COMP 3111
SOFTWARE ENGINEERING

LECTURE 2
MODELING SOFTWARE SYSTEMS
USING UML
EXERCISE

EXERCISE: CAR OWNERSHIP AND LOANS

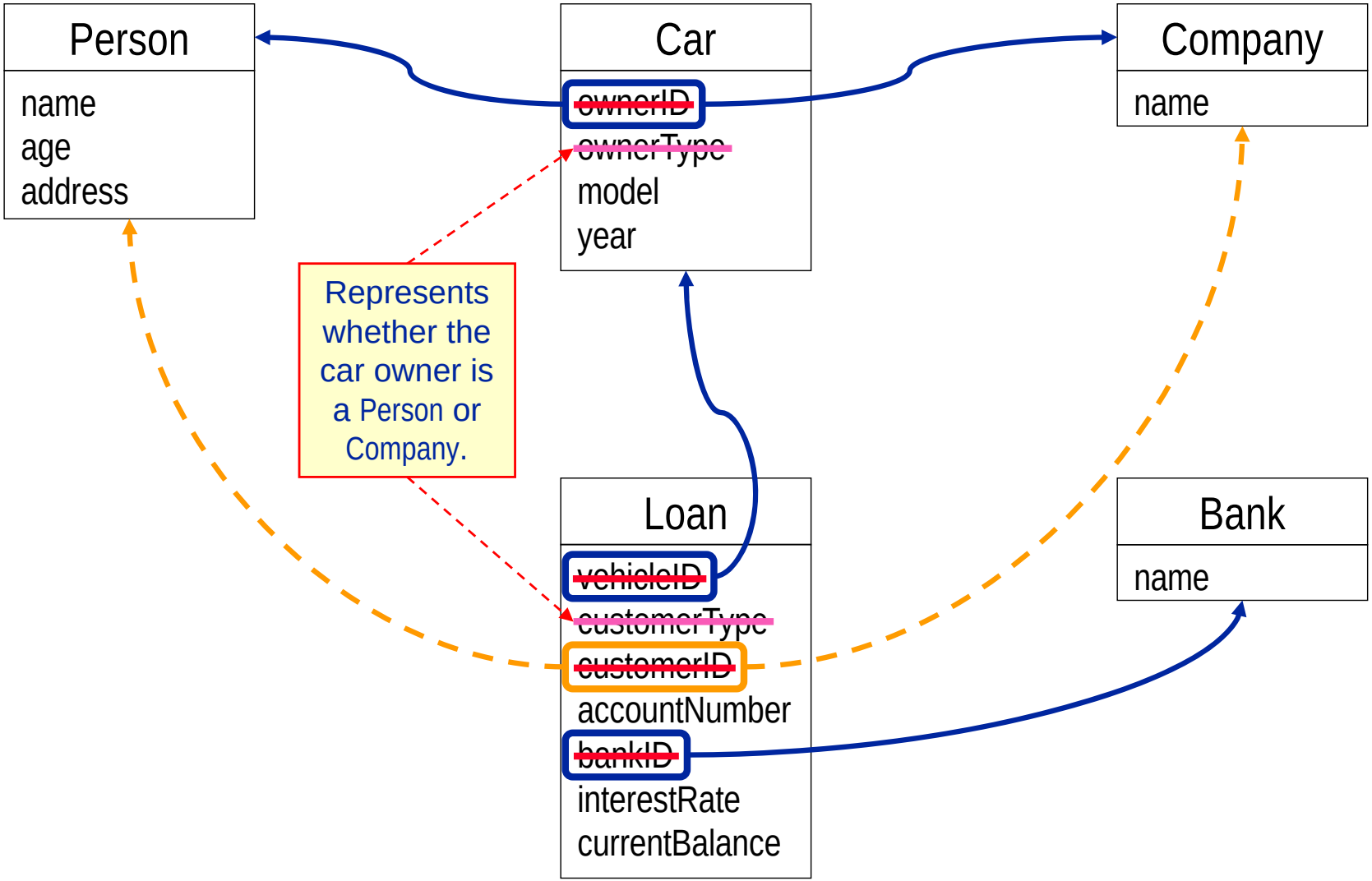
The classes shown below are required to represent information about car ownership and car loans. However, they have some attributes that are internal object identifiers (OIDs) that are being used to represent relationships and that *should not appear* in a class diagram. All such attributes conveniently have names ending in ID.

Persons or companies may own cars. The car owner ID represents either the person or company that owns the car. A car may have only one owner (person or company). A car may have no loan or multiple loans. A bank provides a loan to a person or a company for the purchase of a car. Only the car owner may obtain a loan on the car. The car owner type and the loan customer type indicate whether the car owner/loan holder is a person or company.

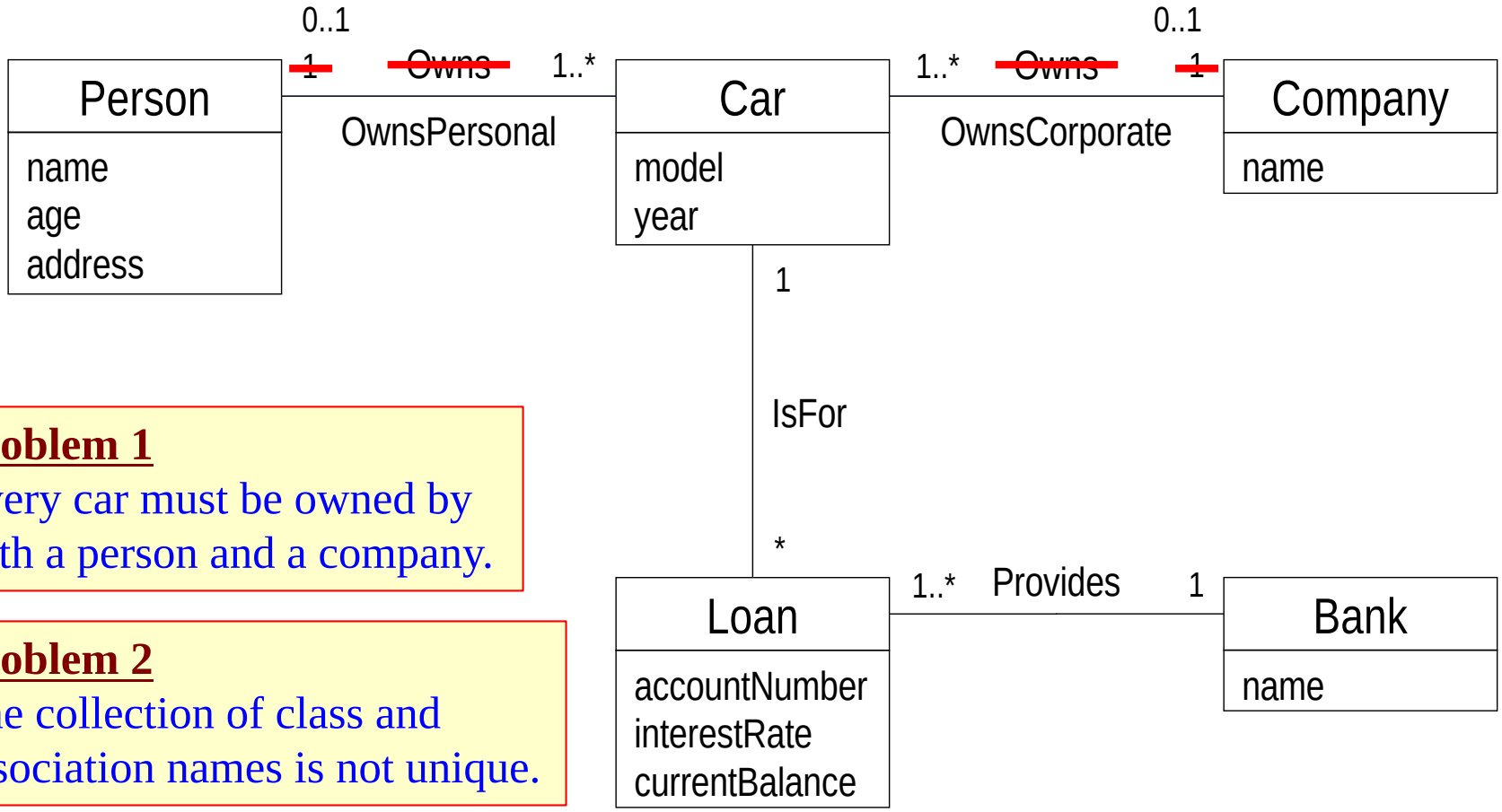
On the class diagram below:

1. **Replace all OIDs with associations.**
2. **Indicate the most likely multiplicities for all associations.**
3. **Cross out any unnecessary attributes.**

EXERCISE: CAR OWNERSHIP AND LOANS — SOLUTION



EXERCISE: CAR OWNERSHIP AND LOANS — SOLUTION



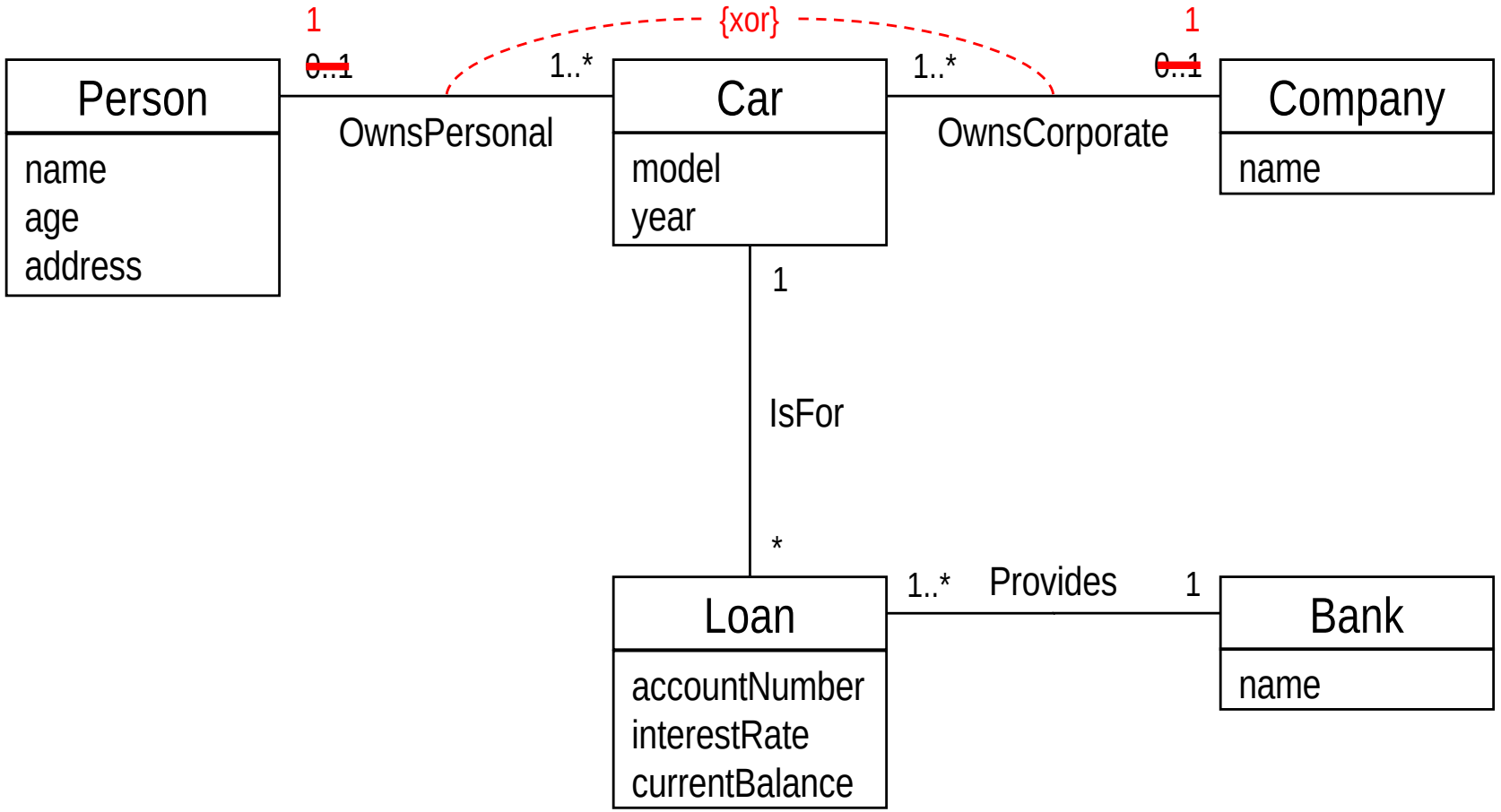
Problem 1
Every car must be owned by both a person and a company.

Problem 2
The collection of class and association names is not unique.

Problem 3
It is still possible for a car to be owned by both a person and a company or to not be owned at all!

➡ Requires an exclusive or constraint (see later).

EXERCISE: CAR OWNERSHIP AND LOANS — SOLUTION REVISITED



Problem 3

It is still possible for a car to be owned by both a person and a company or to not be owned at all!

➡ Requires an exclusive or constraint (see later).

EXERCISE: CAR OWNERSHIP AND LOANS — COMMON ERRORS

- Missing classes or associations
- Extra classes or associations not specified in the requirements
  - Stick to what is stated in the user requirements; don't be creative.
- Incorrect associations
- Redundant associations
  - Two paths in the class diagram that result in the same objects.
- Missing association names
  - While associations names are not required, it is always a good idea to name them.
- Missing or wrong multiplicities
  - (e.g., Owns)
- Using incorrect notation
  - (e.g., entity-relationship notation)