CSC343 Worksheet 15 Solution (Final)

July 15, 2020

1. • E/R Diagram

• UML

Customer	
Name	
Phone	**PK**
Address	**PK**
SSN	**PK**

0..*

0..1

Account	
Number	**PK**
Types	
Balance	

Account Record
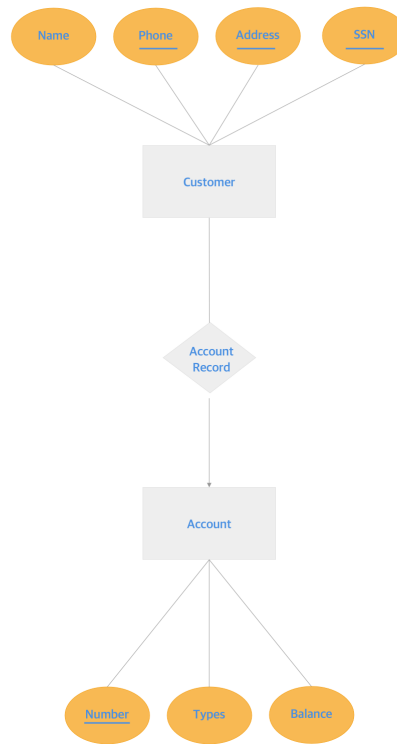
Notes:

- 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

Relation Name

Primary Key

attributes

Movies	
title	PK
year	PK
length	
genre	
<place for methods>	

- 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

1 upper bound
1 lower bound

0 lower bound
1 upper bound

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

many upper bound

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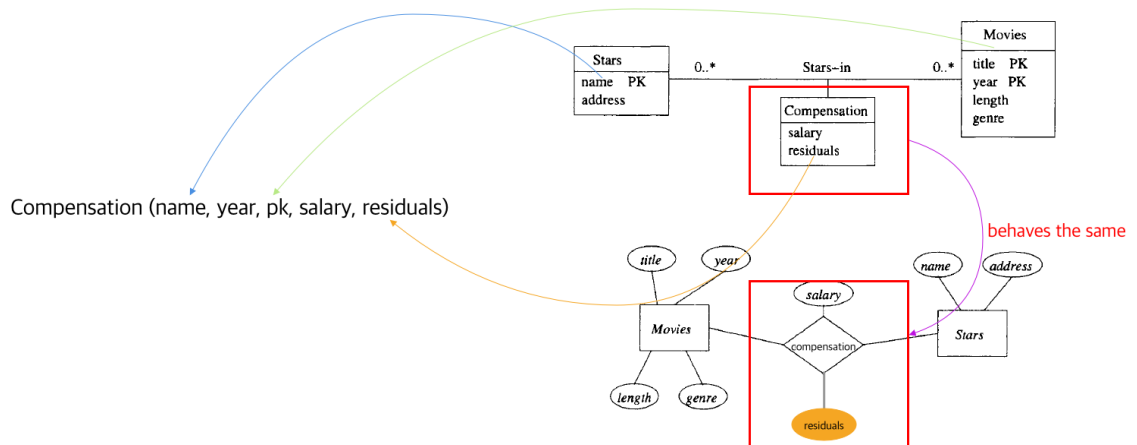
Means one studio can have **at least one** movies
and there could have many more (to infinity!)

- Self-Assoiations

- Assoiations

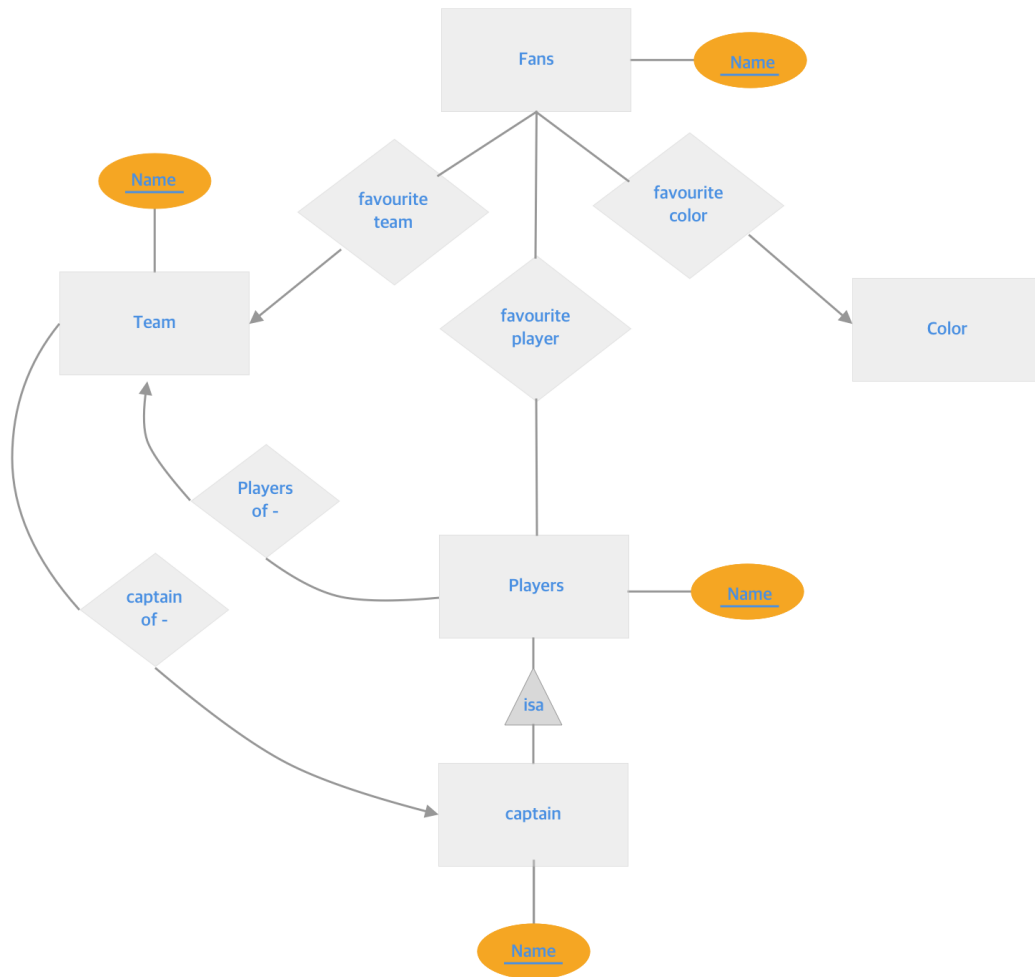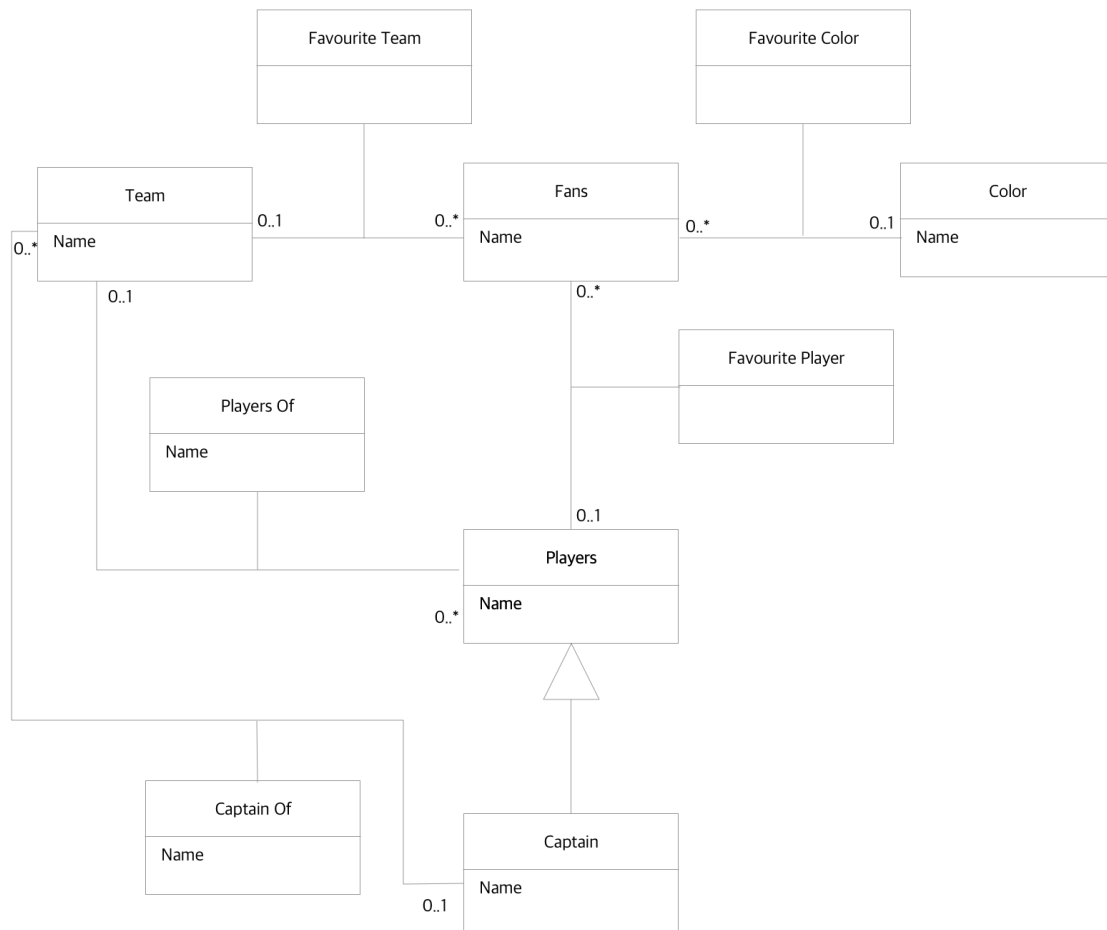Compensation (name, year, pk, salary, residuals)

2. a) **Solution:**

Customer	
Name	
Phone	**PK**
Address	**PK**
SSN	**PK**

0..1

0..*

Account	
Number	**PK**
Types	
Balance	

Account Record

b) **Solution:**

Customer	
Name	
Phone	**PK**
Address	**PK**
SSN	**PK**

0..1

0..1

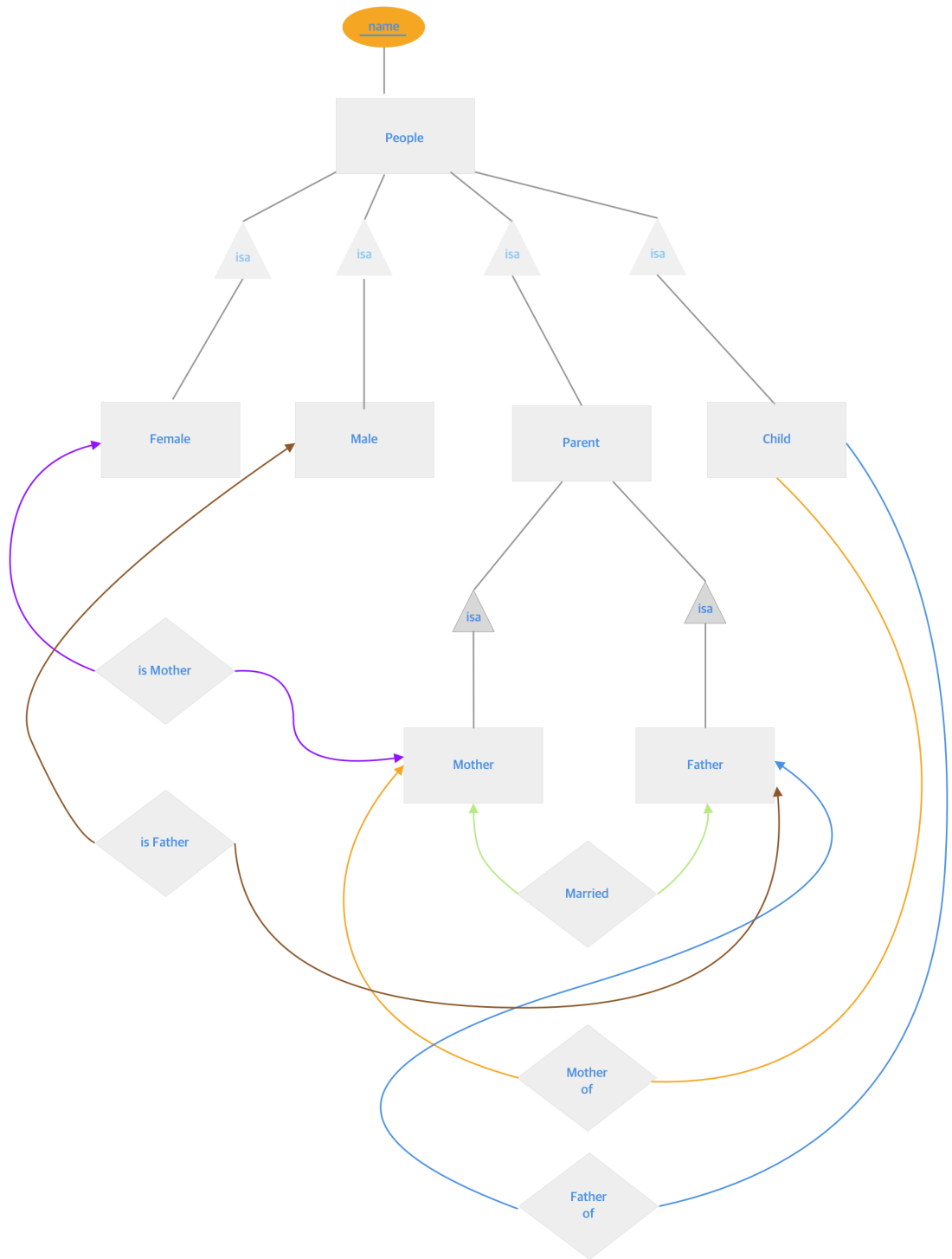| Account	
Number	**PK**
Types	
Balance	

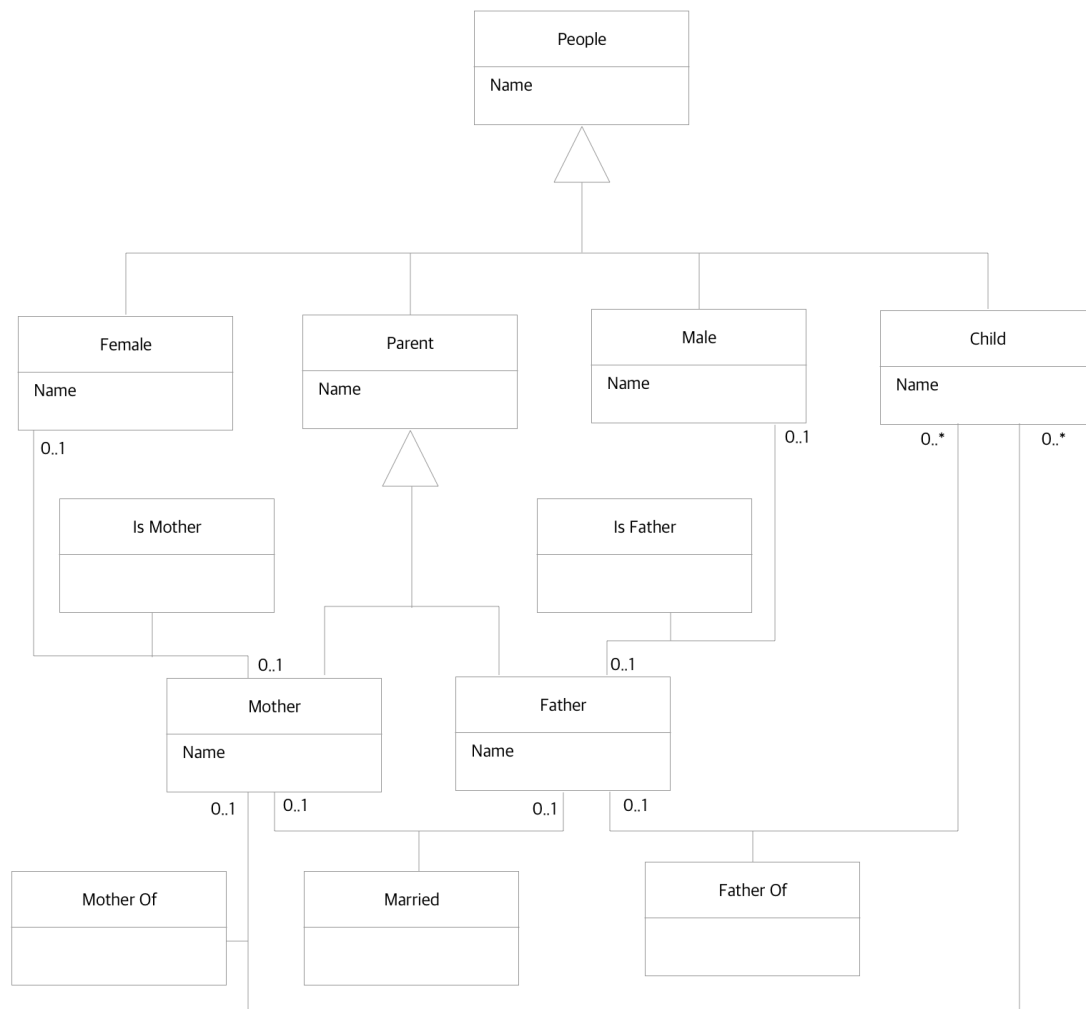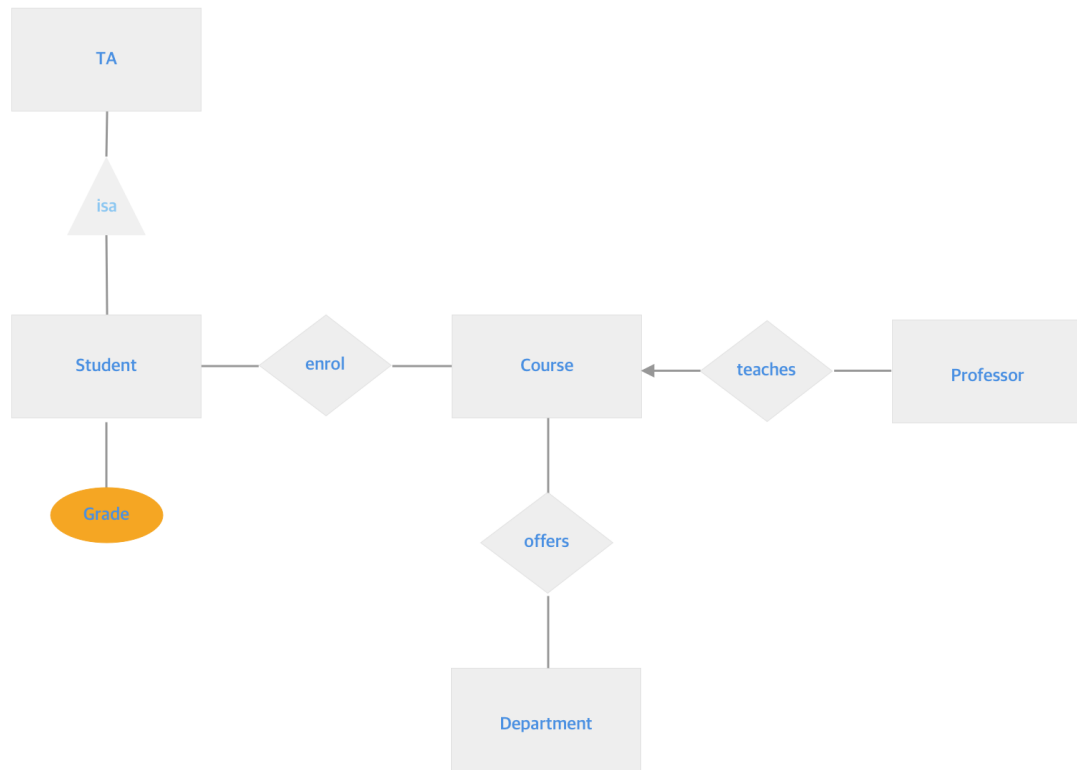| Account Record |
|---|
| |

3.　　• E/R Diagram
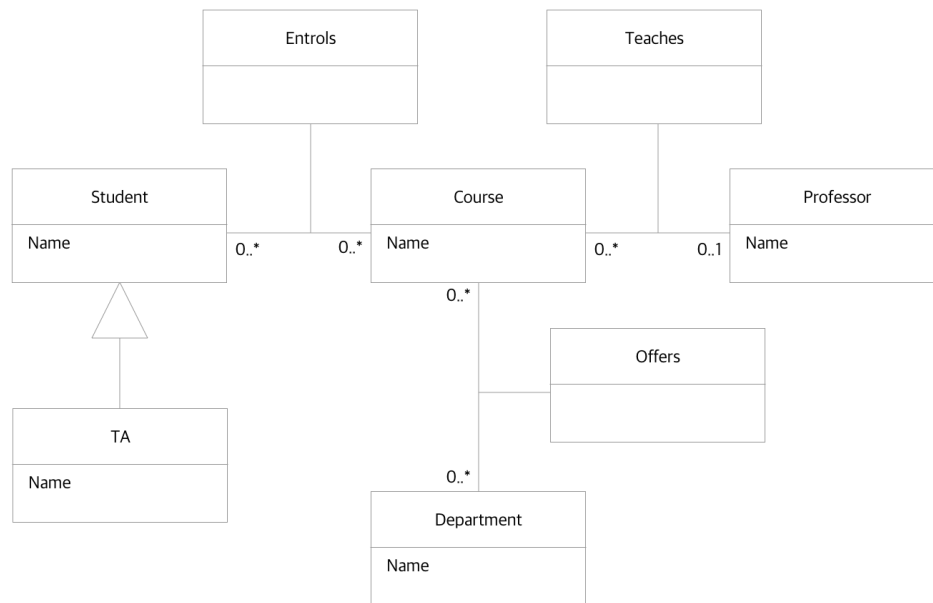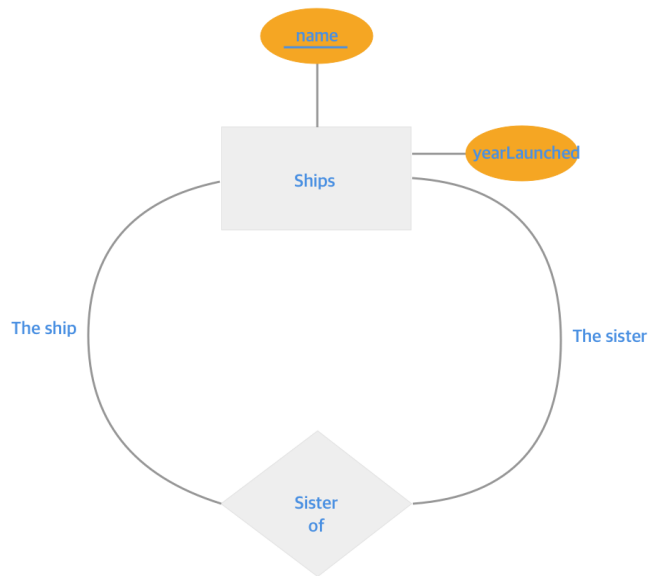
- UML

4.   • E/R Diagram
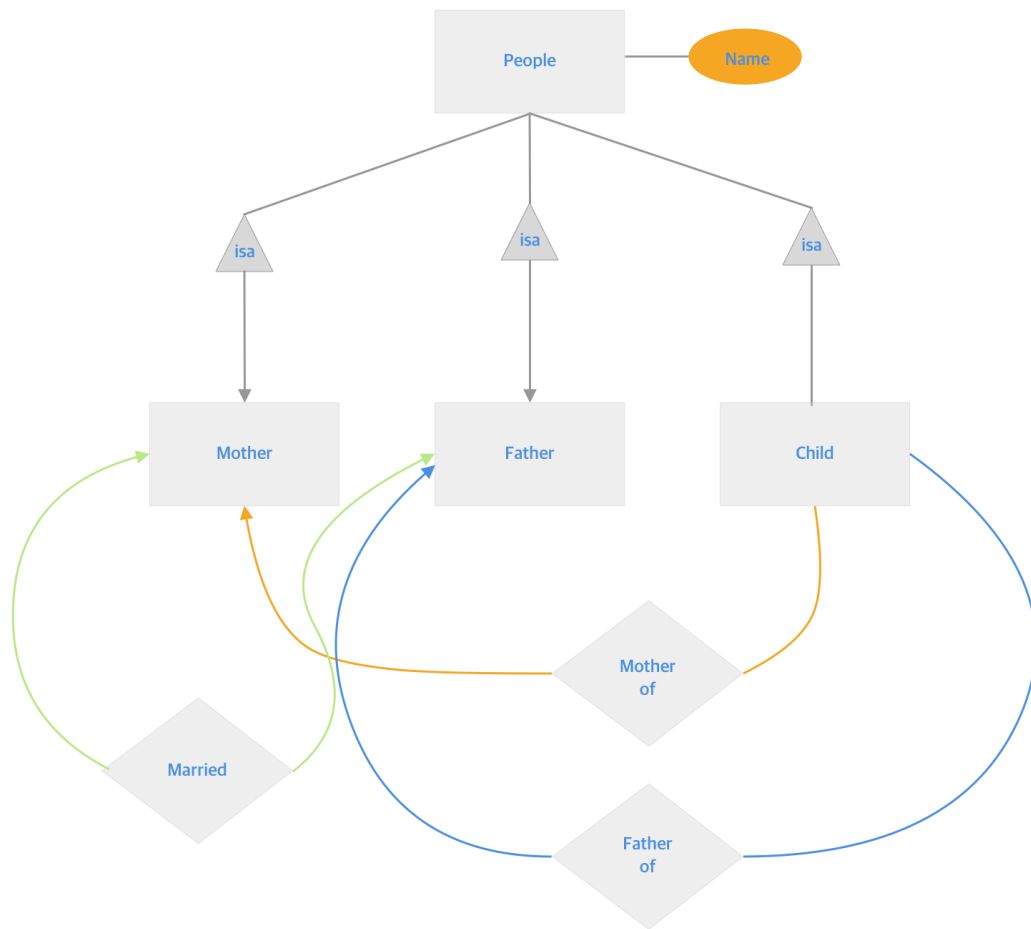
- UML
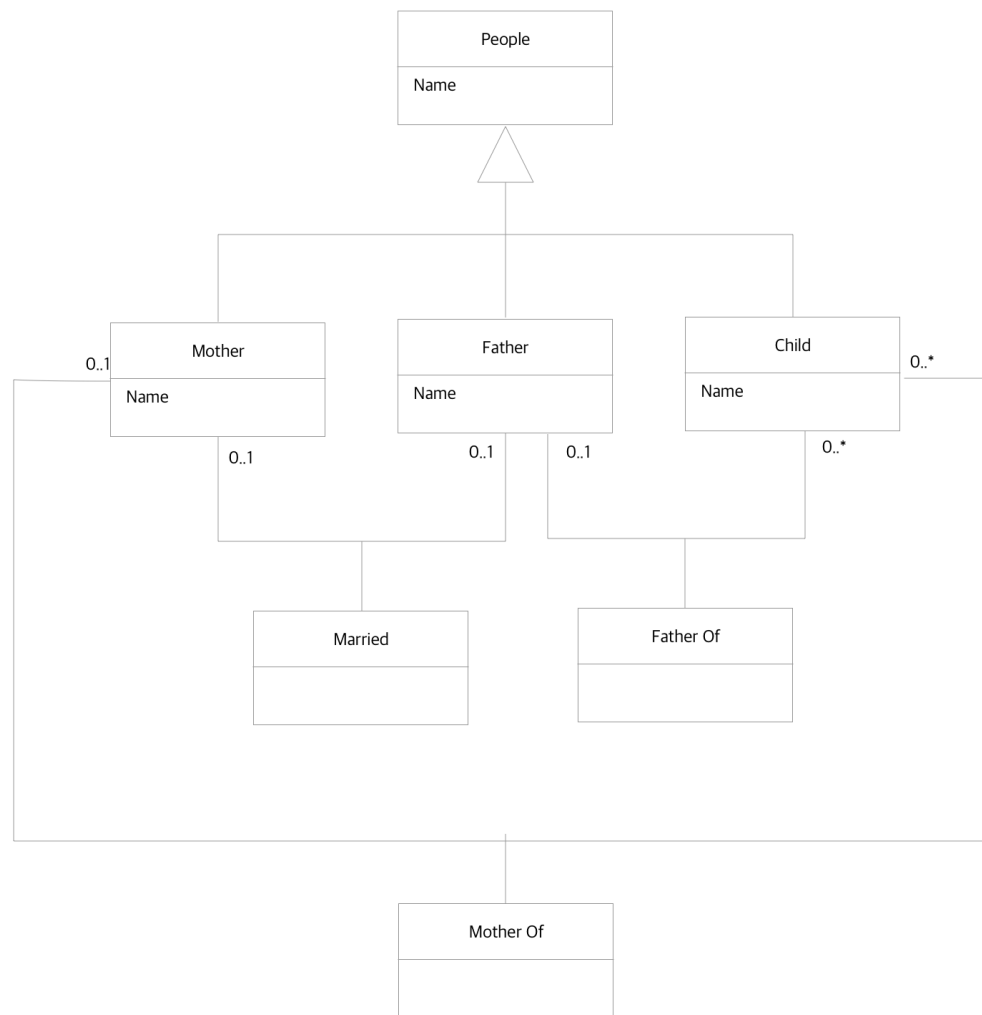
5.   • E/R Diagram

- UML

6. • E/R Diagram

- UML
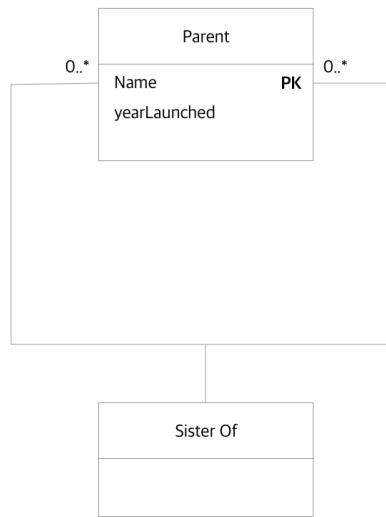
7.   • E/R Diagram

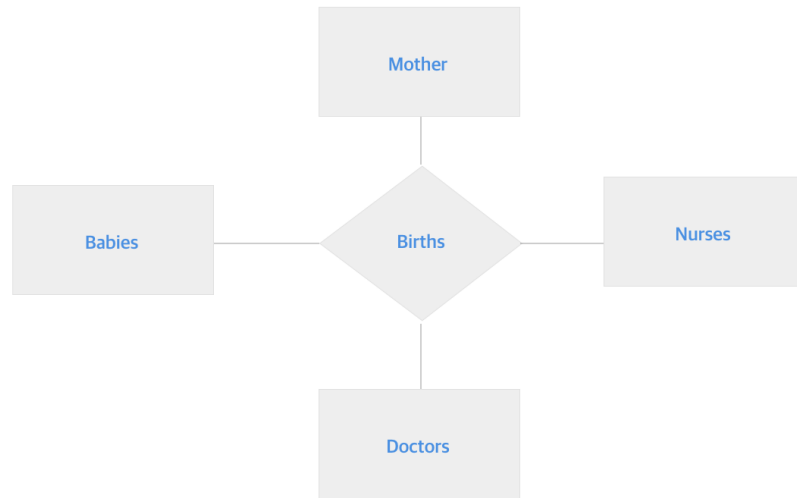   • UML

```
                          ┌─────────────────────┐
                          │      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    │
                          ├─────────────┤
                          │             │
                          └─────────────┘
```
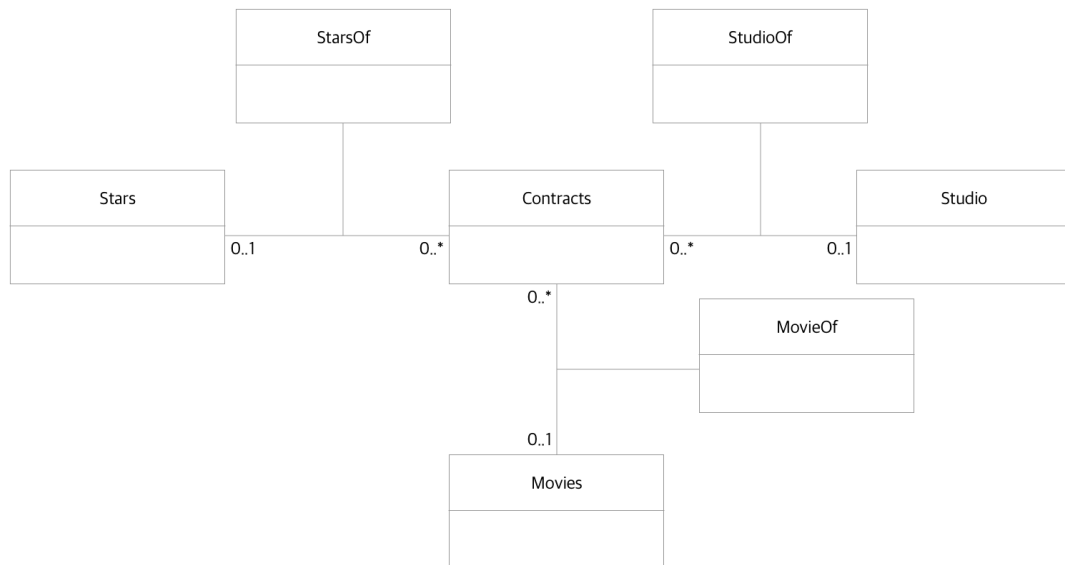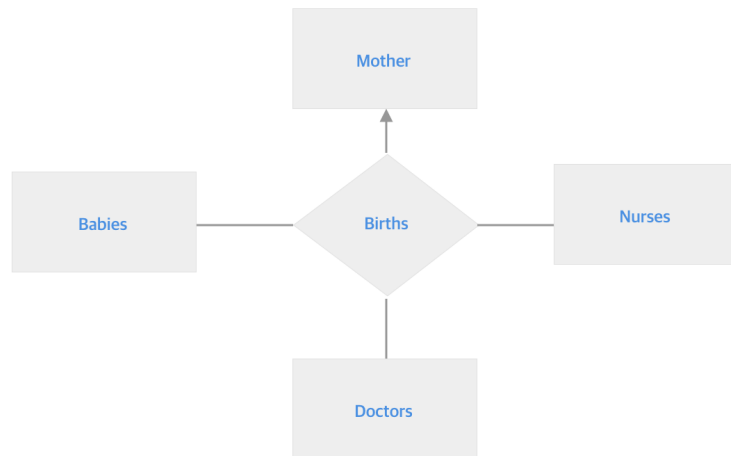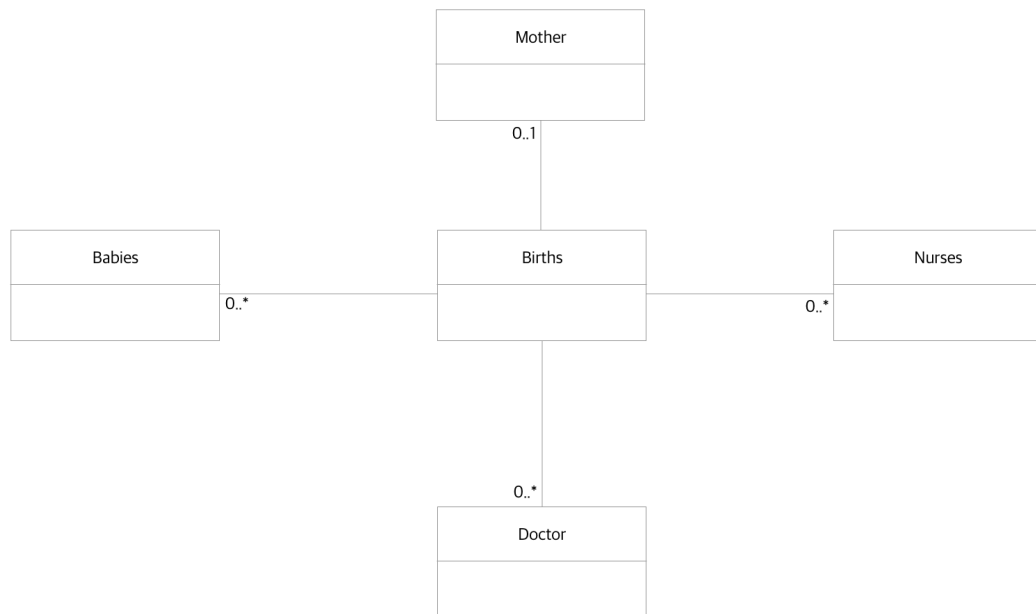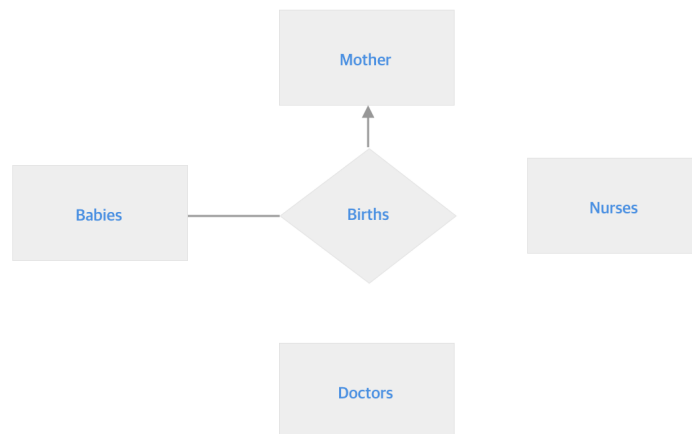
9.
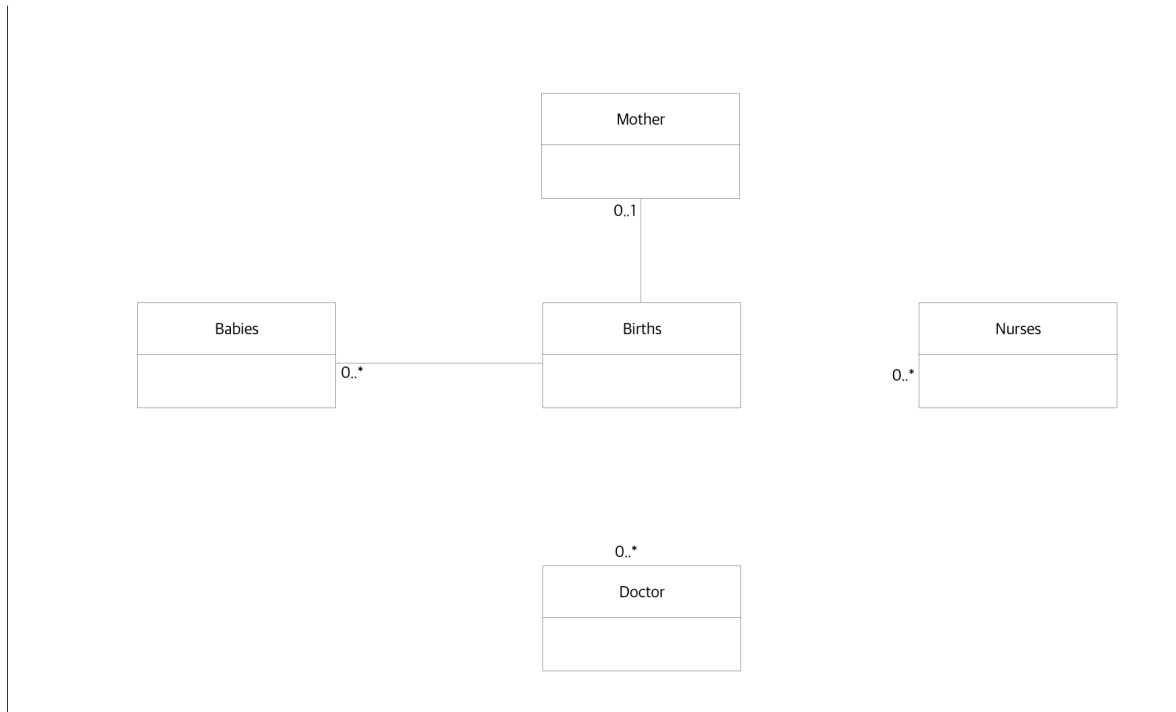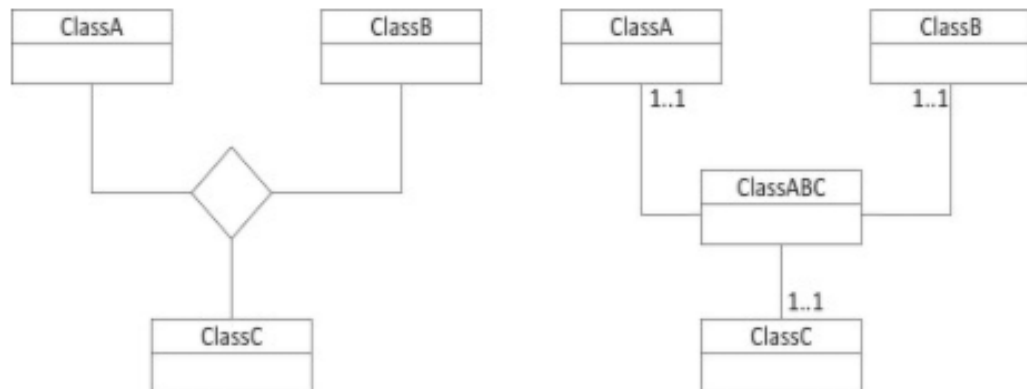
a) **Solution:**

- E/R Model
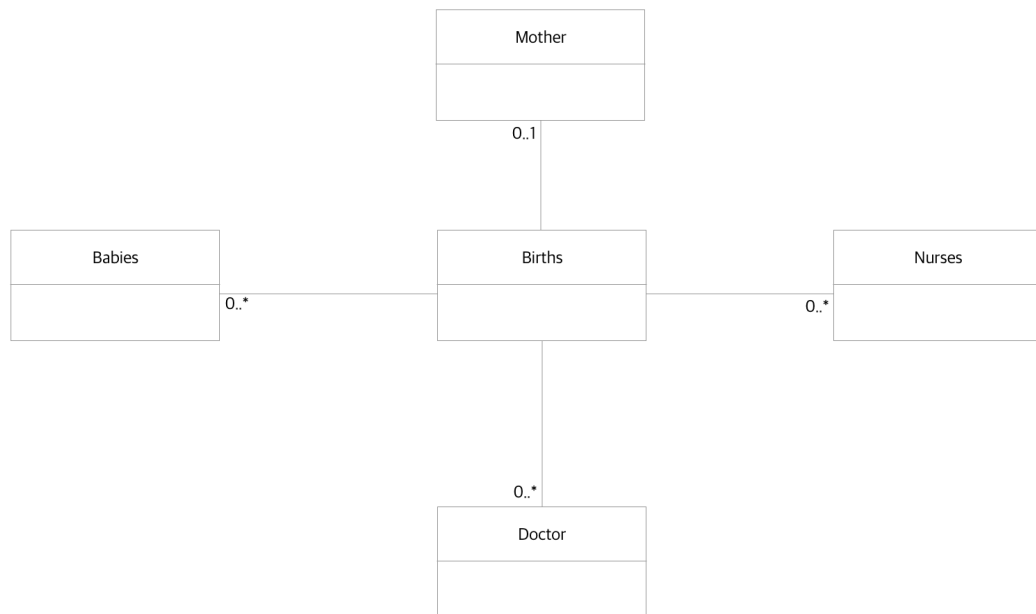

- UML

Correct Solution:
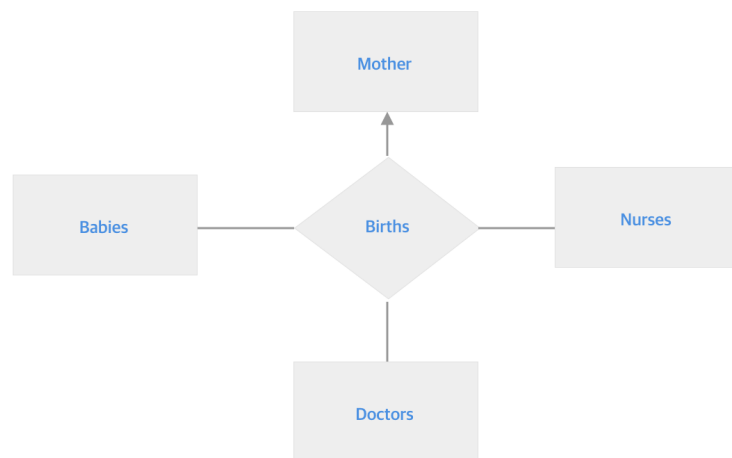
- E/R Model

- 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:**
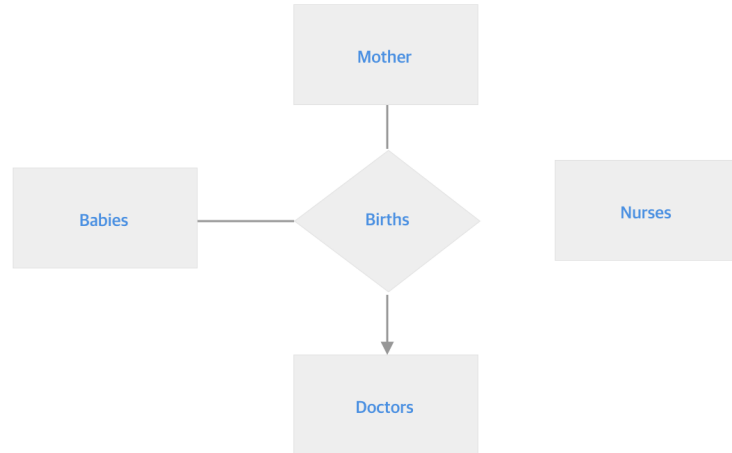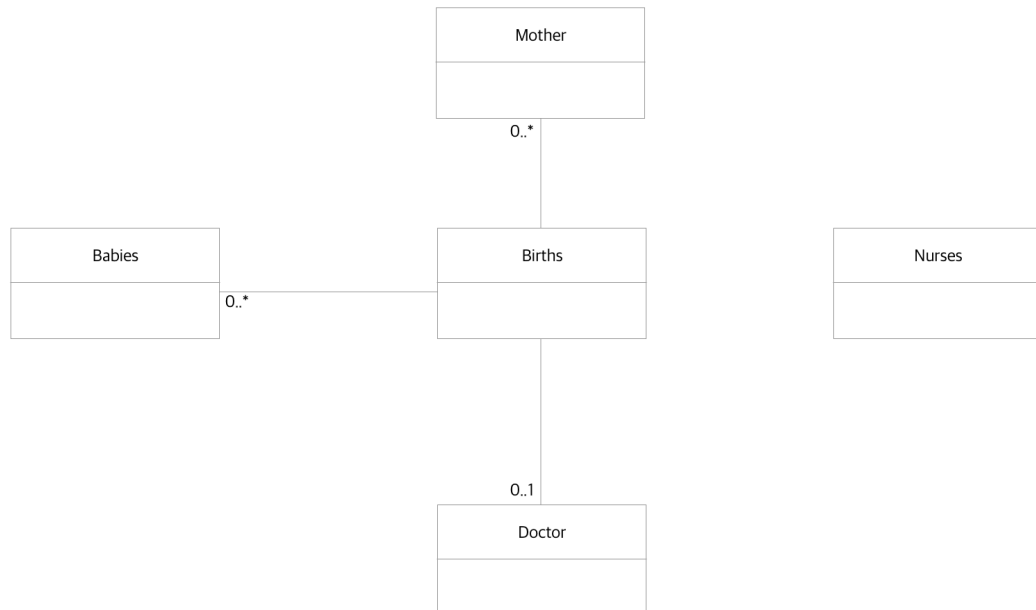 - E/R Model

- UML

c) **Solution:**

- E/R Model

- UML

10.   - Bookings

  Bookings(SSNo, number, day, row, seat)

  - Customers

  Customers(SSNo, name, addr, phone)

- Flights

    Flights(<u>number</u>, <u>day</u>, aircraft)

Notes:

- Weak Entity sets in UML

    Example:

Studios(name, address)

Crews(number, crewChief, studioName)