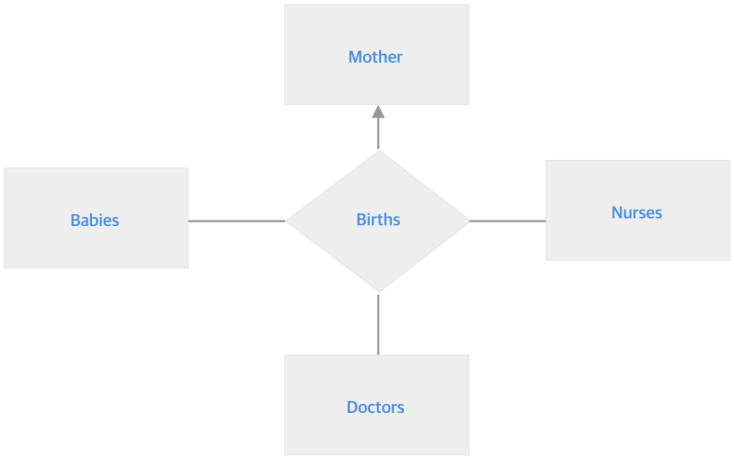


b) **Solution:**

- E/R Model

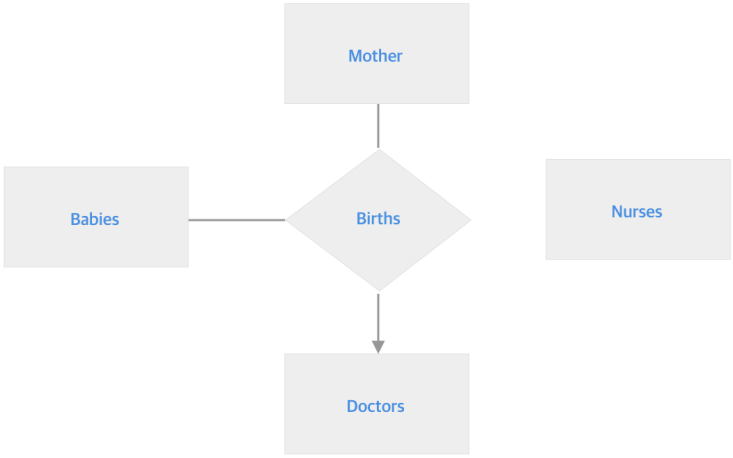


- UML

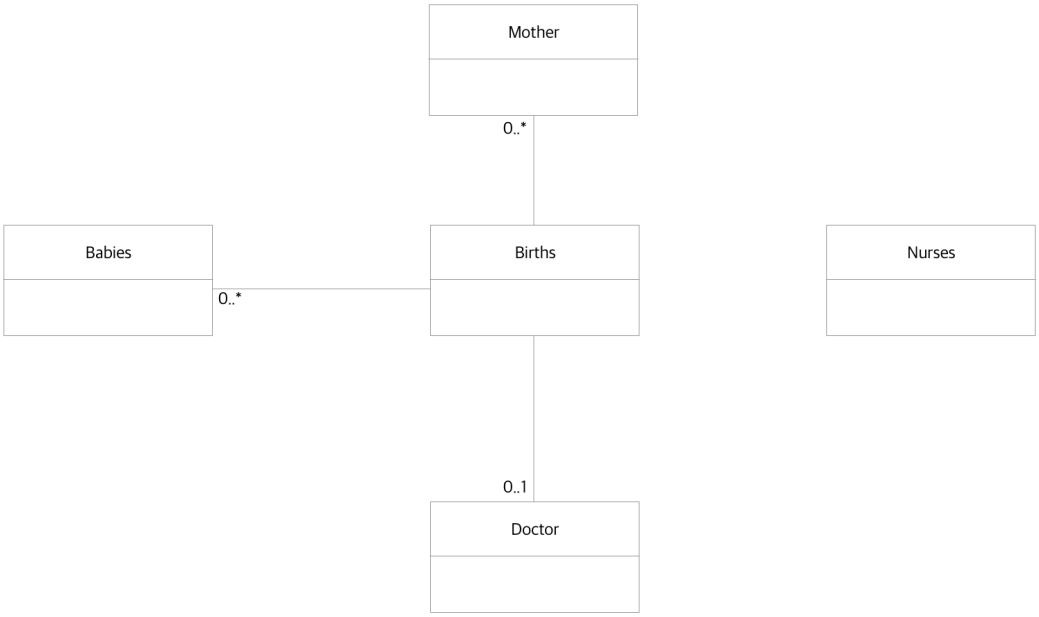


c) **Solution:**

- E/R Model



- UML



10. • Bookings

    Bookings(<u>SSNo</u>, <u>number</u>, <u>day</u>, row, seat)

    • Customers

    Customers(<u>SSNo</u>, name, addr, phone)

- Flights

  Flights(number, day, aircraft)

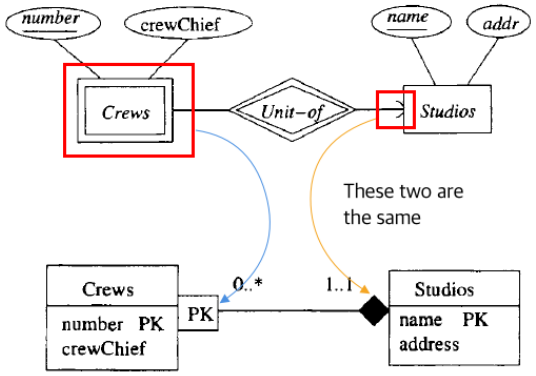
Notes:

- Weak Entity sets in UML

  Example:

Studios(name, address)

Crews(number, crewChief, studioName)



11. a)

- Movies

  Movies(title, year, length, genre)

- Studios

  Studios(name, address)

- Presidents

  Presidents (cert#, name, address)

- Owns

  Owns(title, year, name)

- Runs

  Runs (cert#, name)