This is an exercise from the Merode course at KU Leuven.

The solution is given as a UML diagram and as an EDG (part of a Merode model)

Some of the mistakes from student solutions are specific to Merode, others are universal

Louvre Museum

Development of model-solution

Louvre

The Louvre Museum in Paris is a huge museum with quite a large number of rooms, so that many exhibitions can be organised in parallel in the Museum. Also, the planning phase of an exhibition starts at least two years before the actual opening date of an exhibition, so that even for a single room, several exhibitions in different stages of advancement need to be followed up simultaneously. Therefore, a little management system is required to make sure all these exhibitions run smoothly.

The museum has identified a set of locations inside the museum that can hold exhibitions. The locations can be considered as museums inside the museum, spanning e.g a part of or an entire floor or wing. So, for each location a series of exhibitions is developed.

Each exhibition is assigned an employee of the museum as coordinator. First a series of desired exhibition items is defined. For example, for an exhibition on Vincent Van Gogh, it is defined that one item of his early period is desired, one pencil drawing with the corresponding painting, one sunflower painting, etc. For each desired item, a suitable piece is sourced from the collectors that possess candidate pieces. For some items, only one unique piece is available, but some exhibition items several potential pieces are available from different collectors. (There are for example several "Sunflower" paintings from Vincent Van Gogh). For each exhibition item, the system will keep track of what pieces are requested from which collector.

To foster knowledge transfer, junior employees are assigned a senior employee as coach. This "coaching" relationship between employees is also tracked by the system.

Louvre

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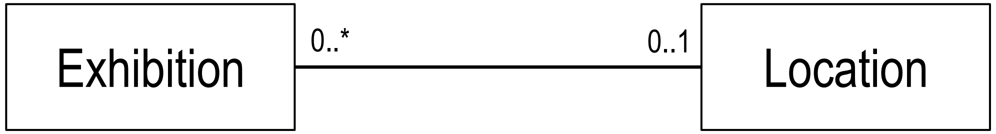
Louvre Museum

- ➢ Universe of Discourse, not a Business Object Type

Exhibition

- ➢ will be the central Business Object Type

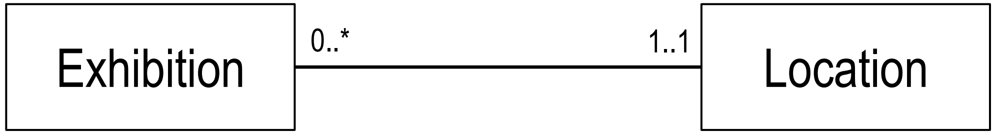
Louvre UML



The museum has identified a set of locations inside the museum that can hold exhibitions. The locations can be considered as museums inside the museum. So, for each location a series of exhibitions is developed.

- Note: the case description isn't really clear about the following questions
  - Does an exhibition need a location right from the start.
  - Can the location be changed?
- If the answers are yes+no, then the association should be 1..1 on the side of location, and it expresses existence dependency. In case of yes/yes or no/yes, the association does not express existence dependency, and then association reification will be required.

Louvre EDG



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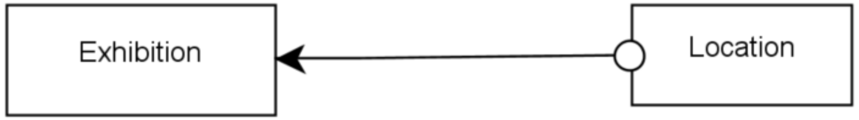
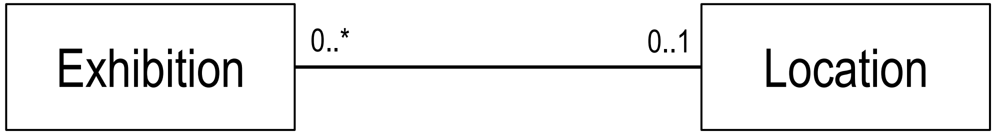


Louvre EDG



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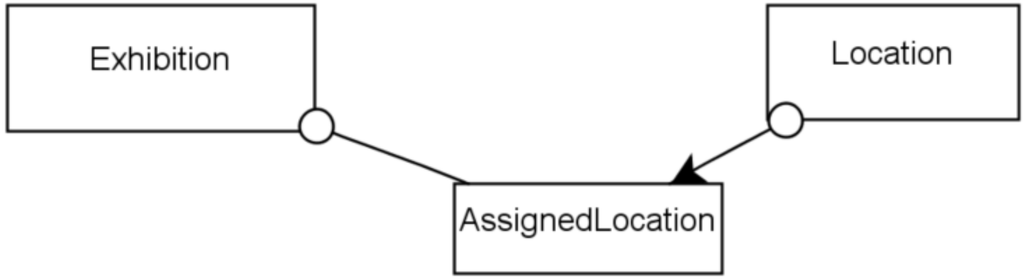
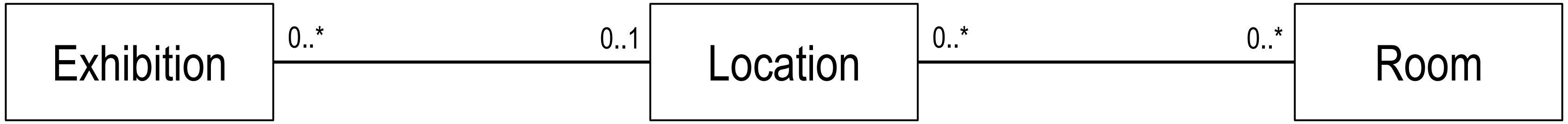
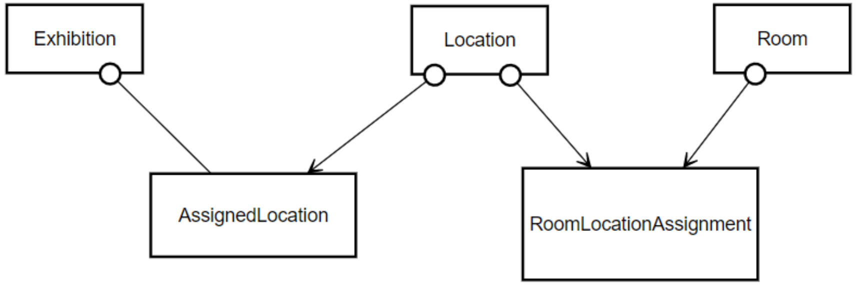


Louvre EDG

- The Louvre Museum in Paris is a huge museum with quite a large number of rooms, so that many exhibitions can be organised in parallel in the Museum. Also, the planning phase of an exhibition starts at least two years before the actual opening date of an exhibition, so that even for a single room, several exhibitions in different stages of advancement need to be followed up simultaneously.

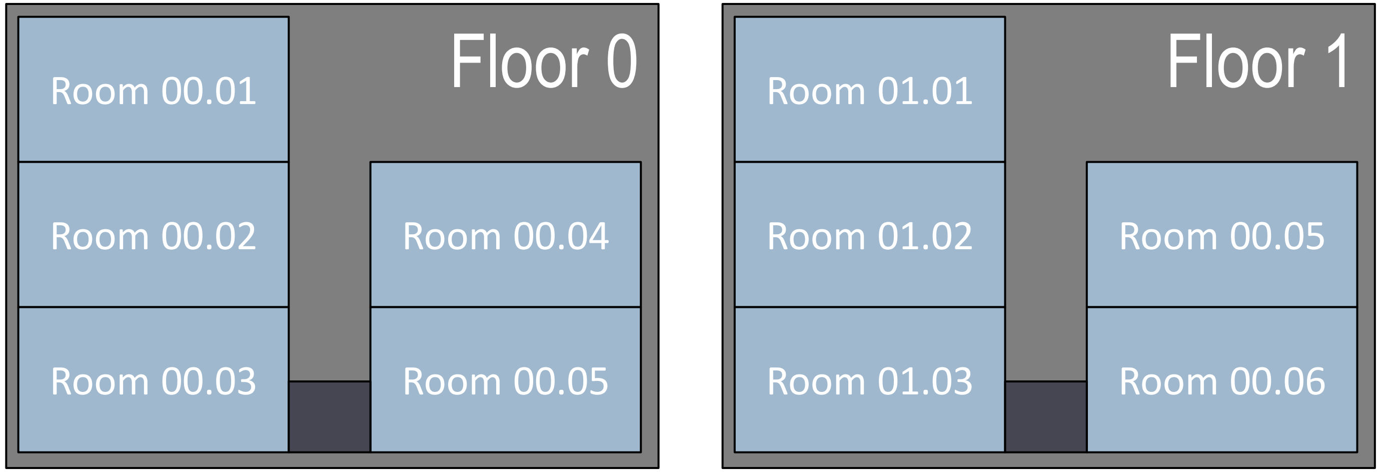


- The association between Location and Room object types are many-to-many, thus, reification is needed.

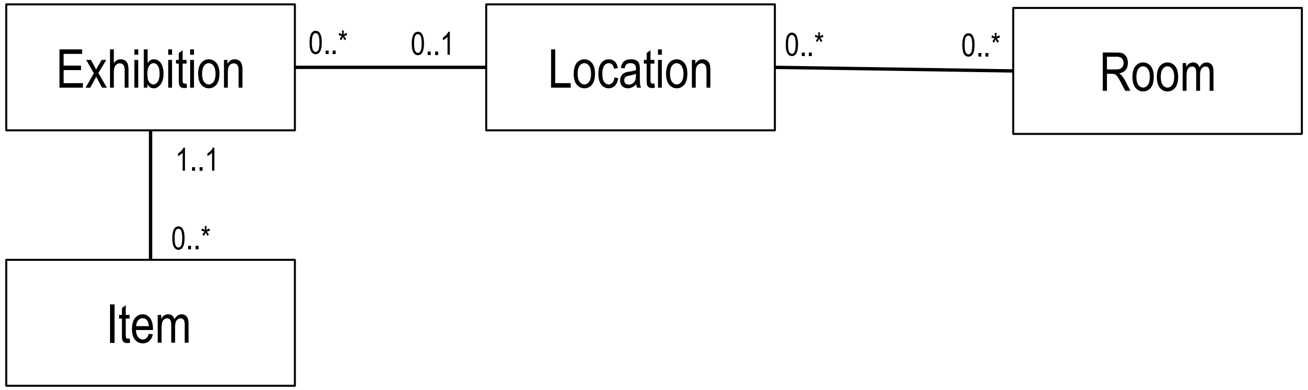


Rooms & Locations example

- One location can contain many rooms:
  - Location 1 = Floor 0 + Floor 1 → 10 rooms
  - Location 2 = Floor 0 only → 5 rooms
- One room can belong to many locations
  - Rooms 00.01, 00.02, 00.03 belong to both Location 1 and Location 2



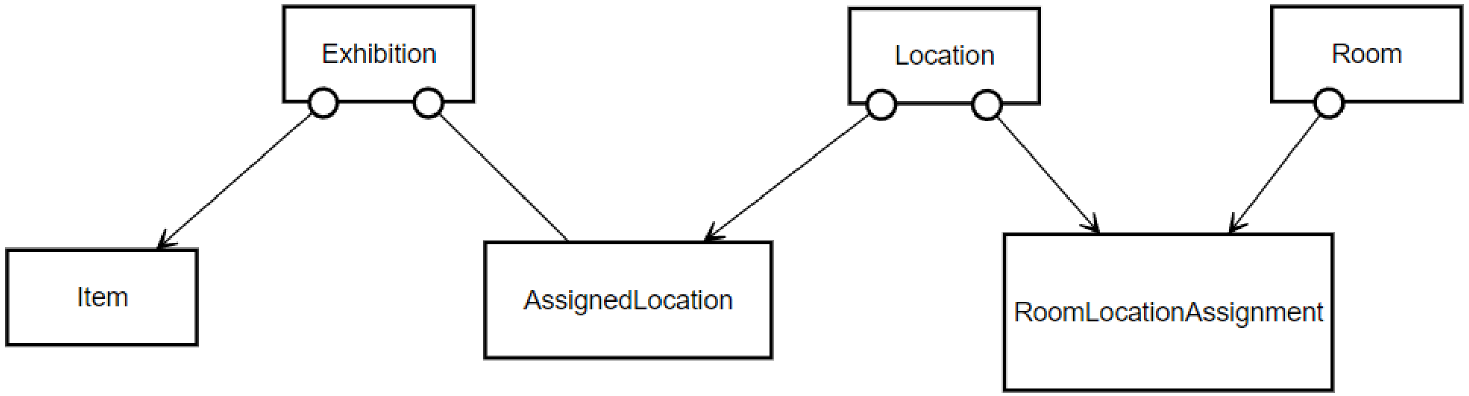
Louvre UML



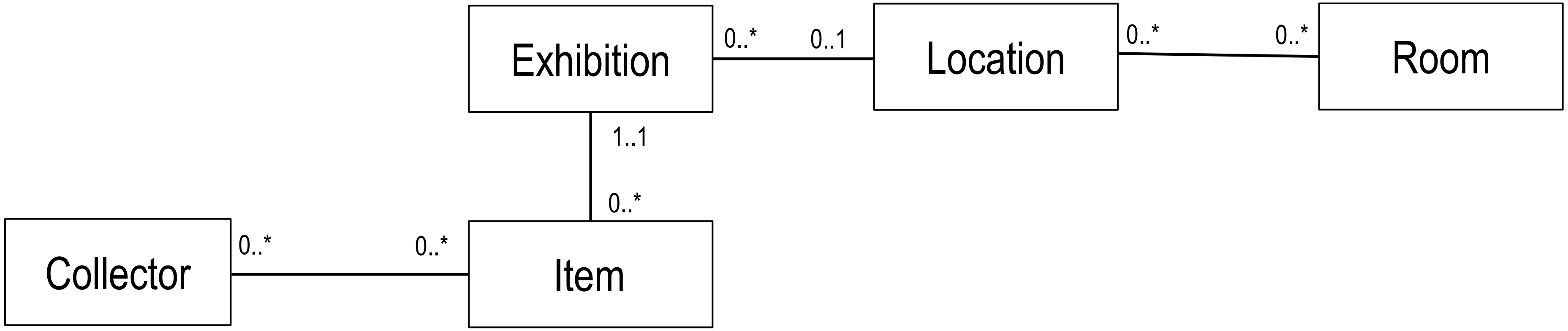
For each exhibition, first a series of desired exhibition items is defined. For example, for an exhibition on Vincent Van Gogh, it is defined that one item of his early period is desired, one pencil drawing with the corresponding painting, one sunflower painting, etc.

- An item is part of an exhibition once and for all. So this association expresses existence dependency. No reification is required.

Louvre EDG


Exhibition
Location
Room
Item
AssignedLocation
RoomLocationAssignment

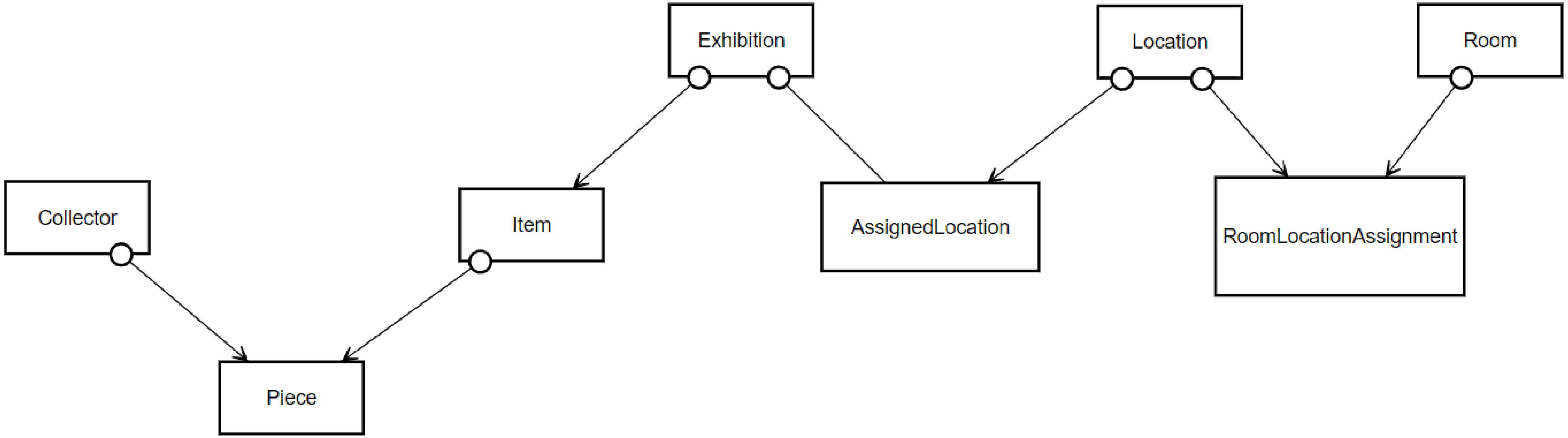
Louvre UML



For each desired item, a suitable piece is sourced from the collectors that possess candidate pieces. For some items, only one unique piece is available, but some exhibition items several potential pieces are available from different collectors.

- For each items, several collectors are contacted. A collector may supply pieces for many exhibition-items.

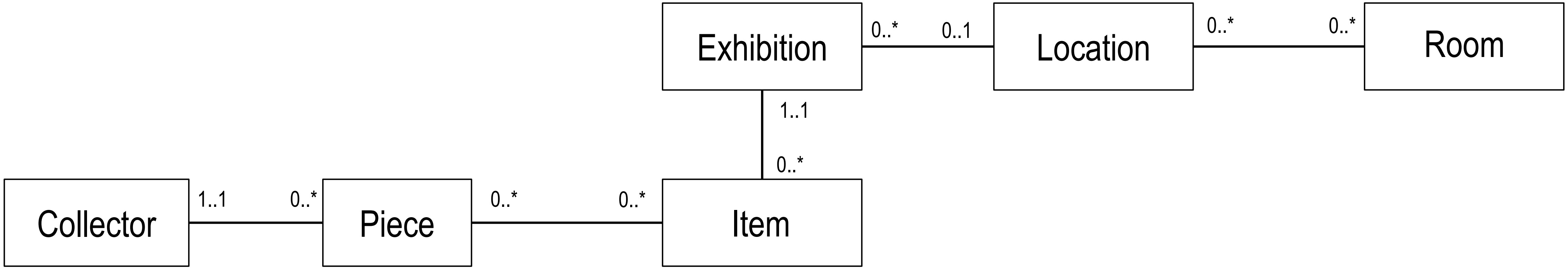
Louvre EDG



According to this EDG,

1. you can only register pieces in connection to an exhibition item
2. a Piece always refers to one and always the same item.

Louvre UML

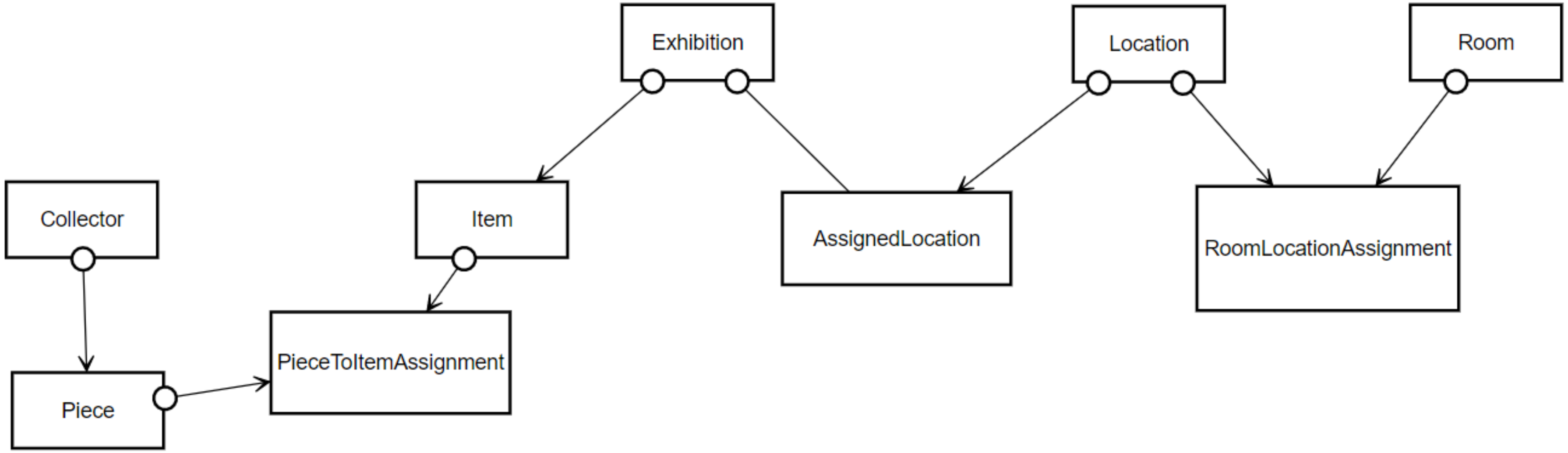


For each desired item, a suitable piece is sourced from the collectors that possess candidate pieces. For some items, only one unique piece is available, but some exhibition items several potential pieces are available from different collectors.

Alternative

- The pieces that are possessed by a collector, may be recorded first, and then matched to exhibition items. This requires a model that is more extended.
- You probably don't want to trace how collectors trade pieces in their possession. It's then acceptable to assume that pieces are "existence dependent" on their owning collector.

Louvre EDG

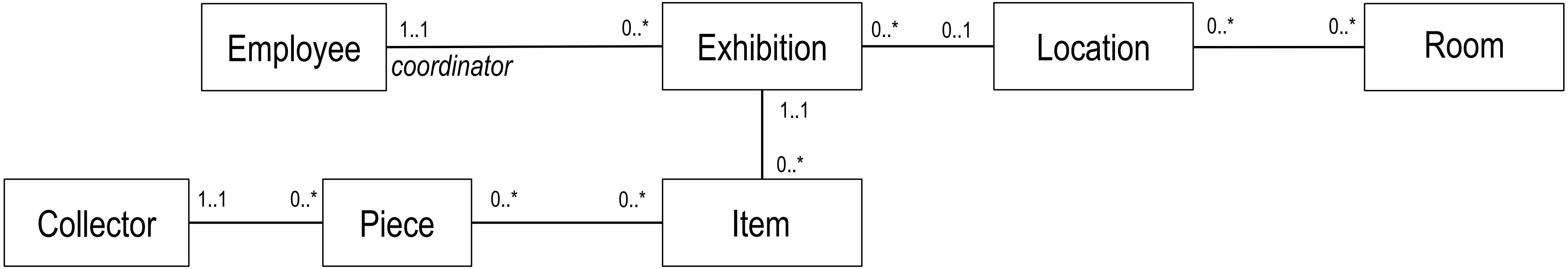


Alternative

According to this EDG,

1. You can register pieces independently from setting up exhibitions
2. A piece can be used for several exhibition items: a same piece may be targeted by several exhibitions. Final assignment can then only be done if the time slots are non-overlapping (presumes a process of request that may be accepted or refused, to be captured in FSMs or BP layer).

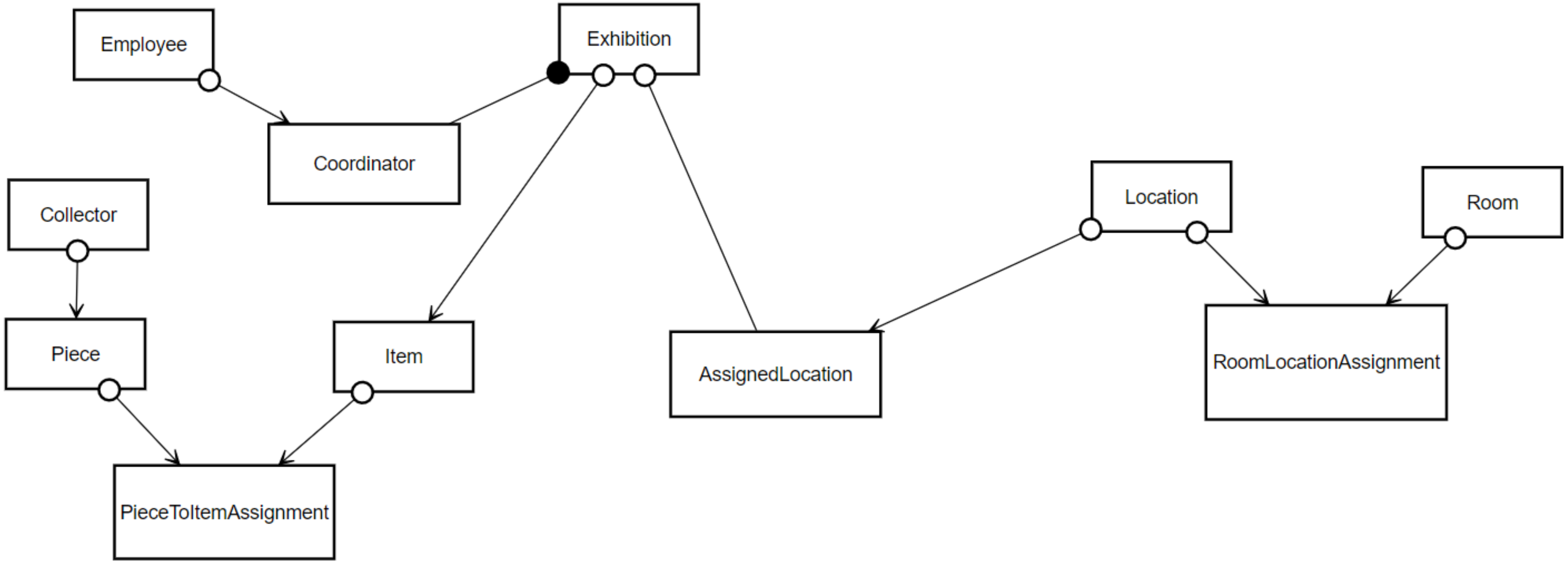
Louvre UML



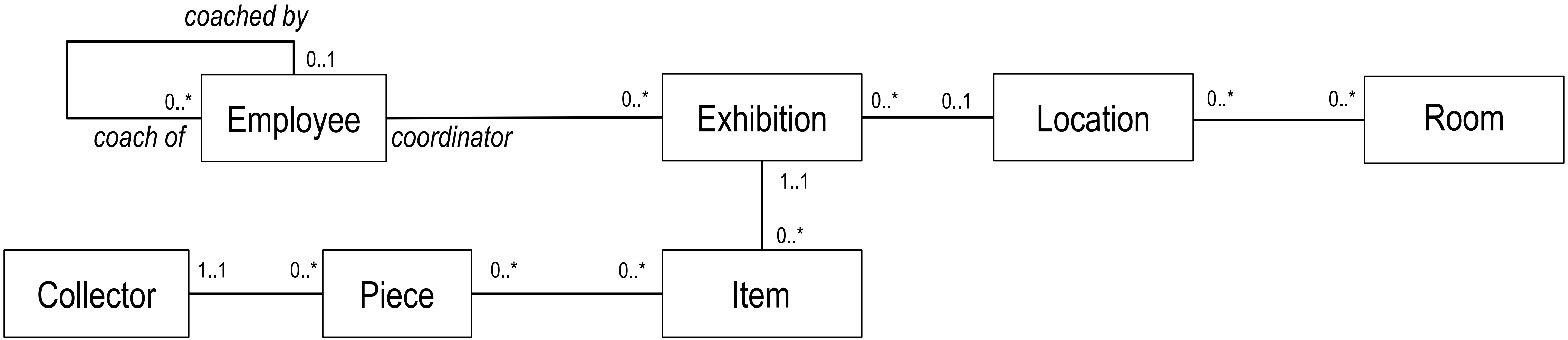
Each exhibition is assigned an employee of the museum as coordinator.

- Employee will not be existence dependent on the exhibition, nor is an exhibition existence dependent on an employee. So this association will need reification.

Louvre EDG


Employee
Exhibition
Coordinator
Collector
Location
Room
Piece
Item
AssignedLocation
RoomLocationAssignment
PieceToItemAssignment

Louvre UML

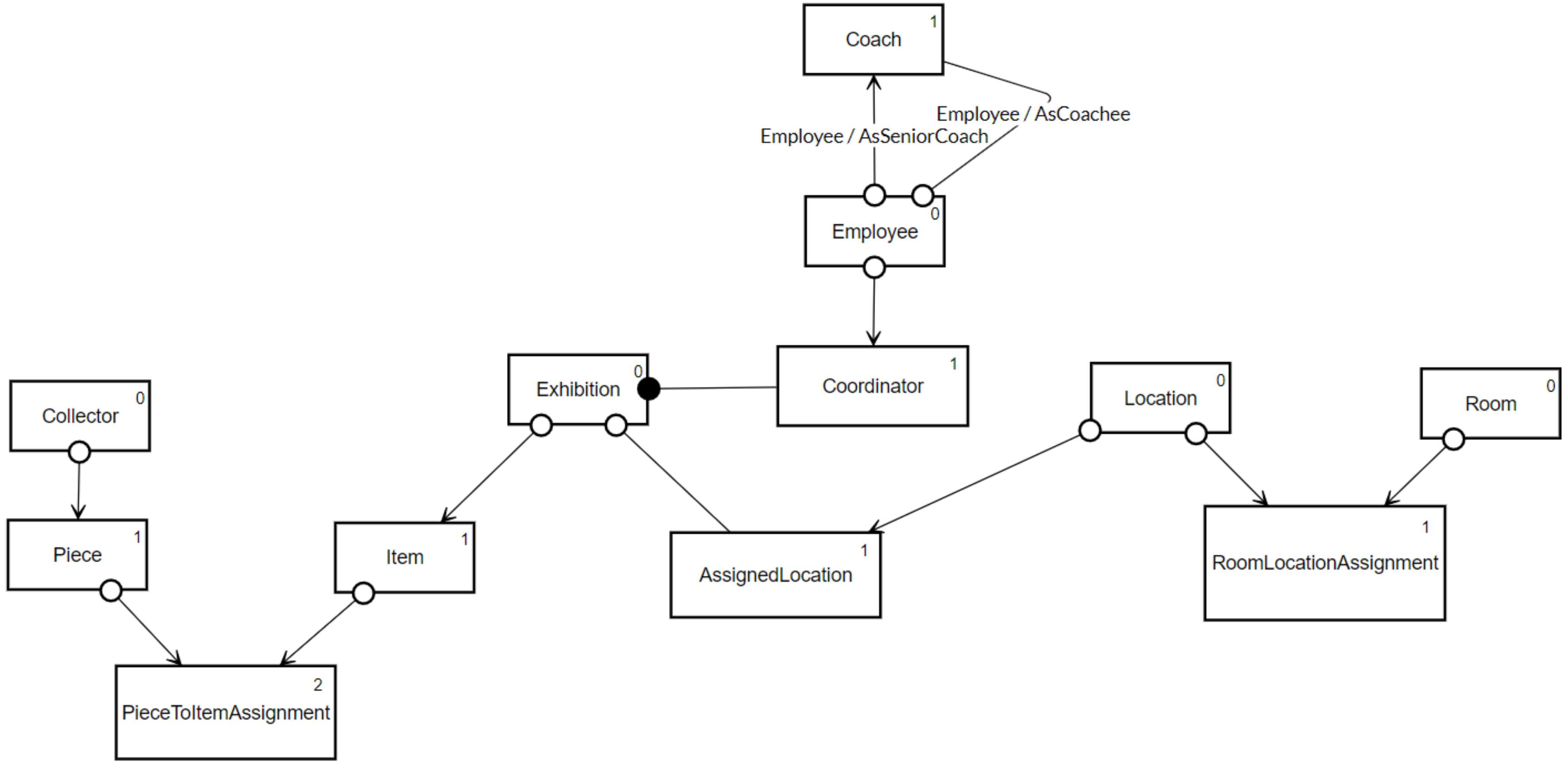


To foster knowledge transfer, junior employees are assigned a senior employee as coach.

- Unary associations always need to be reified.

14:34

Louvre EDG


Coach
1
Employee / AsCoachee
Employee / AsSeniorCoach
Employee
0
Coordinator
1
Exhibition
0
Collector
0
Location
0
Room
0
Piece
1
Item
1
AssignedLocation
1
RoomLocationAssignment
1
PieceToItemAssignment
2

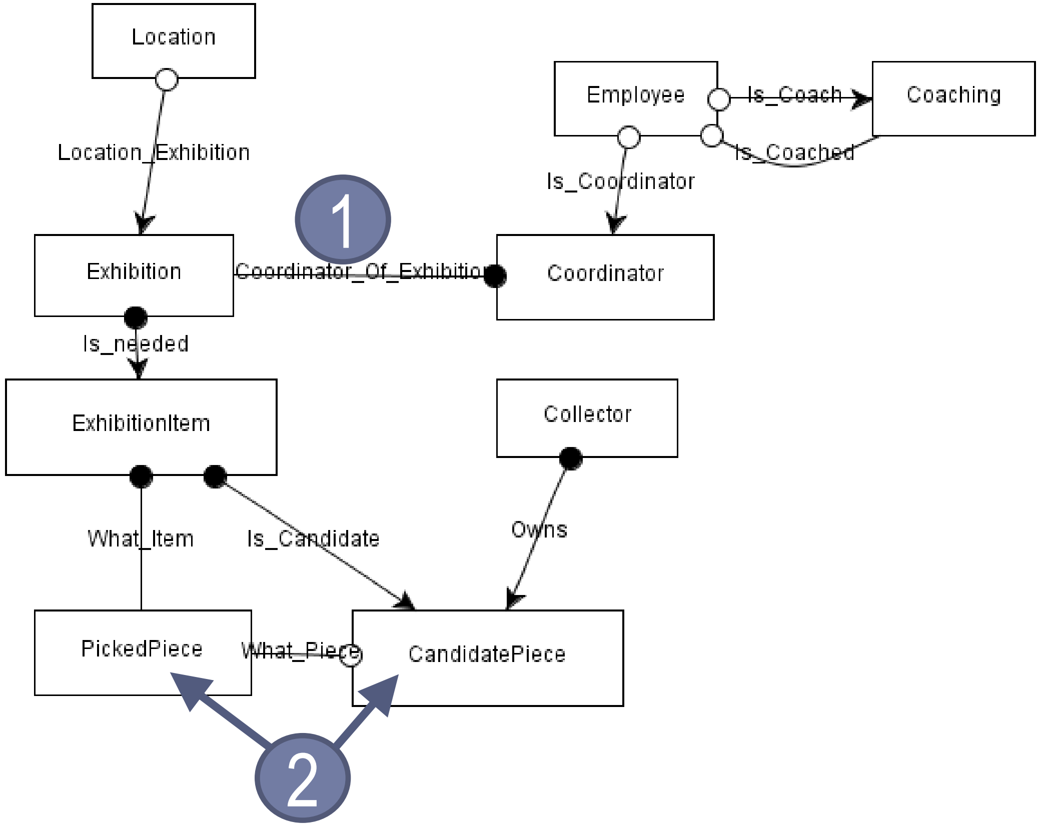
LouvreMuseum

Advice based on student solutions

Tips

1. Double check direction of association: which object exists first?
2. Objects in different states → in FSM
3. Different classes should not overlap in terms of instances
4. Have meaningful names for business objects
5. Do not reify more than necessary
6. Double check cardinalities of associations
7. Do not have more associations than needed
8. Do not include the Universe of Discourse as a business object type
9. Do not include information system
10. Do not include business process tasks
11. Do not confuse direct and indirect associations

Louvre - Feedback



1. Double check direction of association: which object exists first?

2. Objects in different states ==> in FSM

Louvre - Feedback

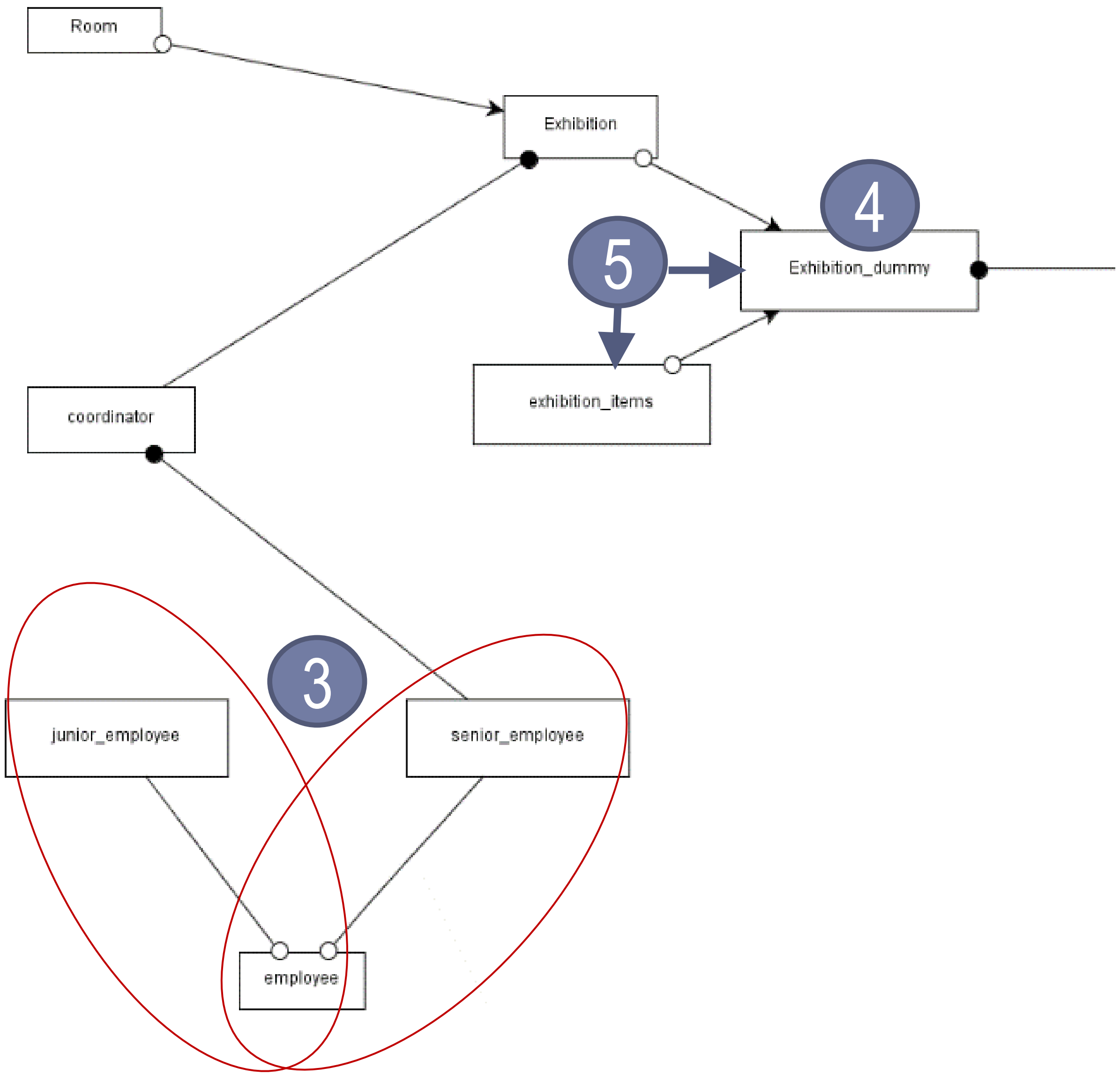
3. Different classes should not overlap in terms of instances

See chapter 8, Inheritance

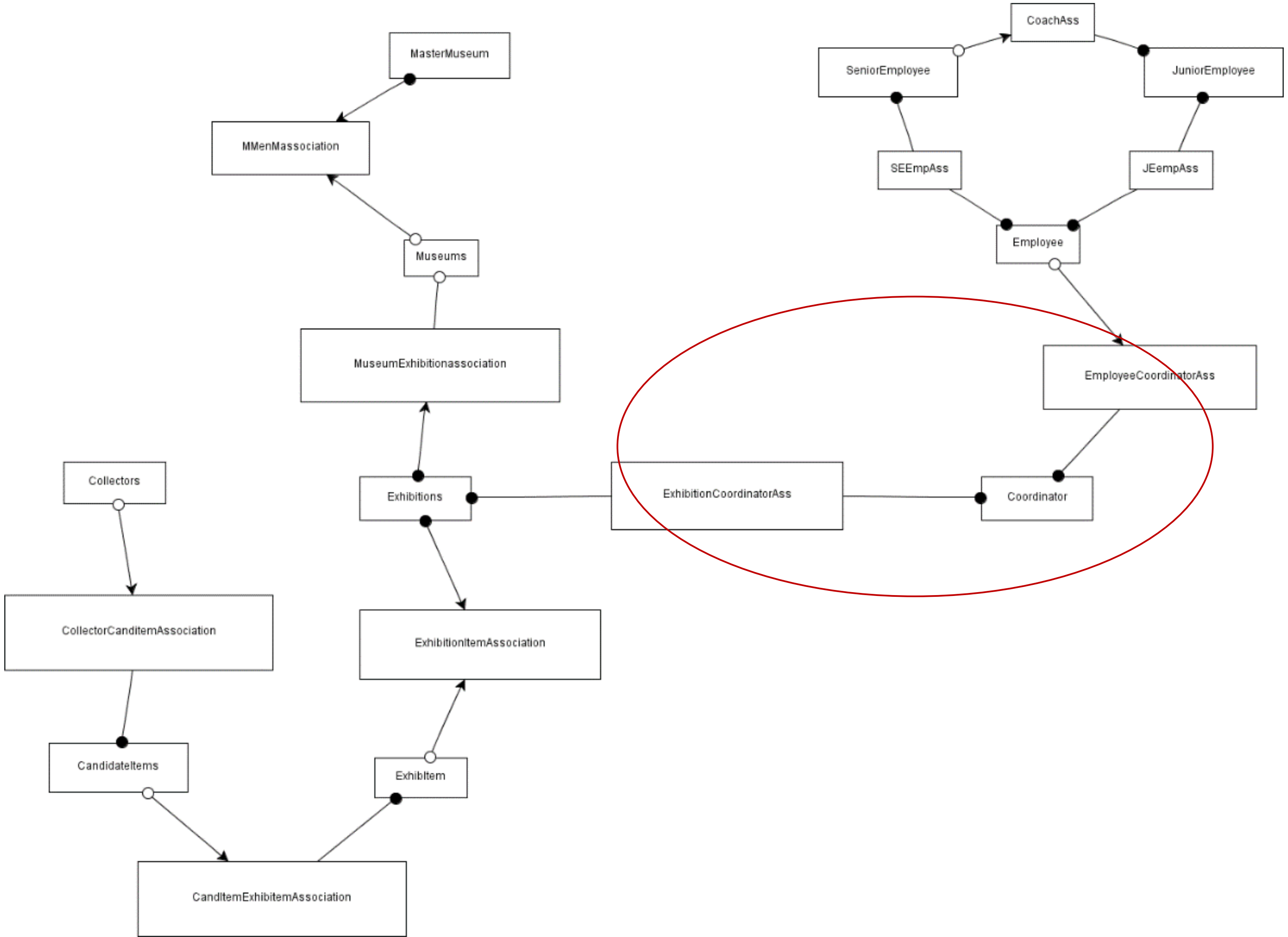
4. Have meaningful names for business objects

5. Do not reify more than necessary:

Is it required to be able to create exhibition items independently from an exhibition? Then find another name



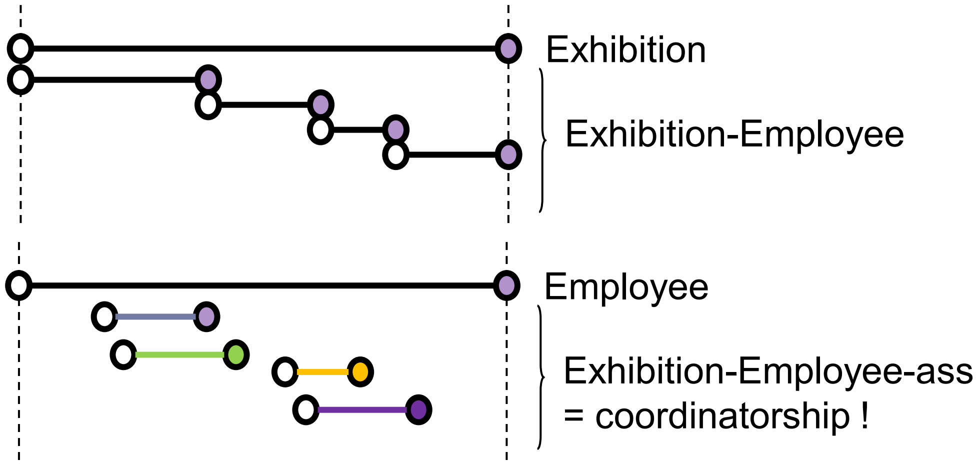
Louvre - Feedback



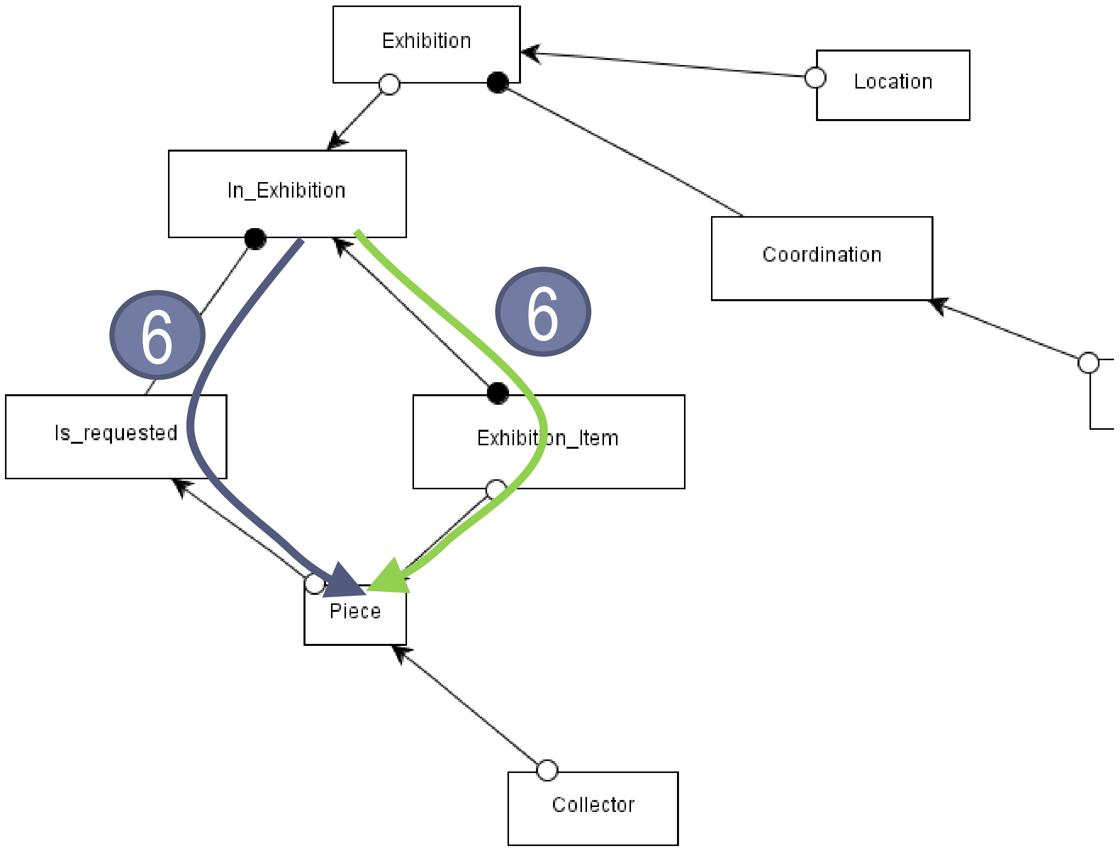
5. Do not reify more than necessary !

Check lifecycles of objects!

Only 1 association class is needed, not 3



Louvre - Feedback

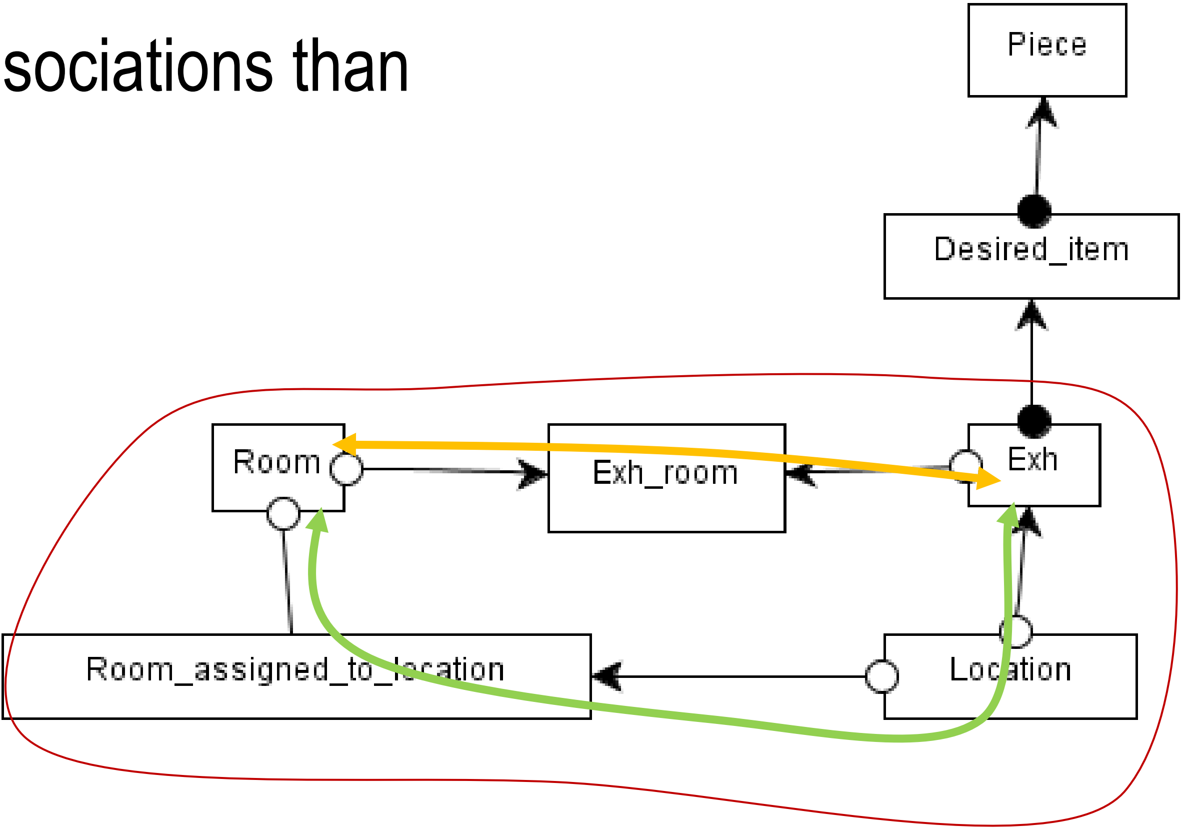


6. Double check cardinalities of (implicit) associations via all paths

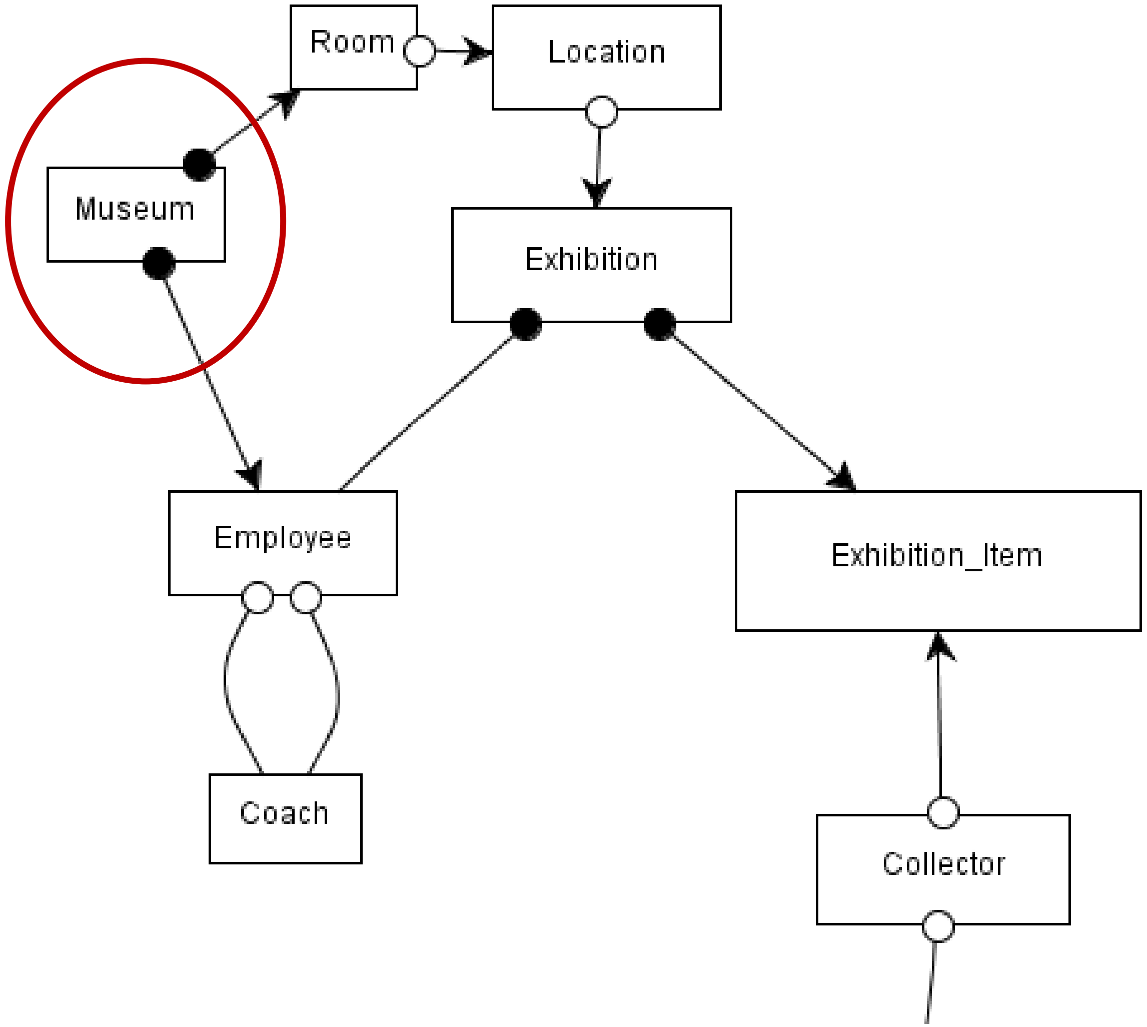
How many exhitibion items/ pieces are connected to in_exhibition via the blue and the green path?

Louvre - Feedback

- **7.** Not more associations than needed

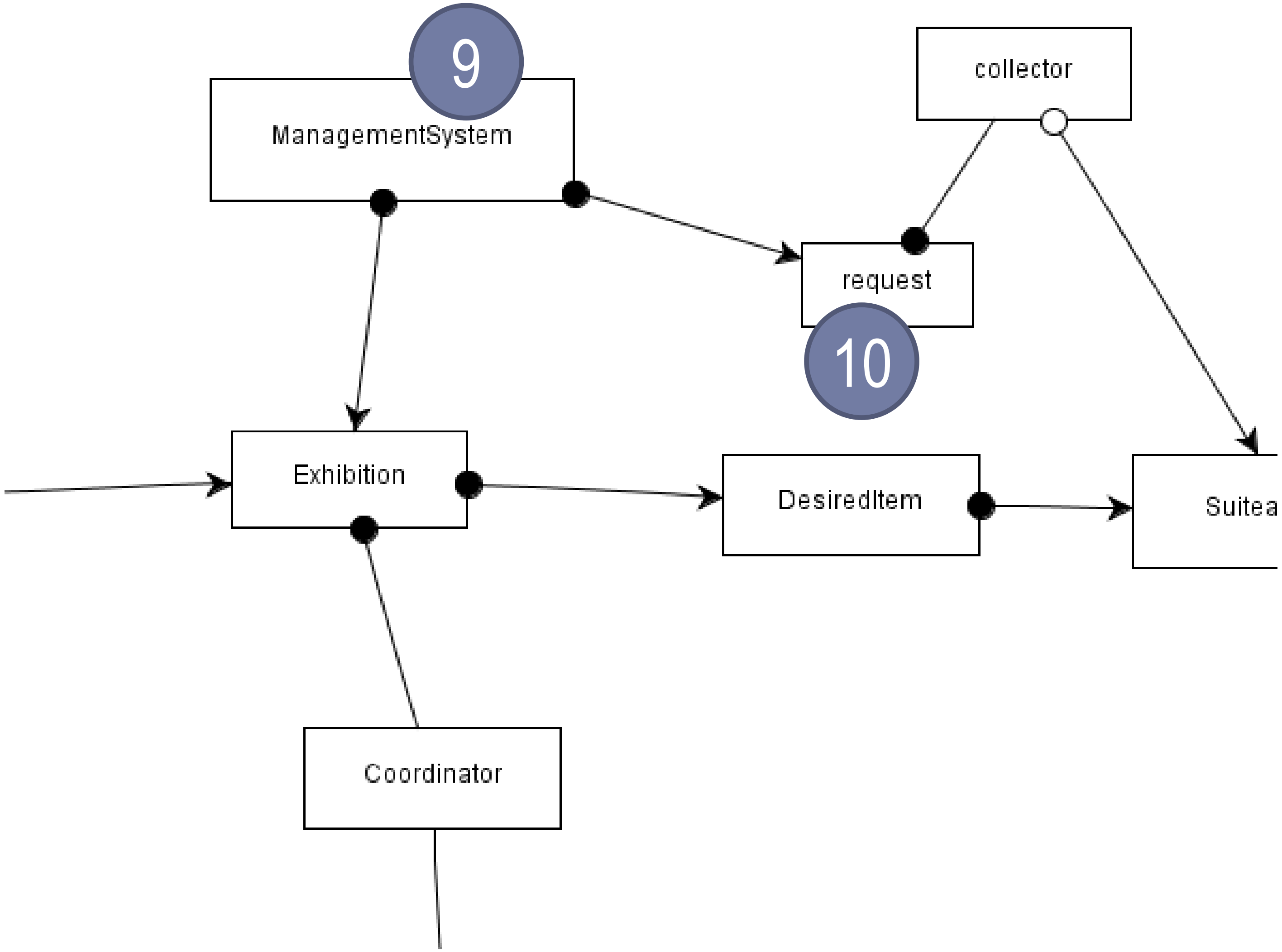


Louvre - Feedback



8. Do not include the Universe of Discourse as a business object type

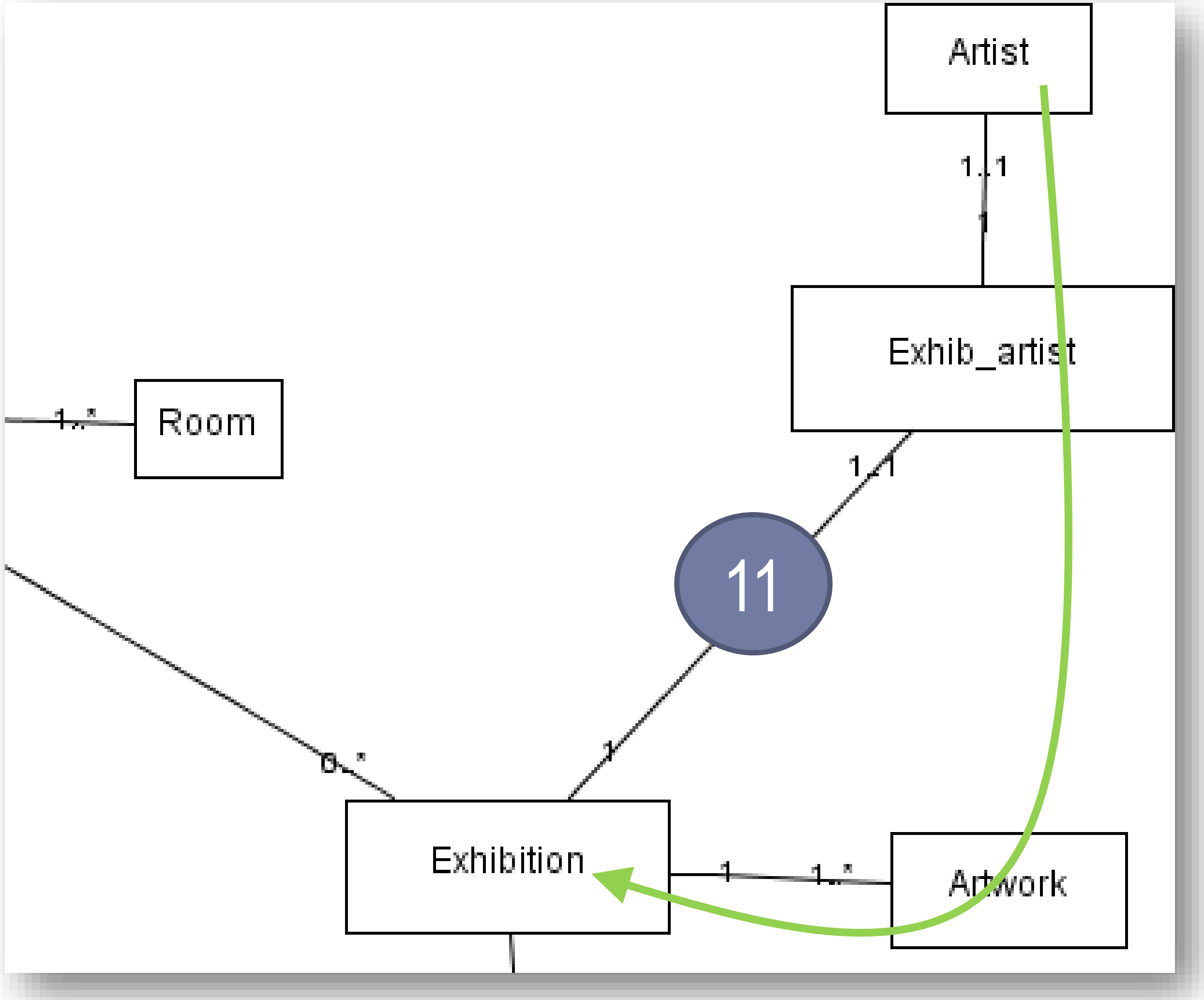
Louvre - Feedback



9. Do not include information system

10. Do not include business process tasks

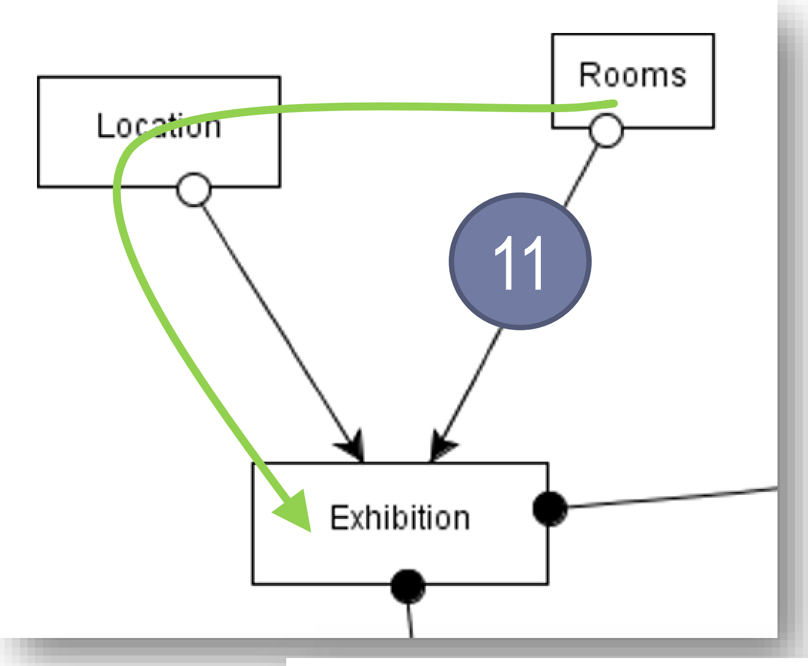
Louvre - Feedback

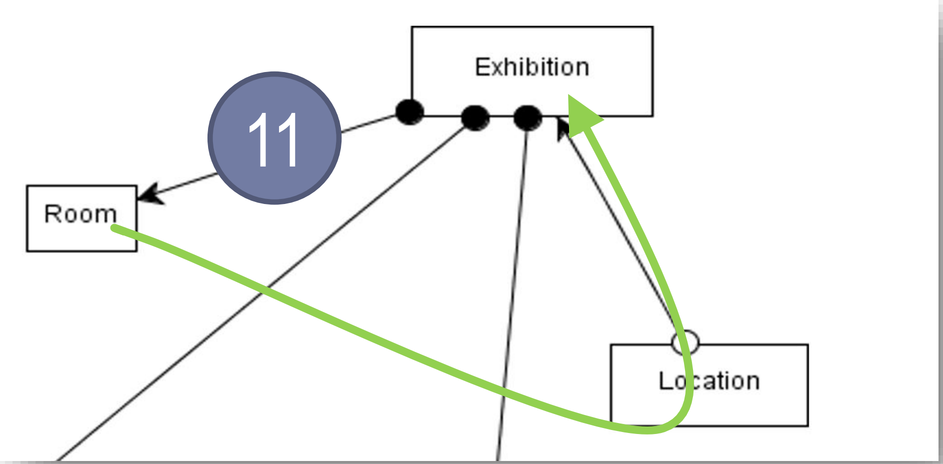


11. Do not confuse indirect associations with direct associations

> *An artist is related to an exhibition because his/her artwork is shown at the exhibition.*

Louvre - Feedback





11. Do not confuse indirect associations with direct associations

Rooms are related to an exhibition because they are related to the location.