

Object-oriented design heuristics

Object-oriented software design

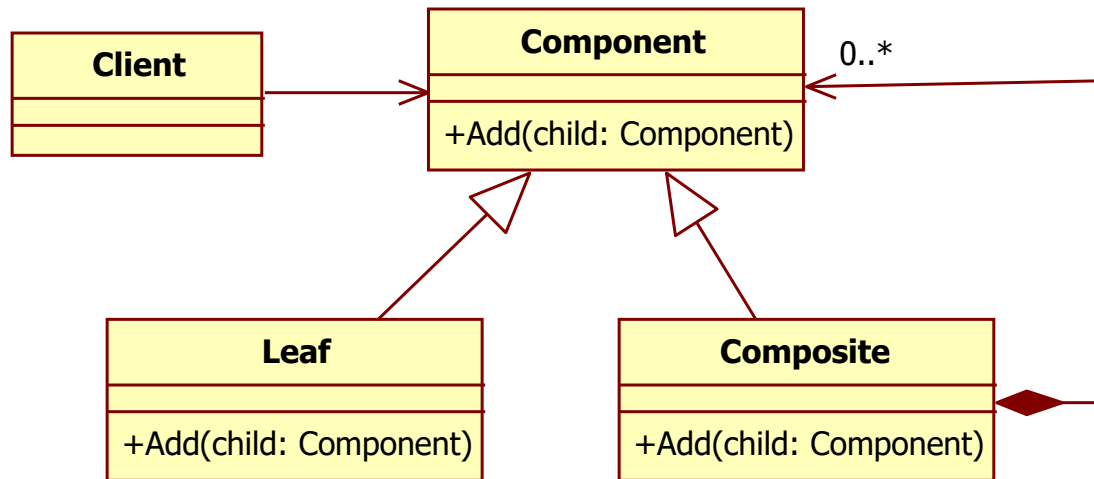
Dr. Balázs Simon

BME, IIT

SOLID

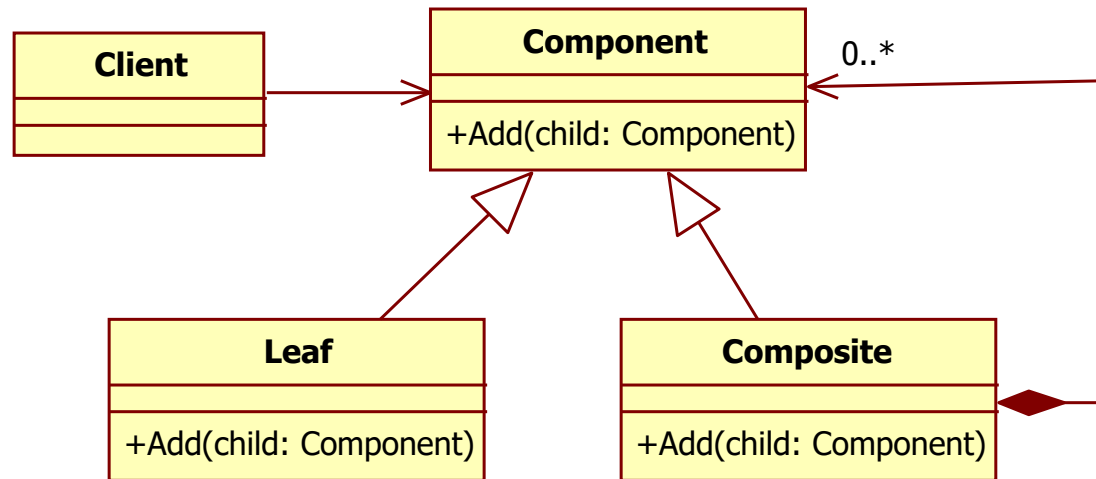
Which of the following design principles does the Composite pattern below violate?

LSP and/or OCP



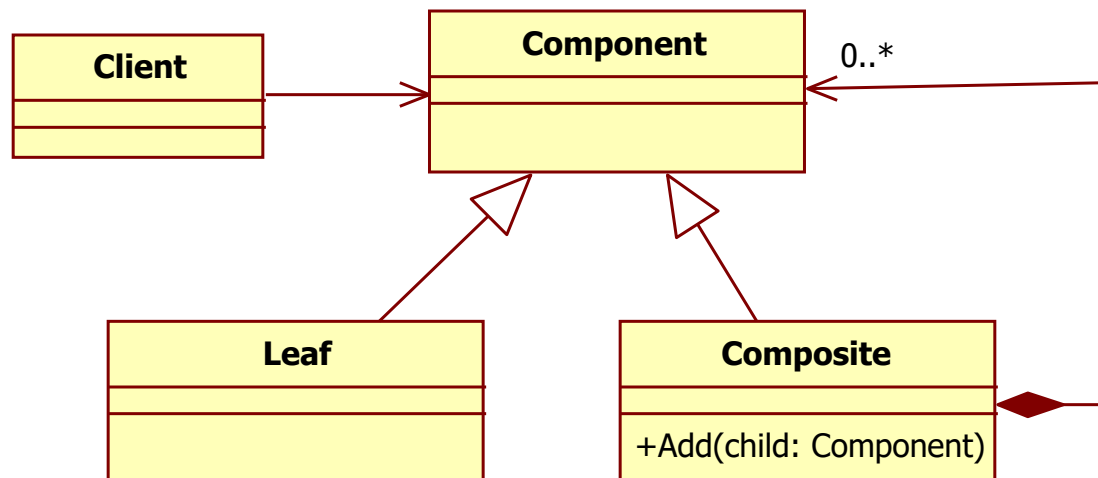
Which of the following design principles does the Composite pattern below violate?

Solution: **LSP** is violated, **OCP** is satisfied



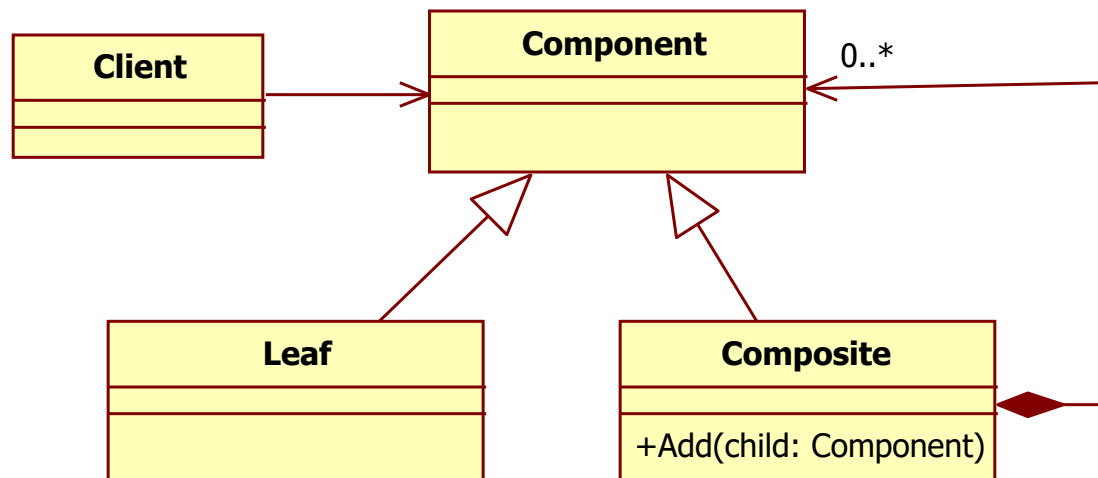
Which of the following design principles does the Composite pattern below violate?

LSP and/or OCP



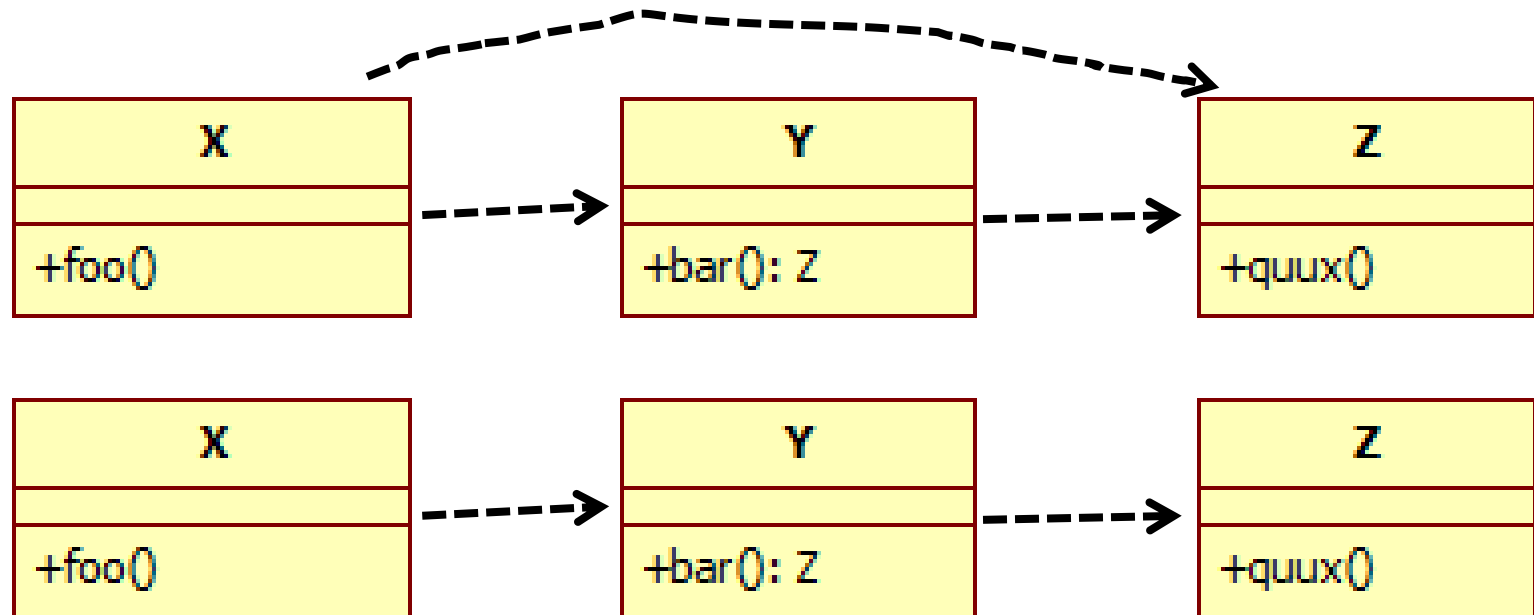
Which of the following design principles does the Composite pattern below violate?

Solution: LSP is satisfied, OCP is violated



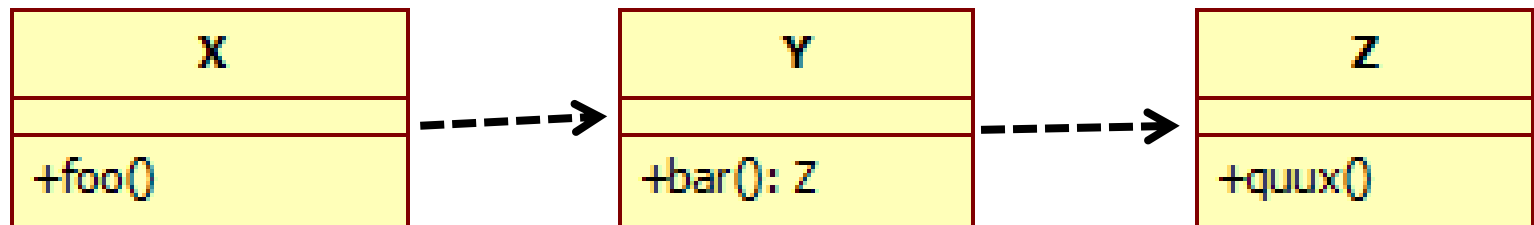
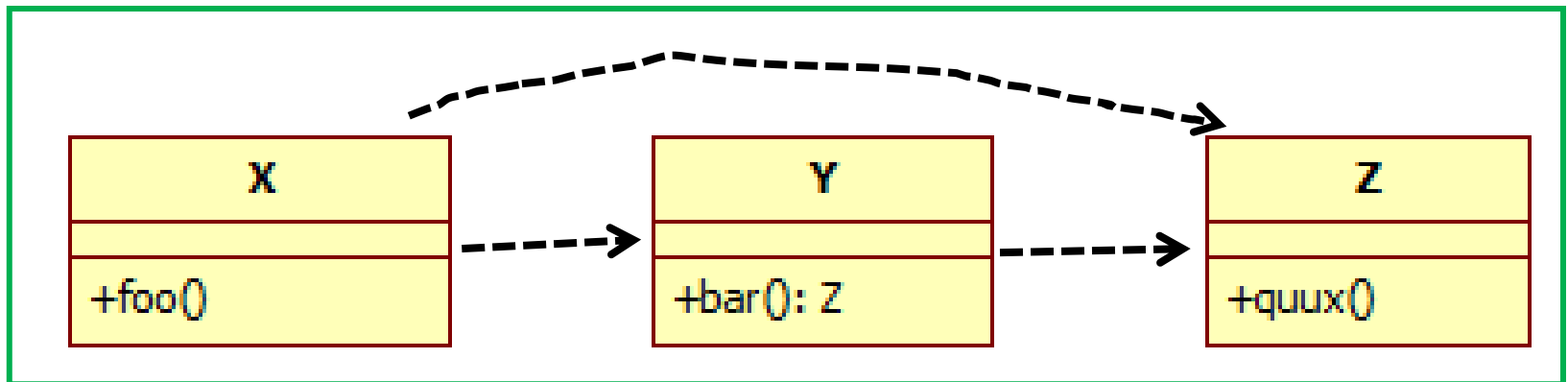
LoD

Which diagram may denote the violation of the Law of Demeter?



Which diagram may denote the violation of the Law of Demeter?

Solution:

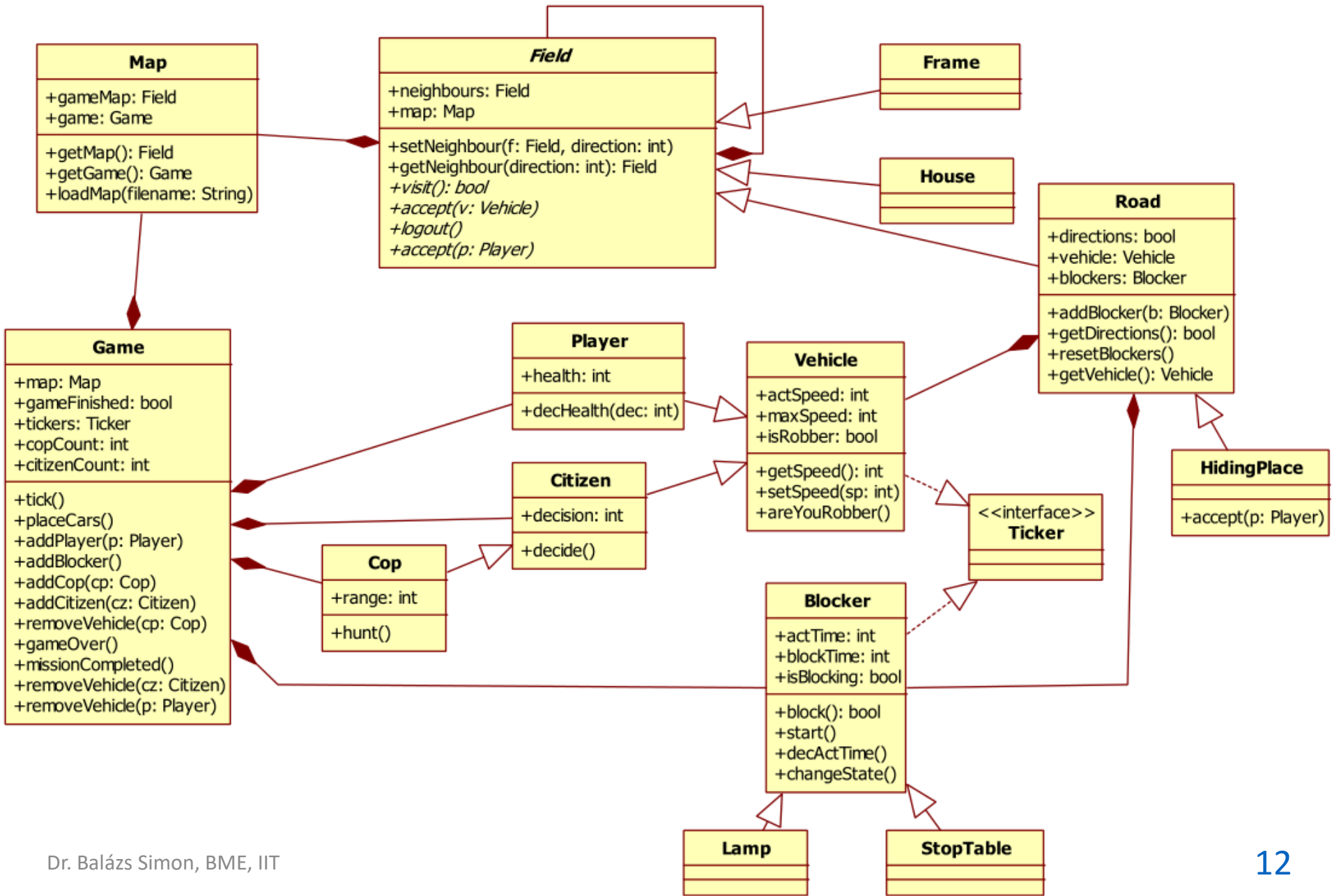


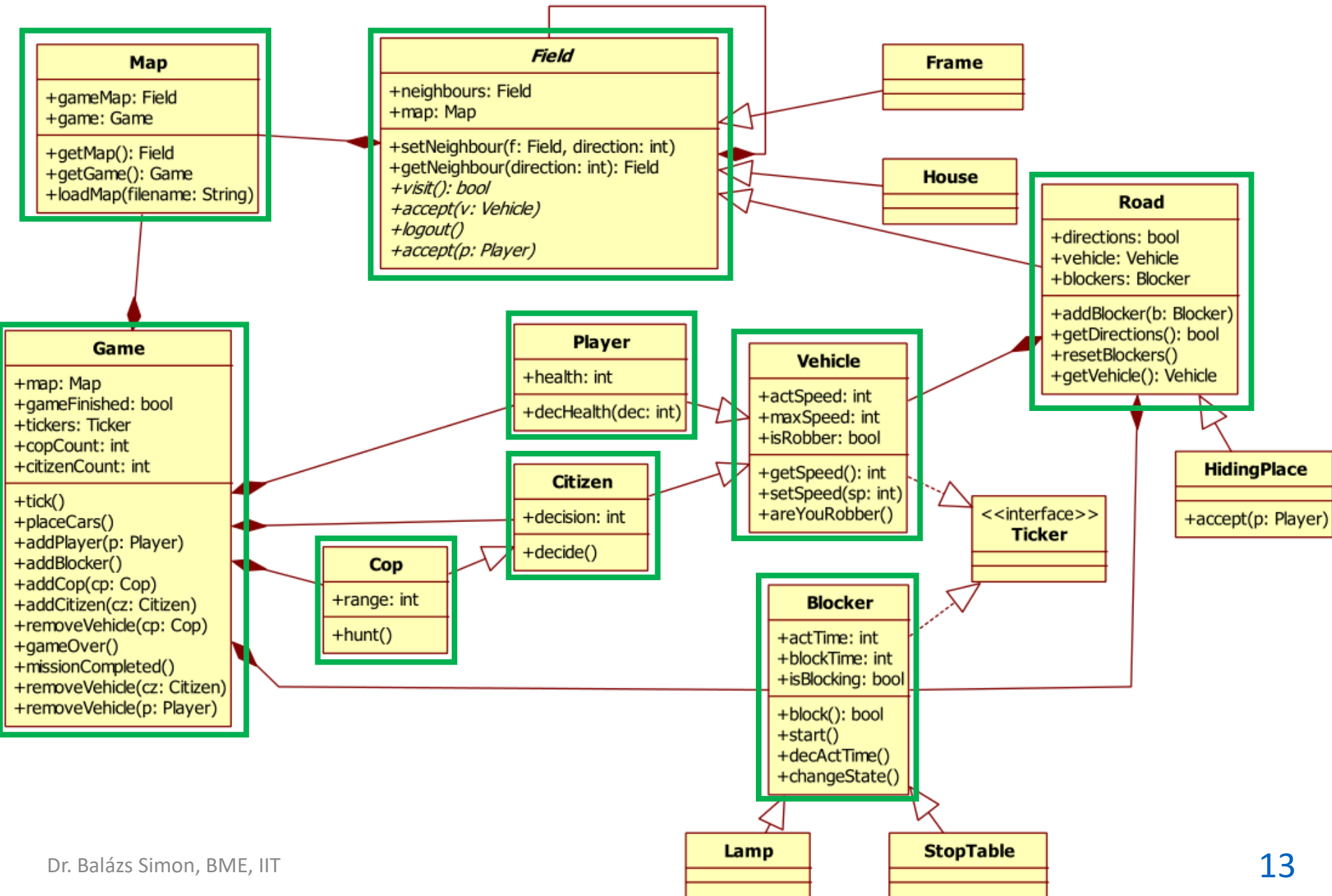
Heuristics

Design task

- In a small town there has been a bank robbery. The robbers try to flee using a car, however, there are other cars on the road and also the police is after them.
- The roads in the town are all one-way roads, and all the rules are signaled by signs (there are no right-handed junctions). All cars follow the roads and keep the rules. They stop at red lights. They also stop at STOP signs and give way to other cars if they are near enough. The cars go in a random direction when they arrive at a junction. Cars do not bump into each other, and they do not take over each other. If a faster car catches up with a slower car, it also slows down, but when it can go freely, it speeds up again. The cars arrive from the edges of the city, and they vanish when they leave the city.
- The robbers can break the rules (go through red light and stop signs). But they have to be careful not to hit another car and not to be caught by the police, before they reach their hiding place.

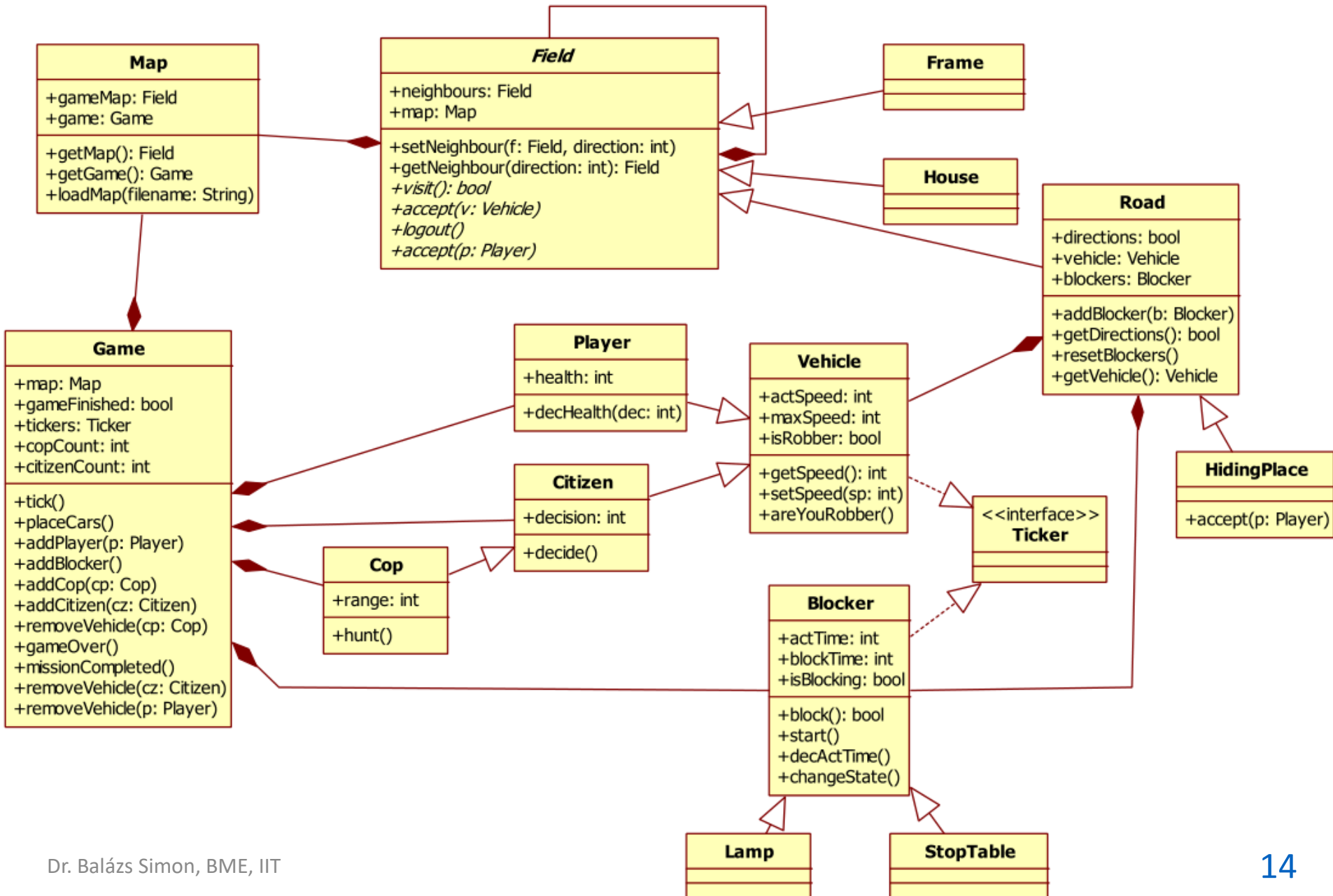
Which classes violate the following OO design heuristic?
"Attributes should be private!"





Is the following statement true or false?

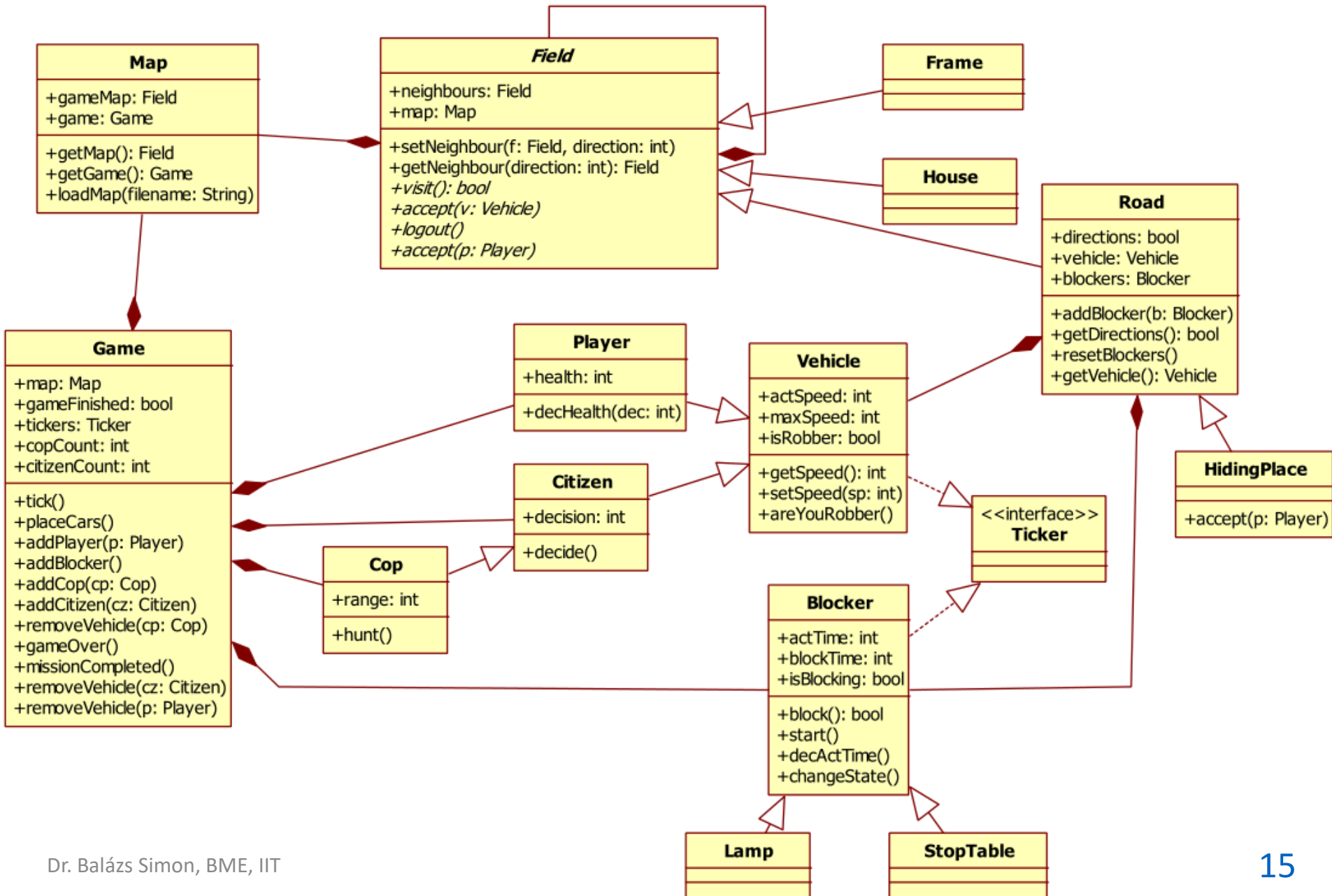
"The direction of the containment between Game and Map is wrong."



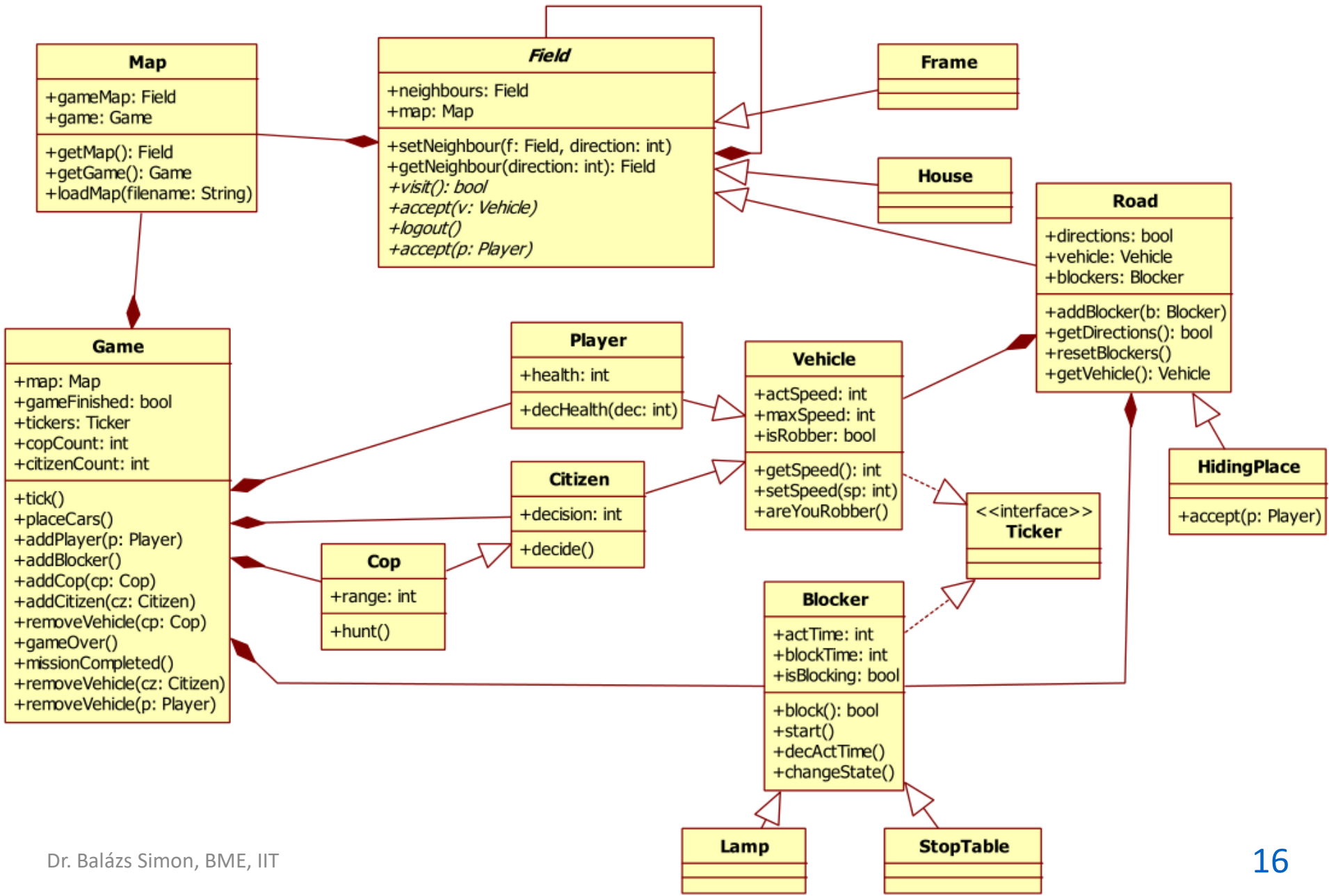
Solution: False

Is the following statement true or false?

"The direction of the containment between Game and Map is wrong."

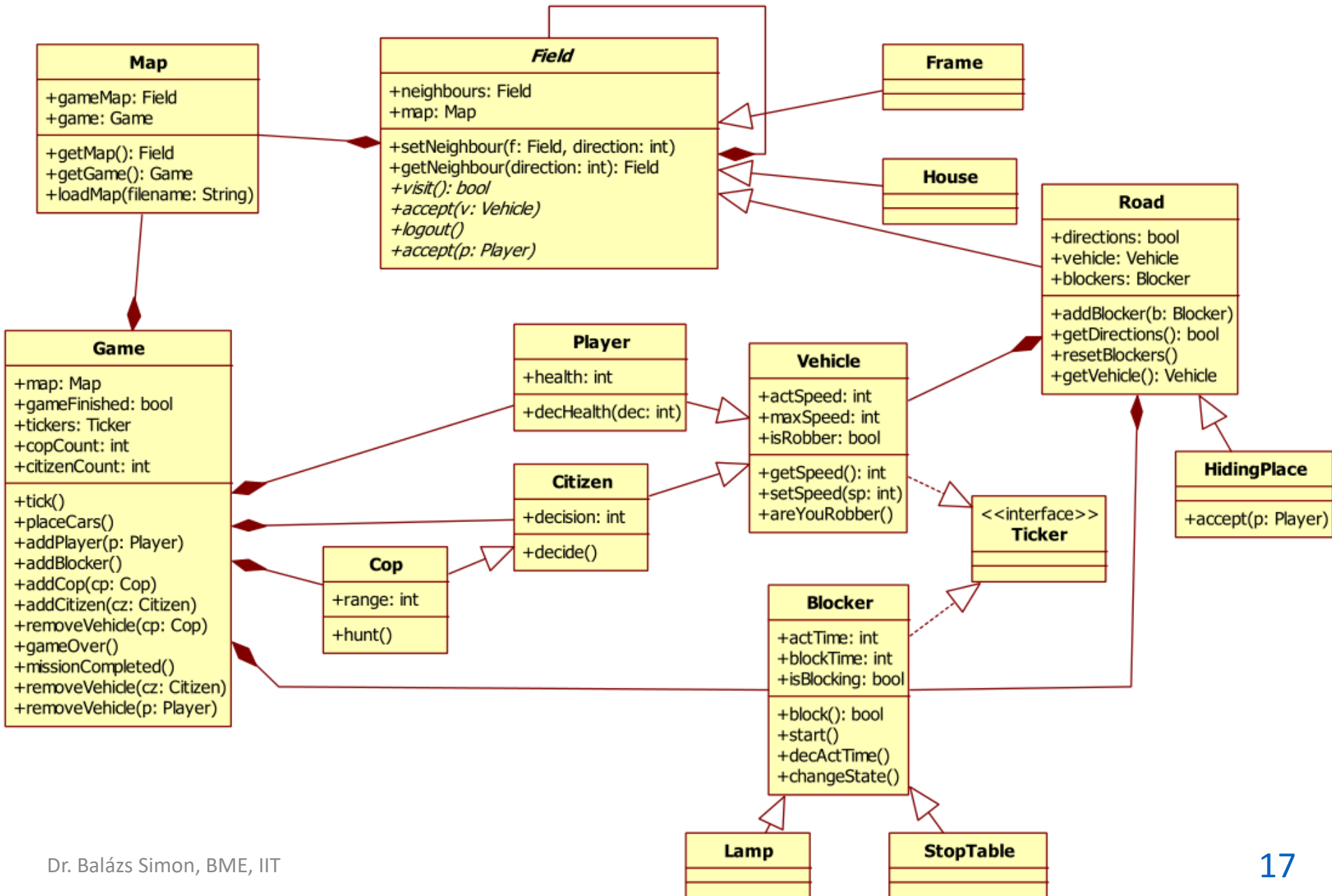


Is the following statement true or false?
"The direction of the containment between Map and Field is wrong."

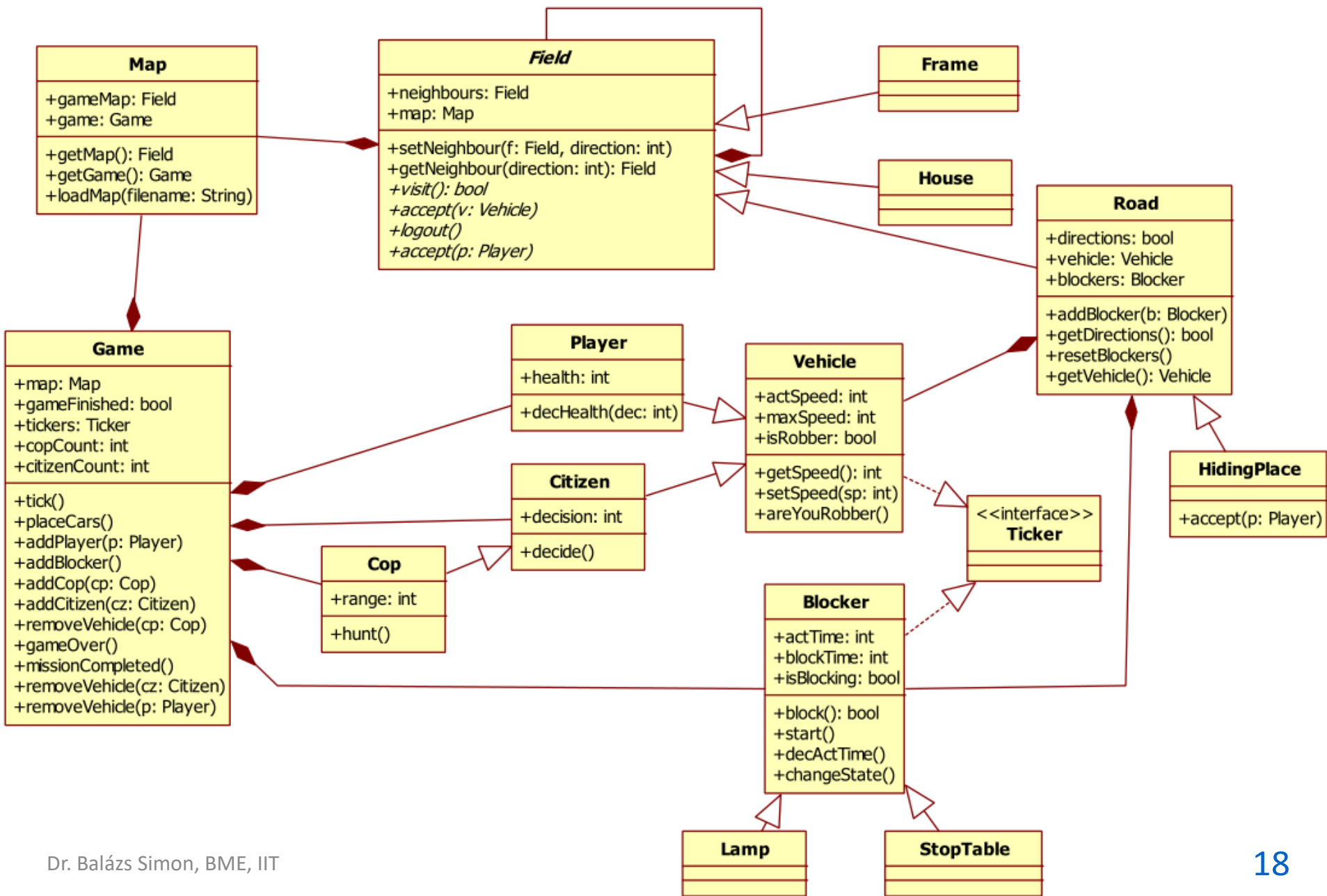


Is the following statement true or false?

"The direction of the containment between Map and Field is wrong."

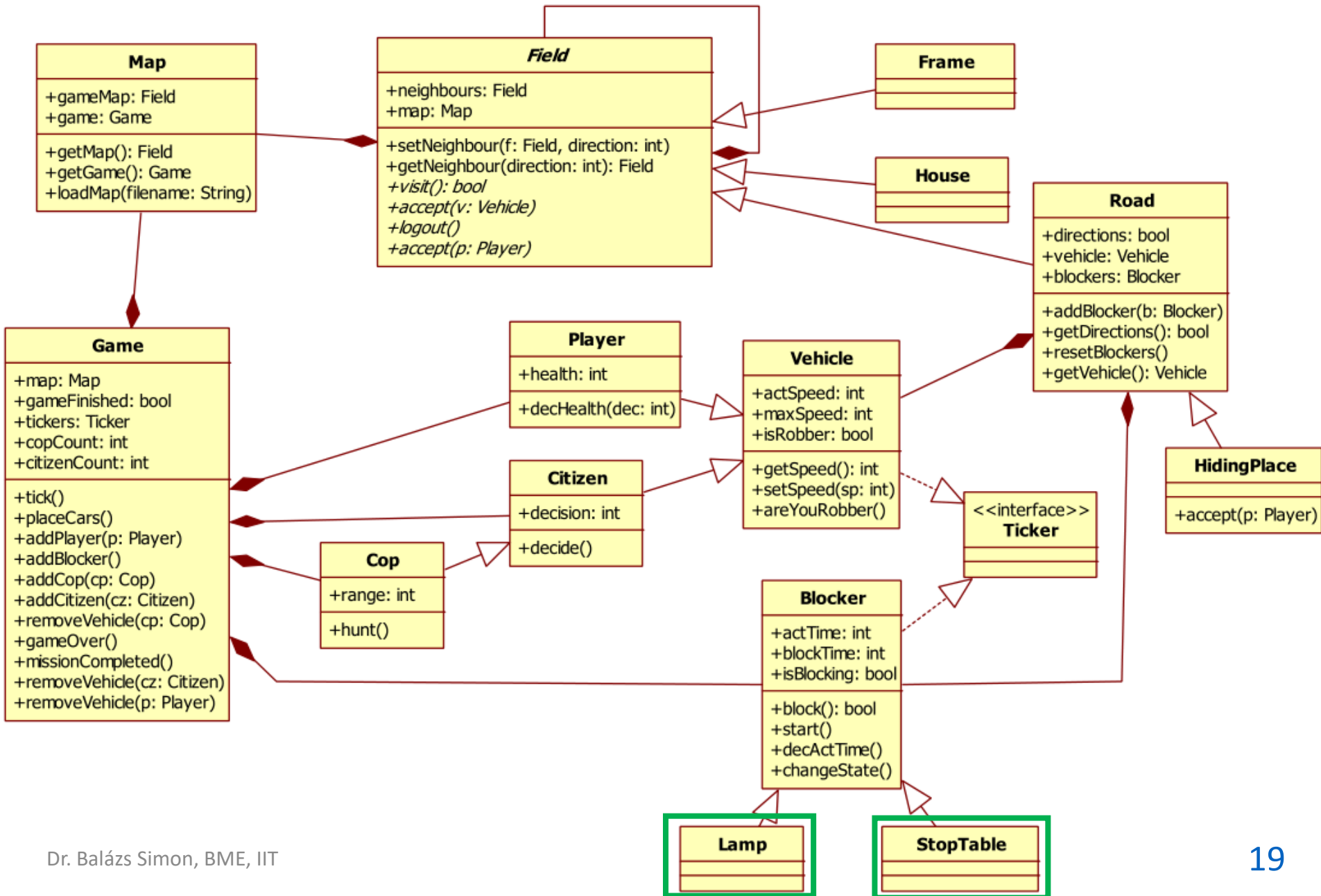


Which classes violate the following OO design heuristic?
"Model for behavior not for roles!"

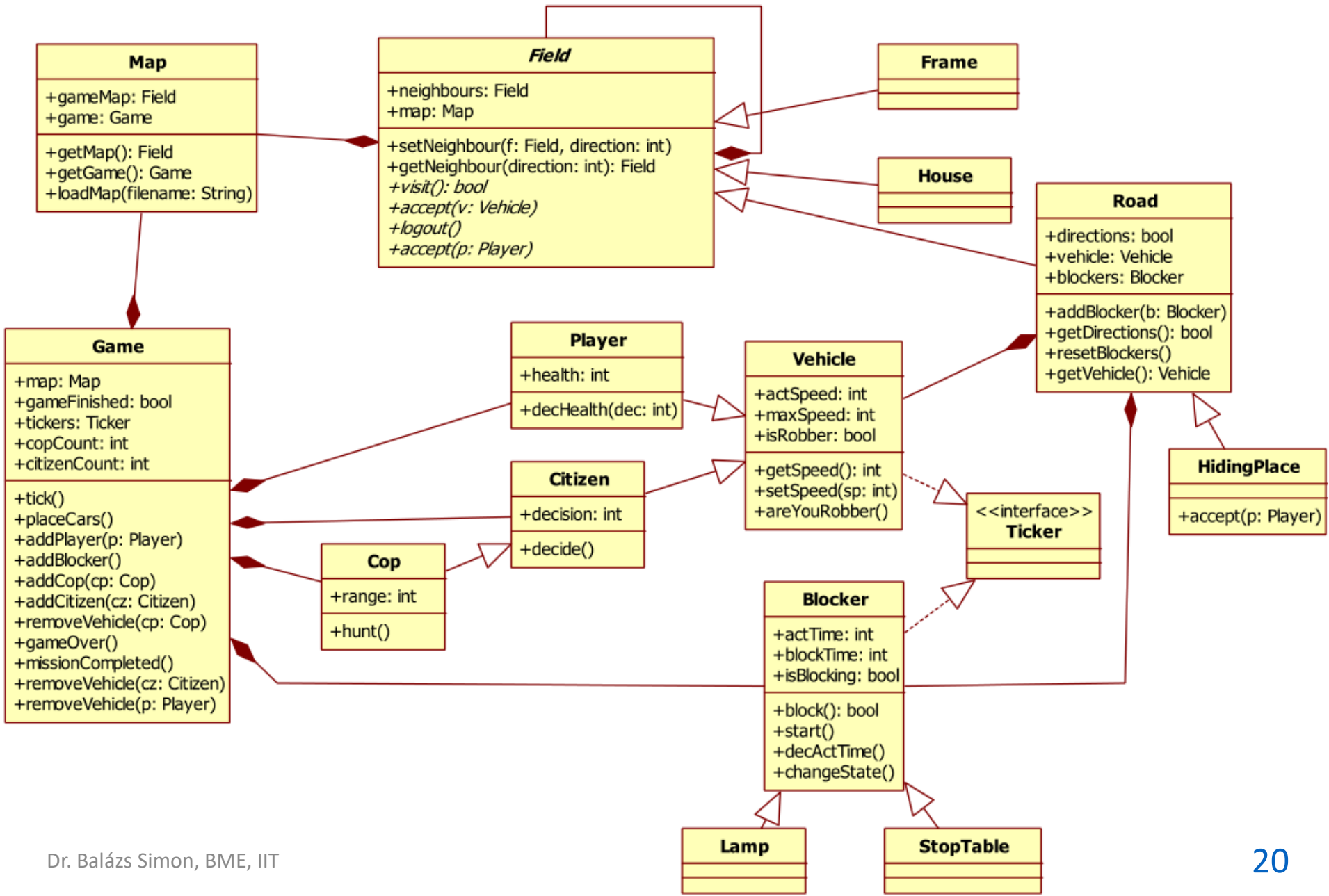


Which classes violate the following OO design heuristic?

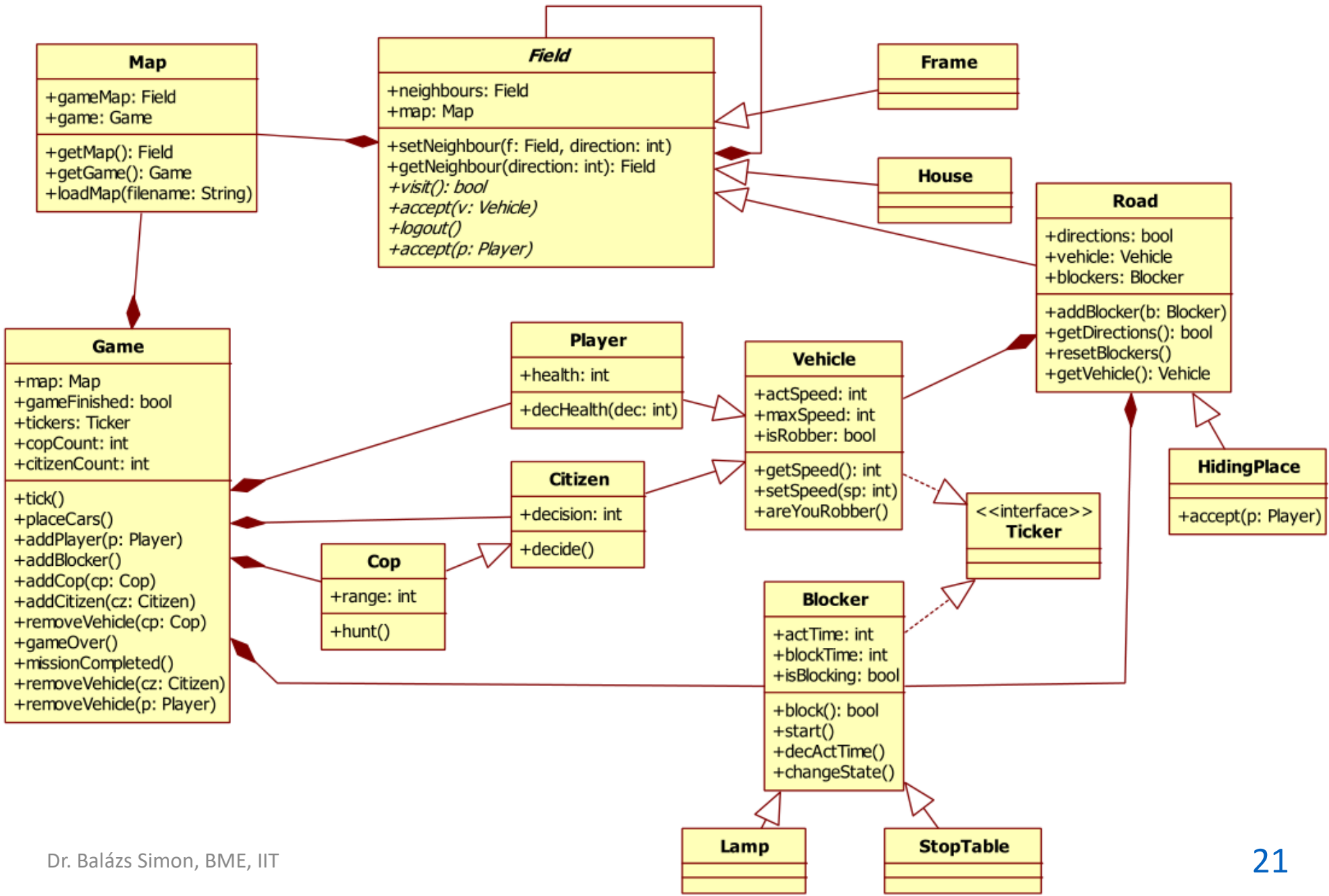
"Model for behavior not for roles!"



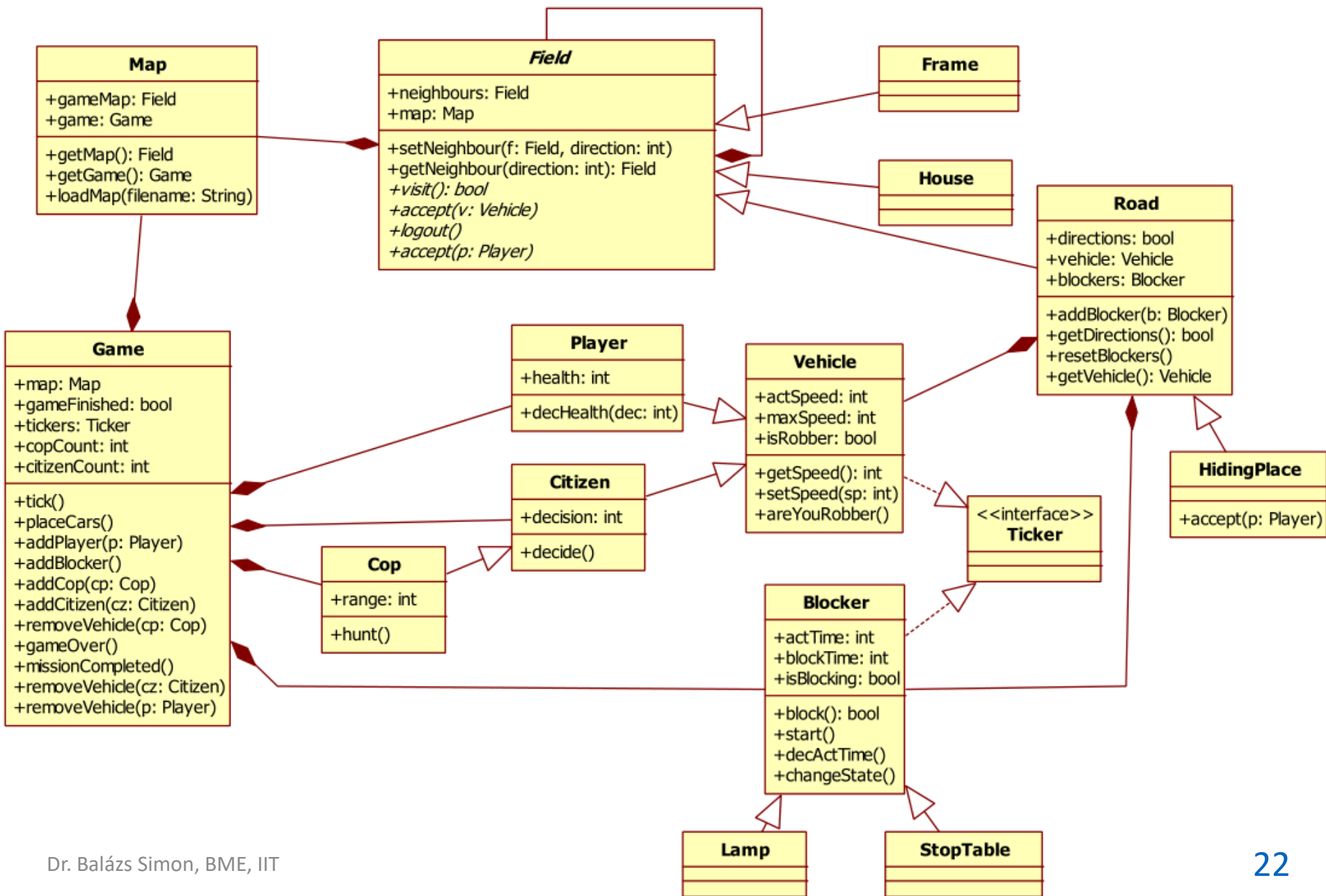
Is the following OO design decision correct?
"Game stores Player, Cop and Citizen objects in separate collections."



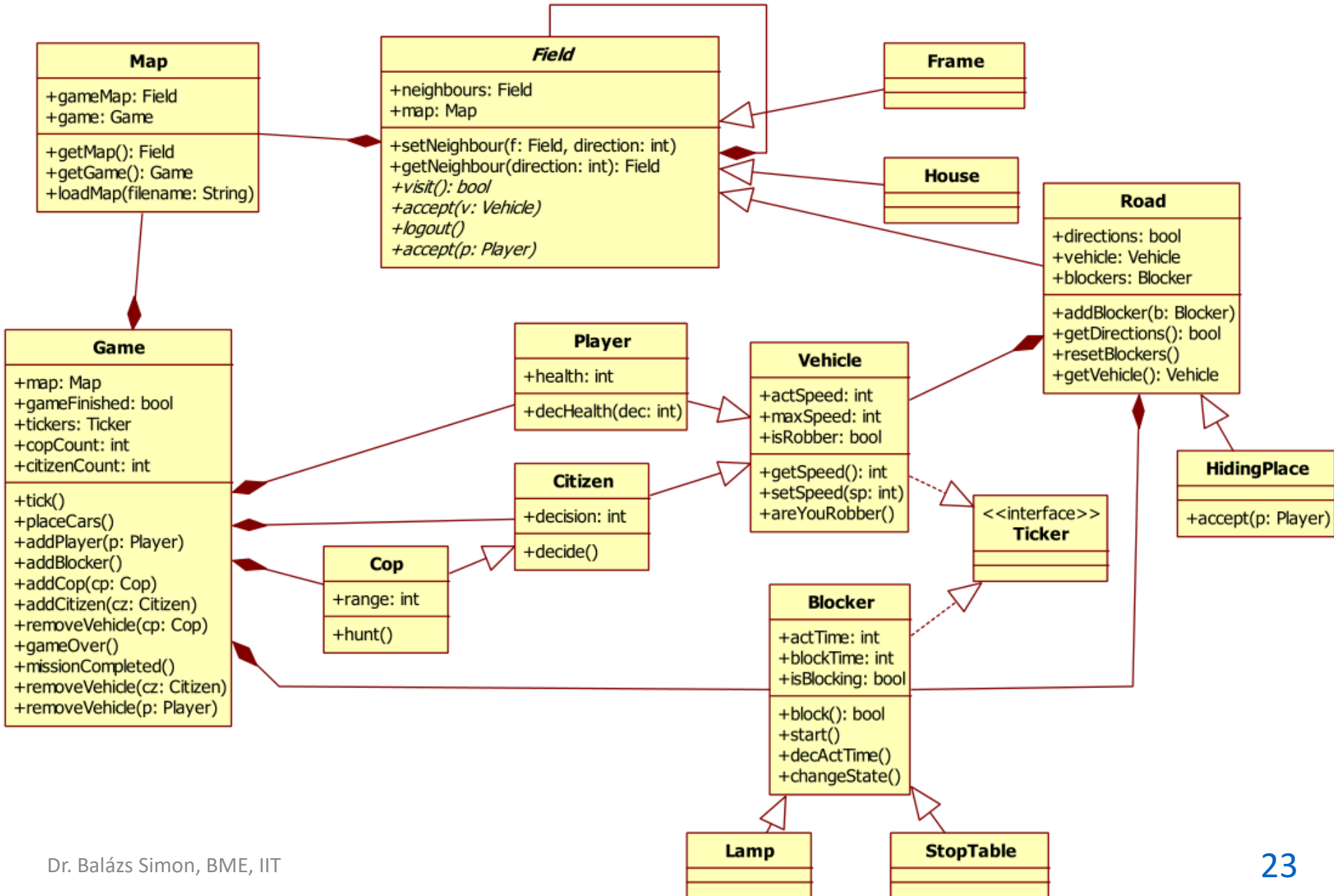
Is the following OO design decision correct?
"Game stores Player, Cop and Citizen objects in separate collections."



Is the following OO design decision correct?
"Road and House are the descendants of Field."



Is the following OO design decision correct?
 "Road and House are the descendants of Field."

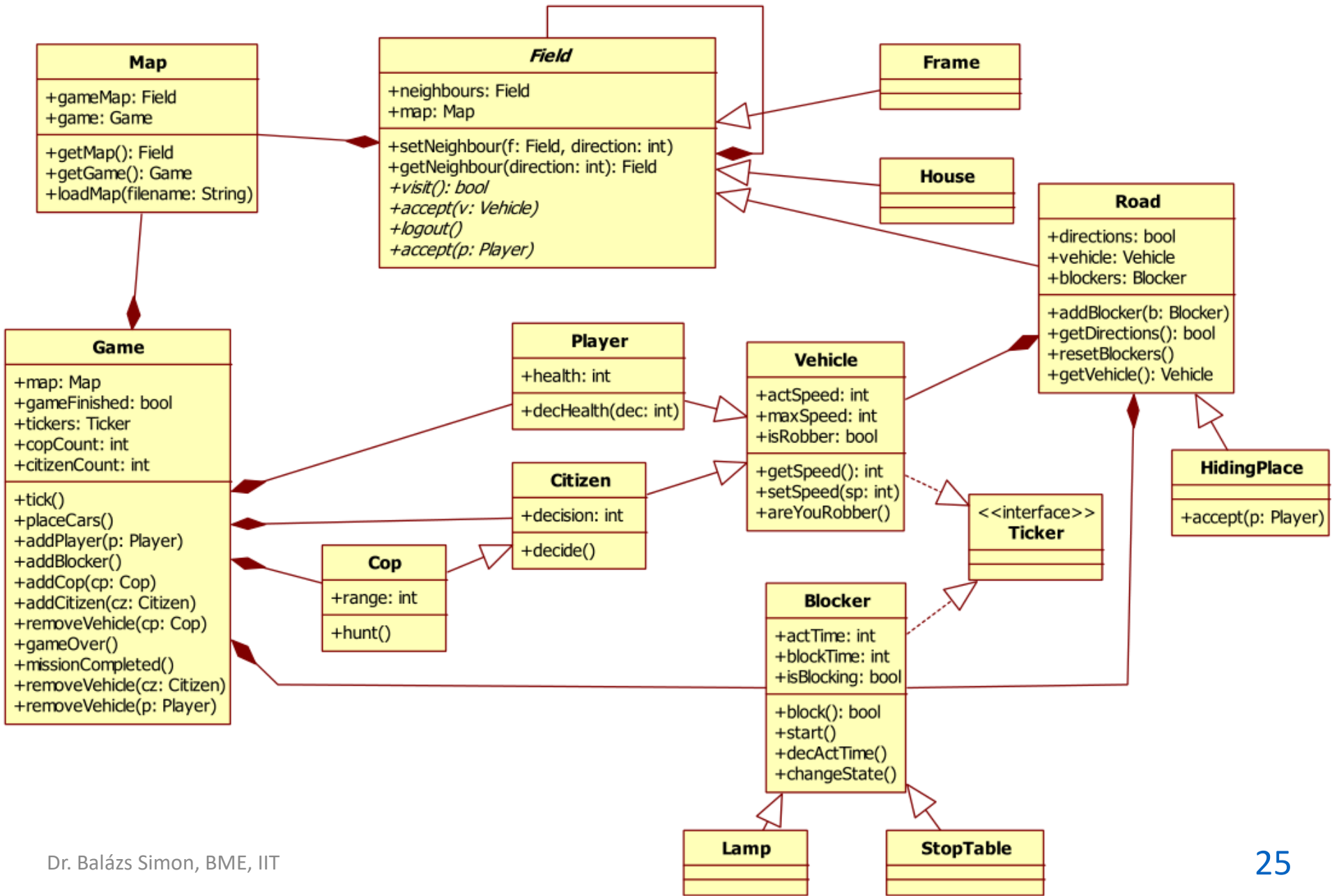


"Field contains its neighbors."

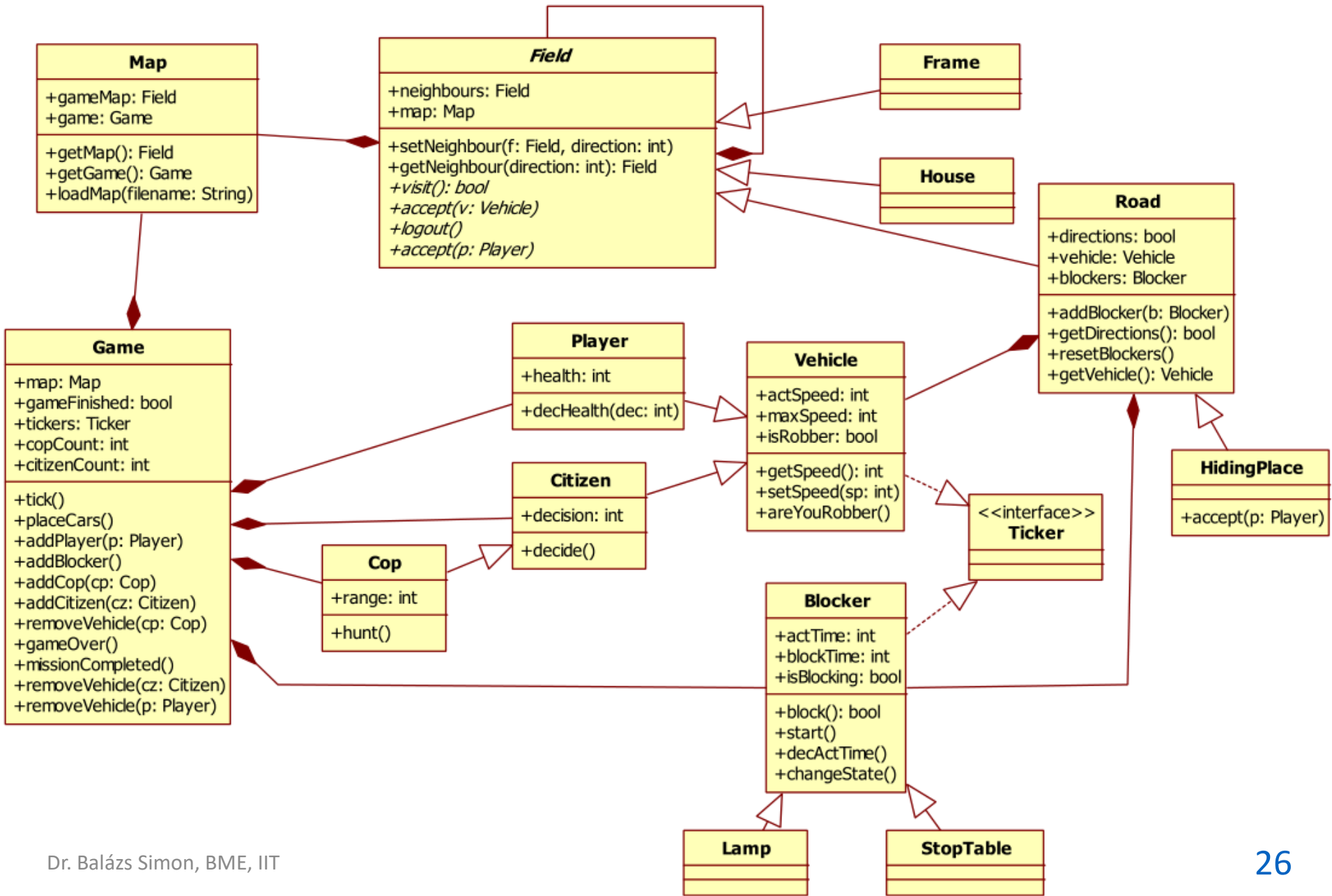


Is the following OO design decision correct?
"Field contains its neighbors."

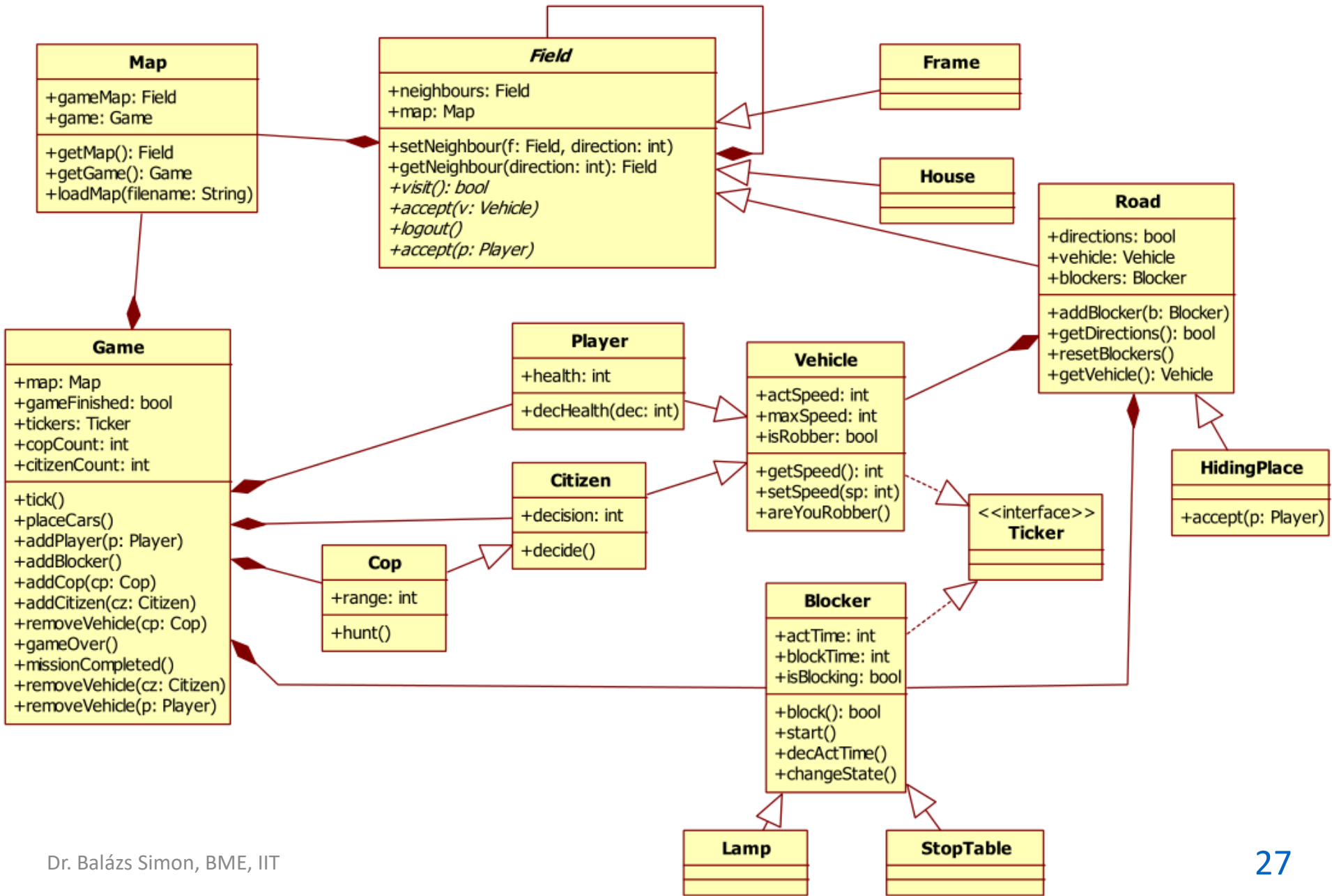
Solution: Incorrect



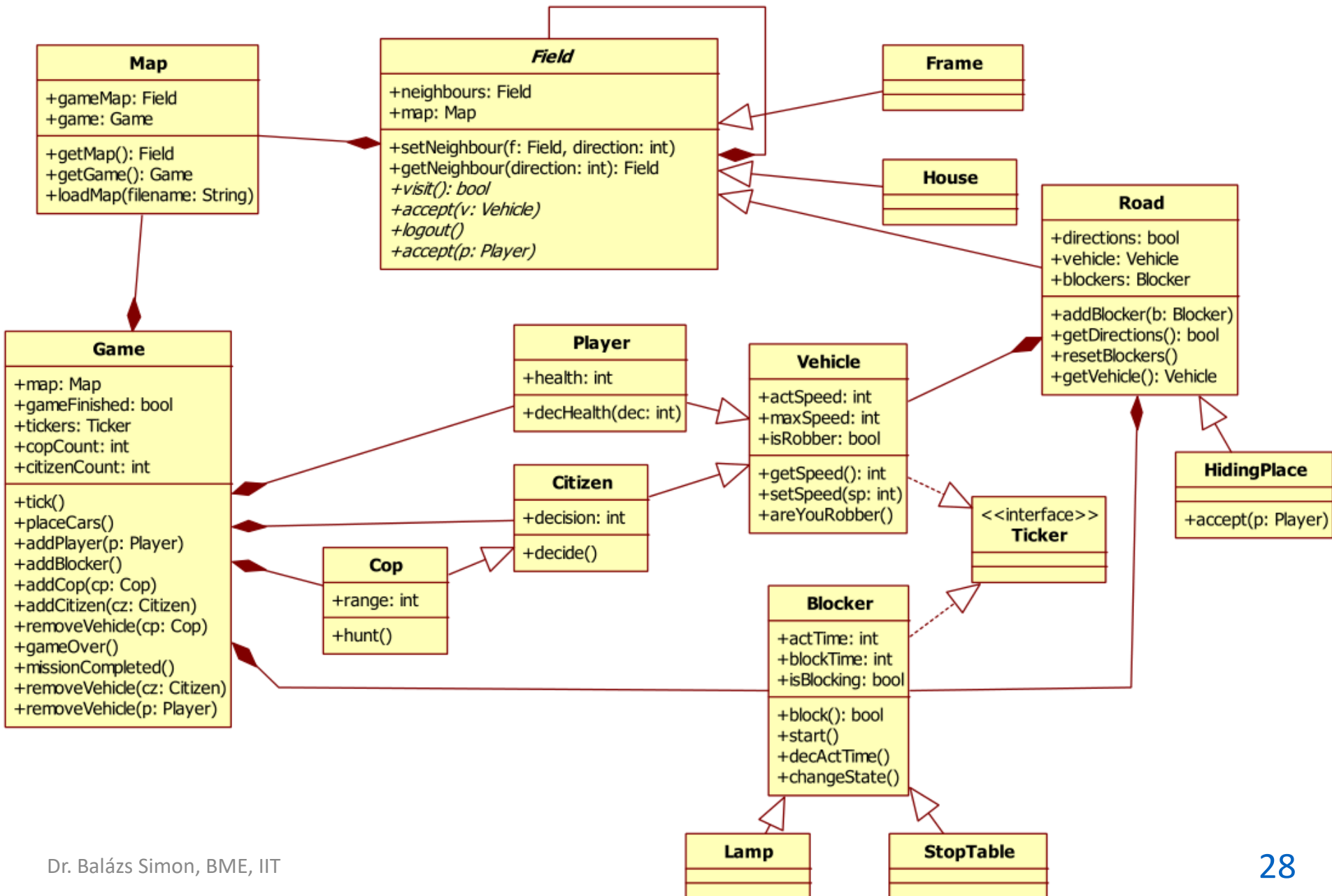
Is the following OO design decision correct?
"Blocker is contained by Game and Road."



Is the following OO design decision correct?
"Blocker is contained by Game and Road."

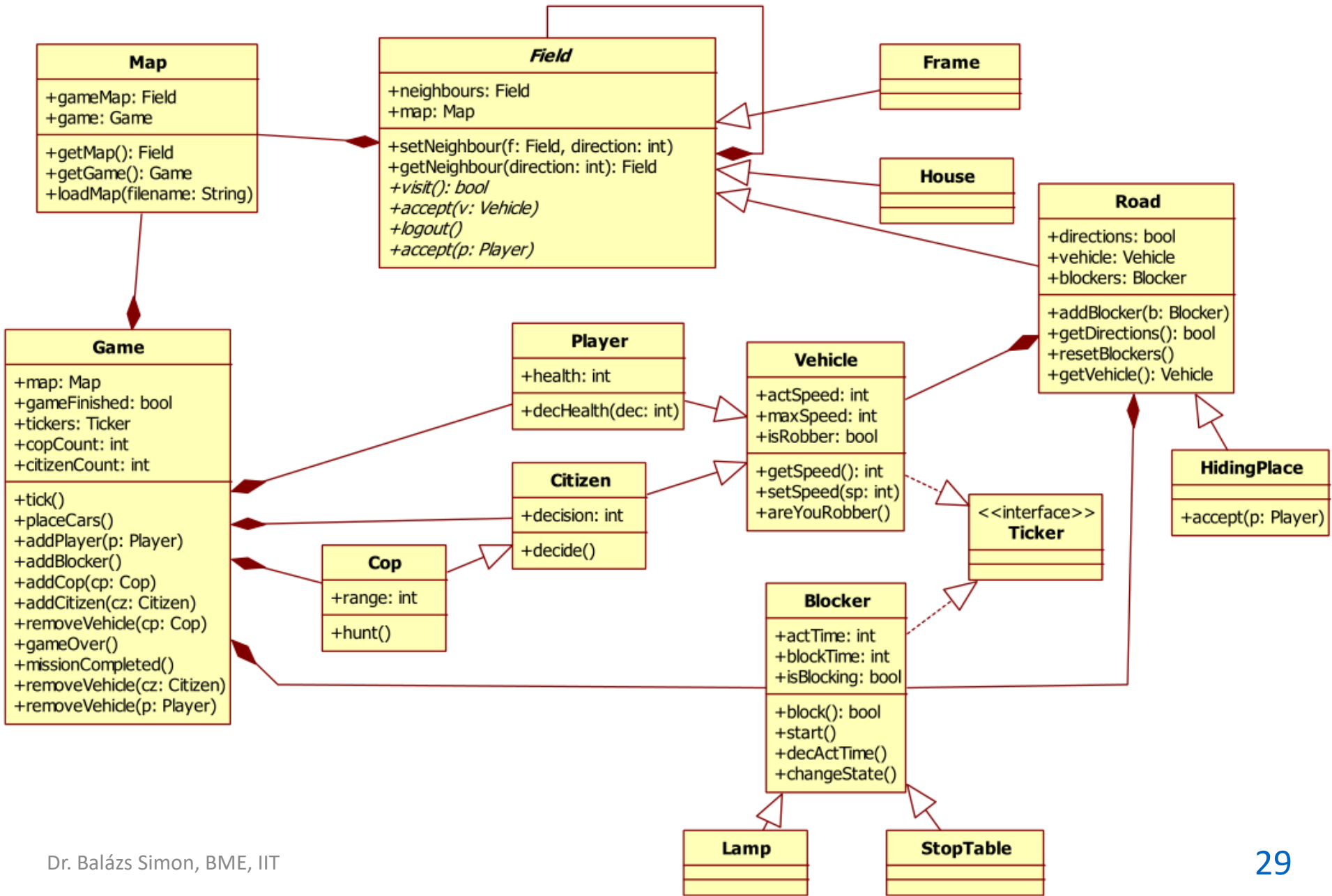


"The Ticker interface is empty."

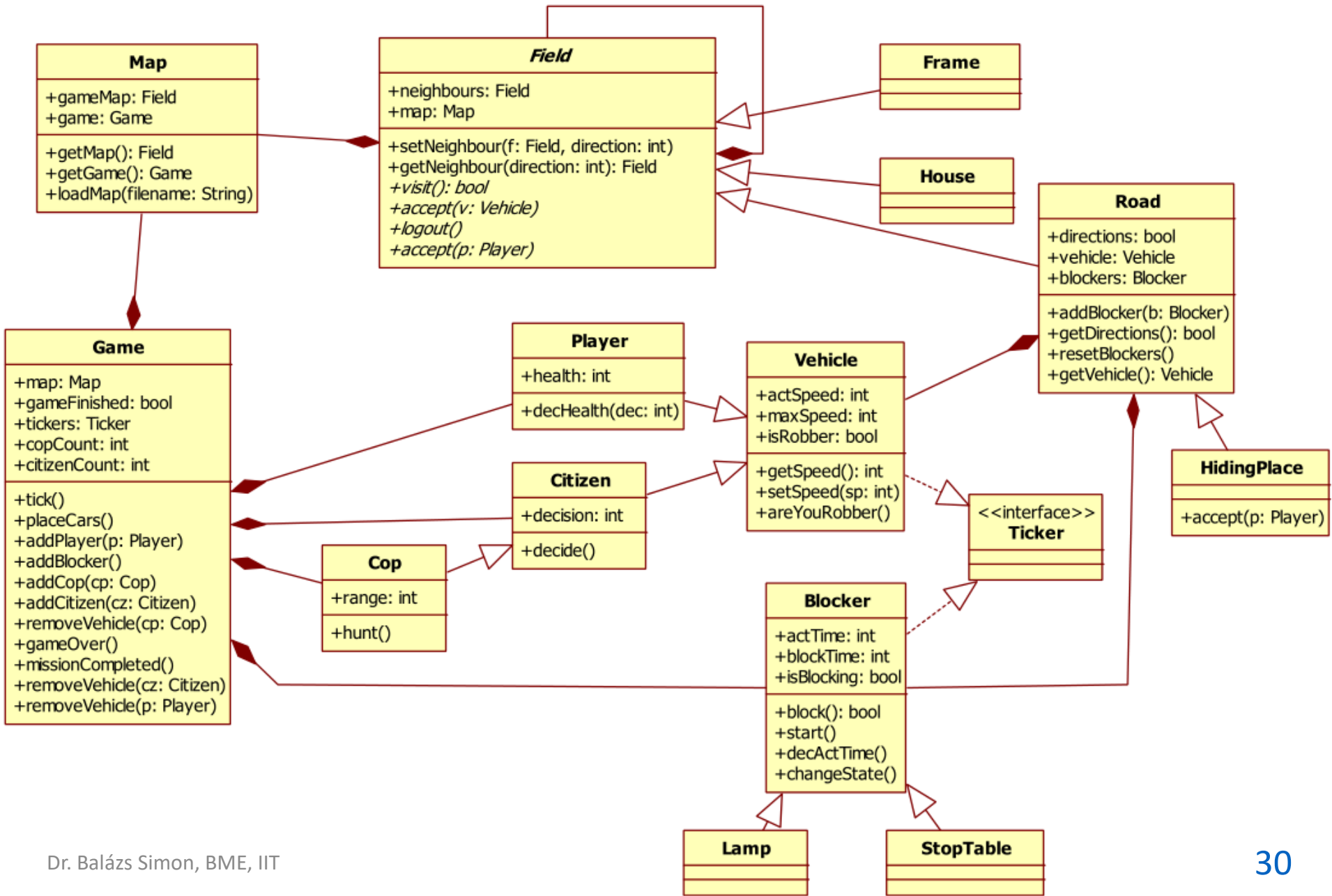


Is the following OO design decision correct?
"The Ticker interface is empty."

Solution: Incorrect

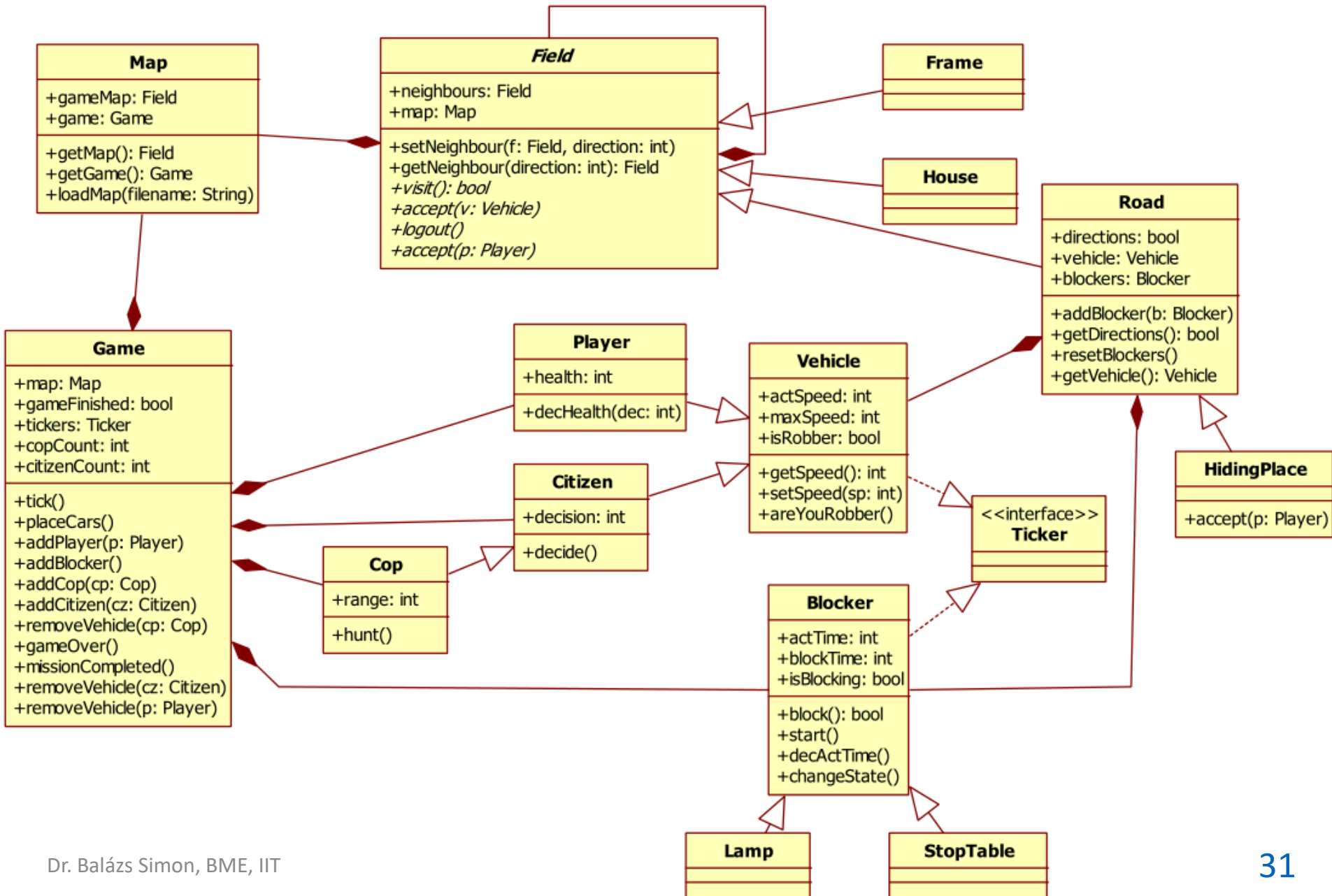


Which classes violate the following OO design heuristic?
"Keep related data and behavior together!"

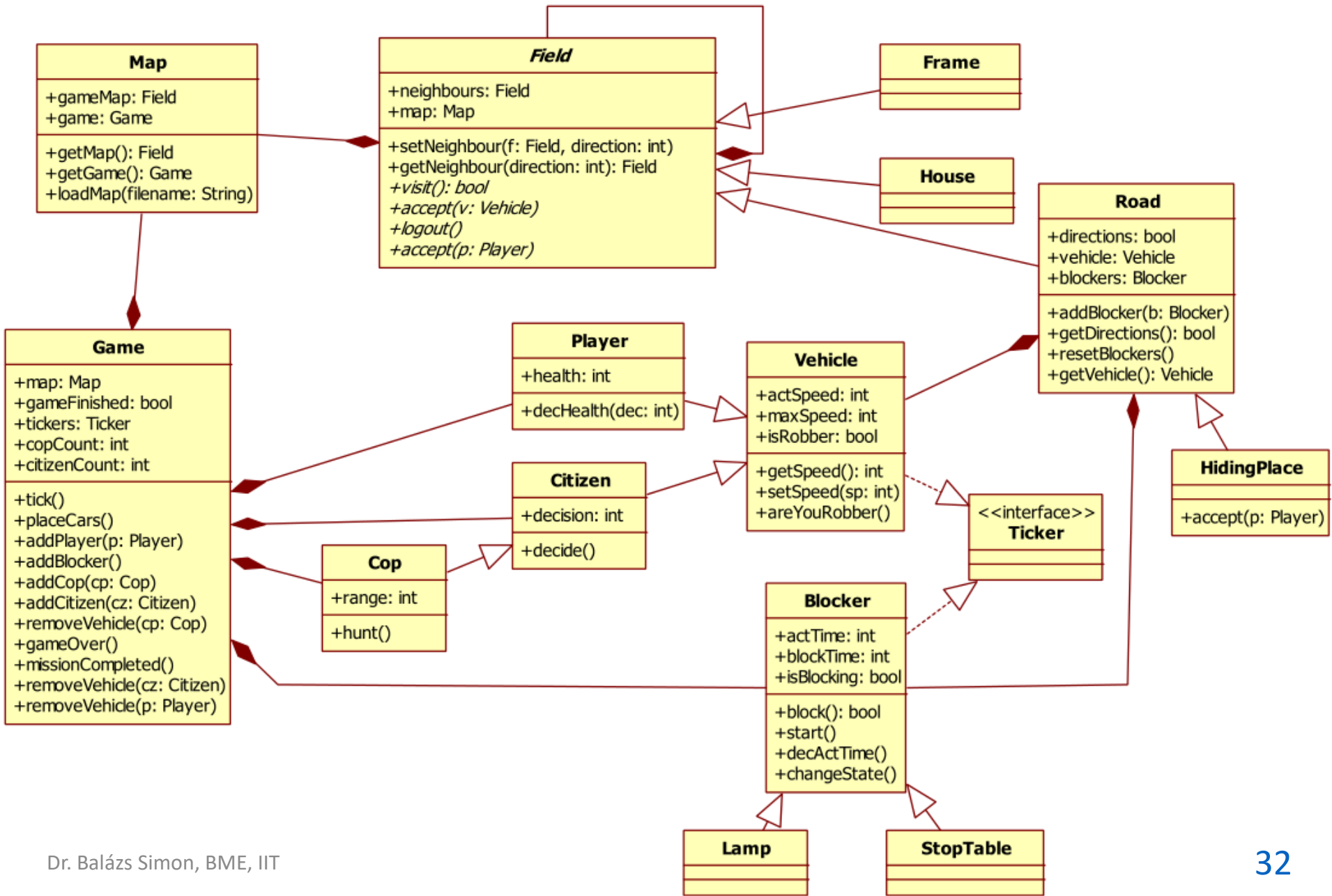


Solution:
none of them

Which classes violate the following OO design heuristic?
"Keep related data and behavior together!"



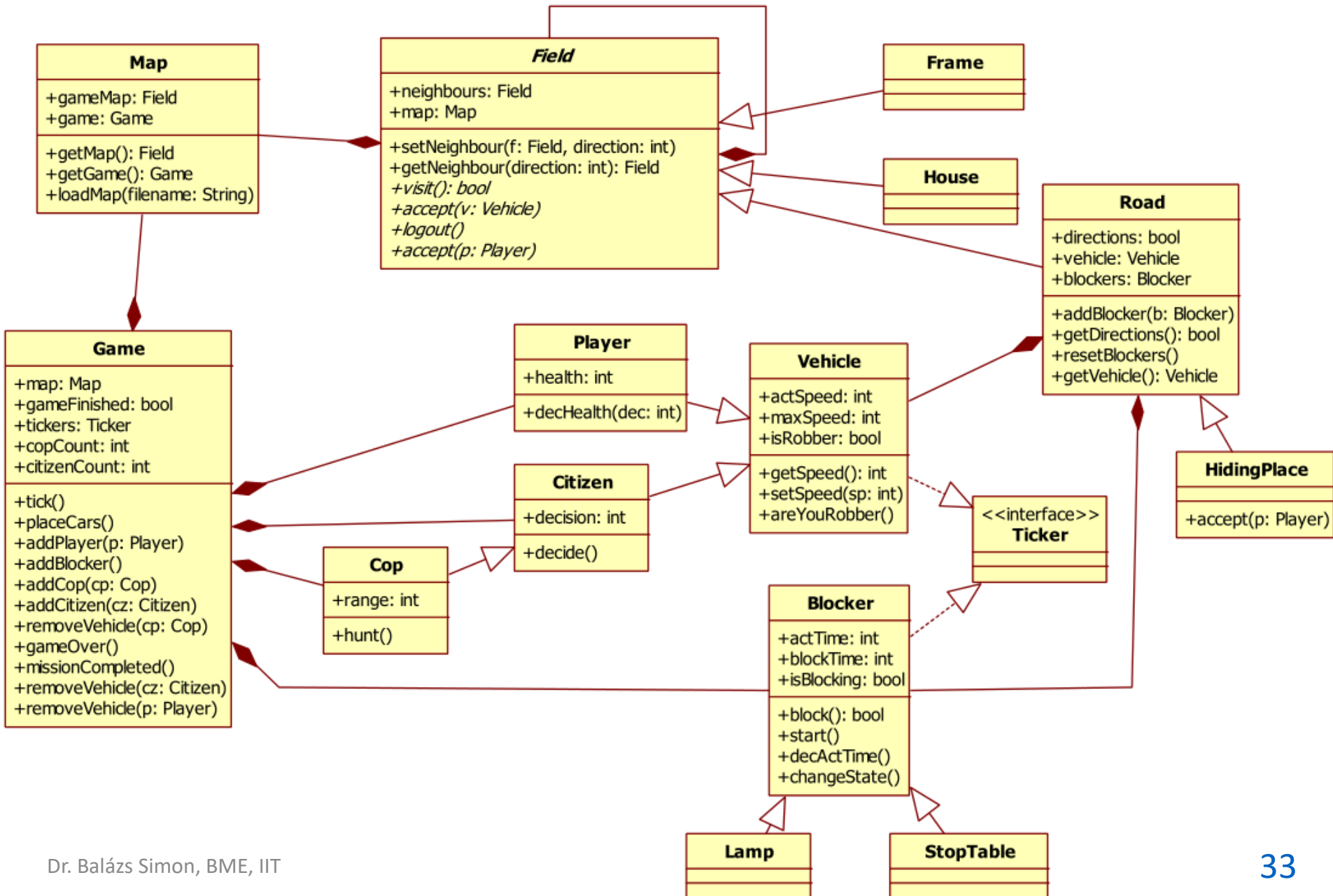
Which classes violate the following OO design heuristic?
"Avoid classes which should be methods!"



Solution:
none of them

Which classes violate the following OO design heuristic?

"Avoid classes which should be methods!"

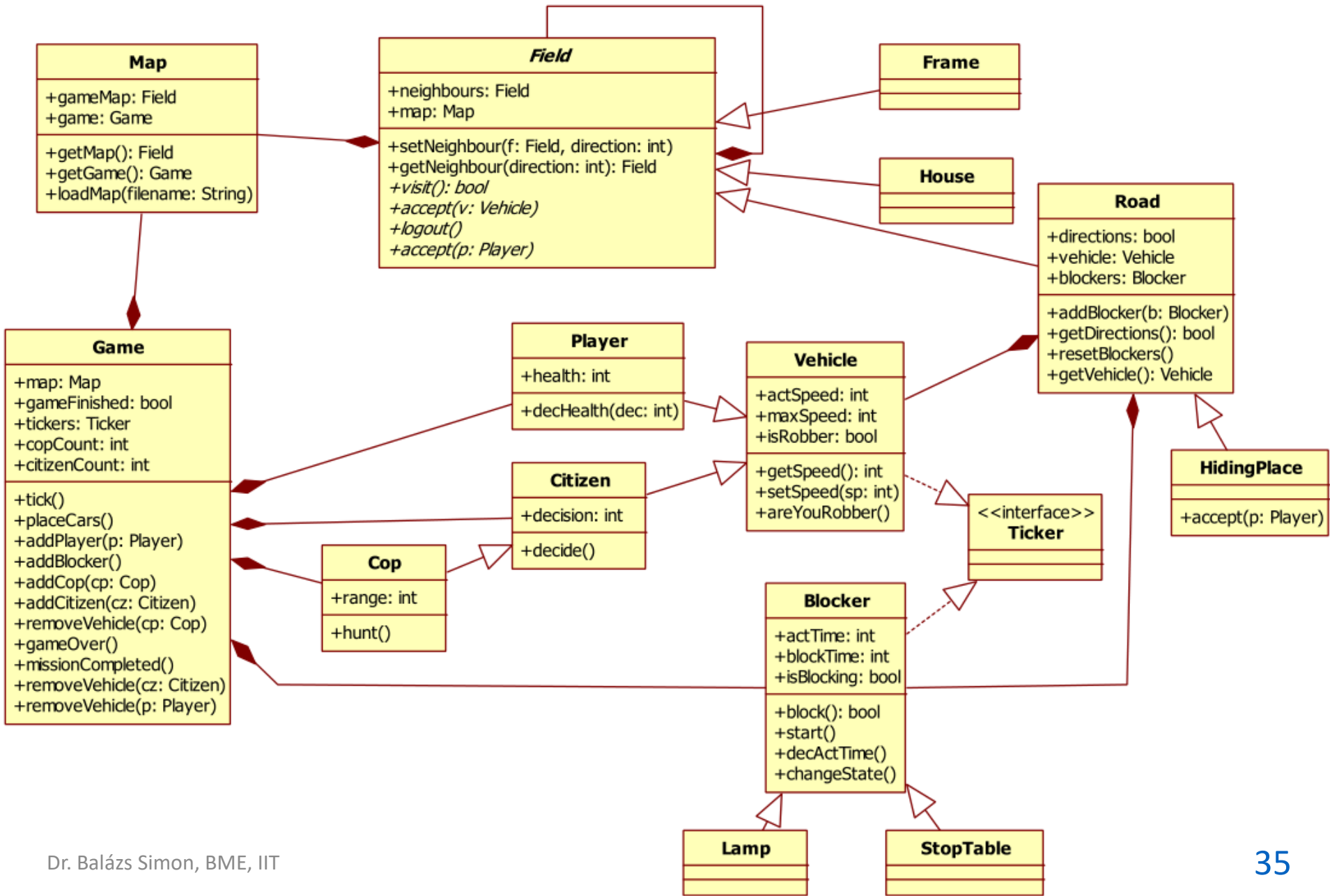


"Do not use non-public members of another class!"

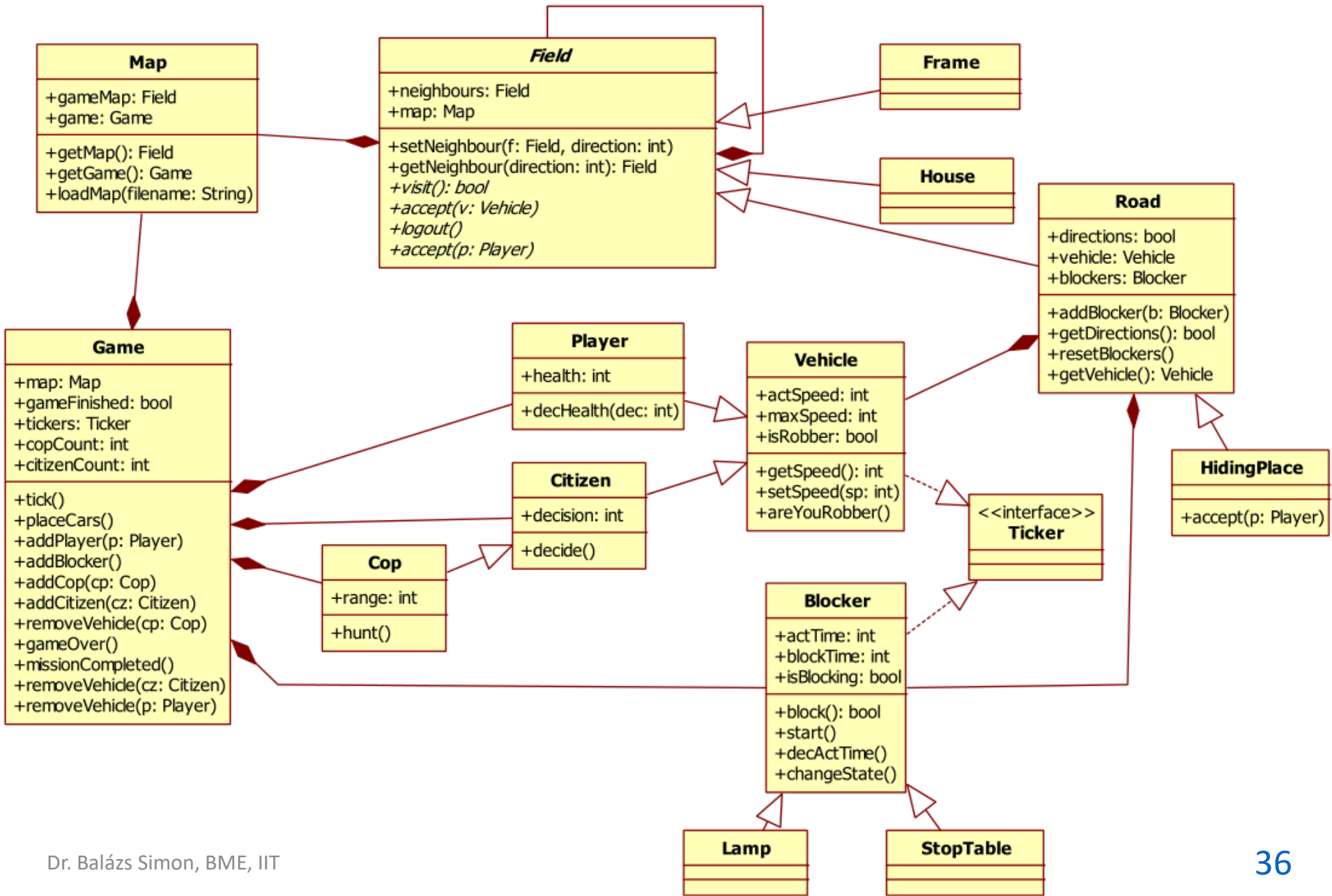


Which classes violate the following OO design heuristic?
"Do not use non-public members of another class!"

Solution:
none of them

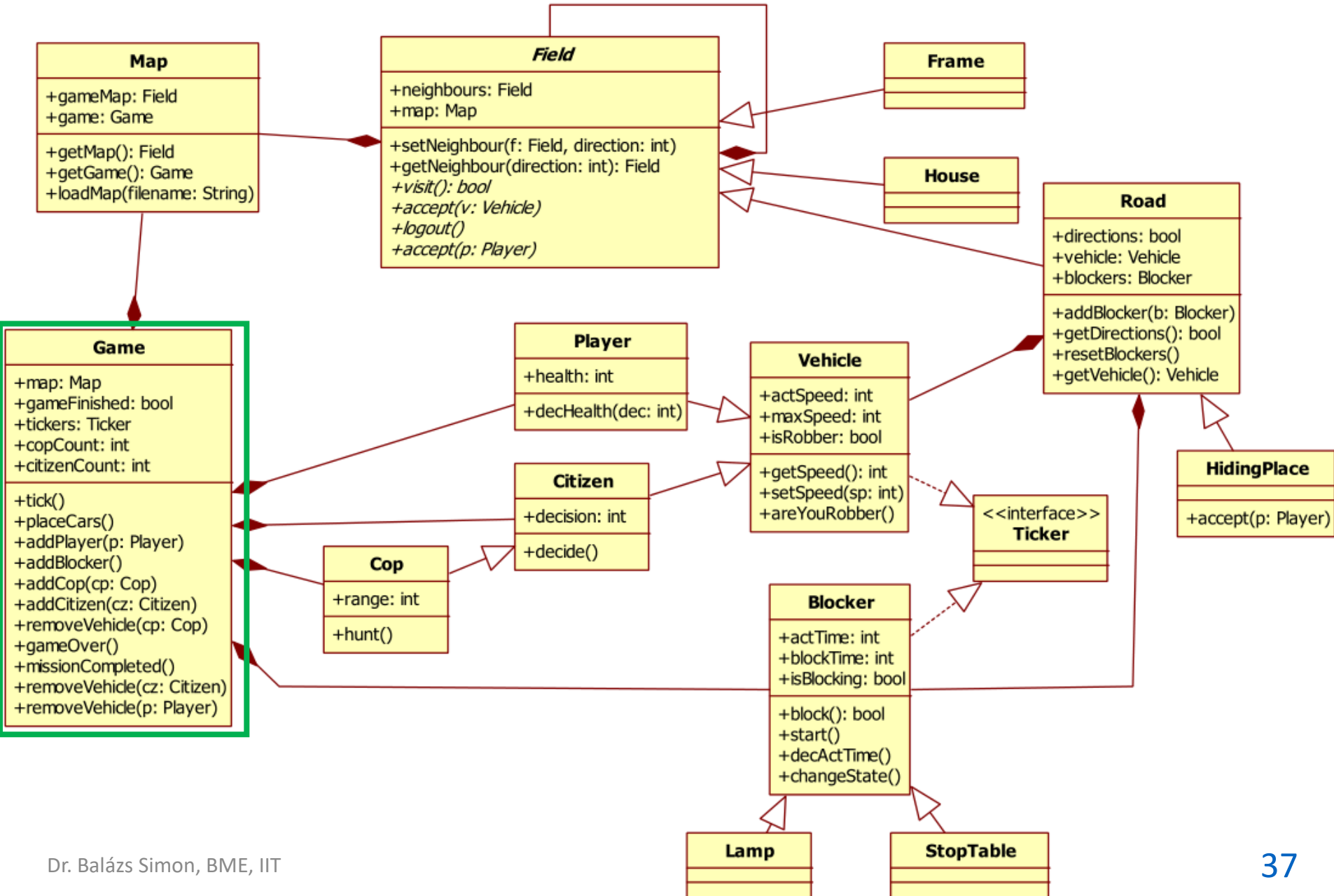


Which classes violate the following OO design heuristic?
"Avoid god classes!"

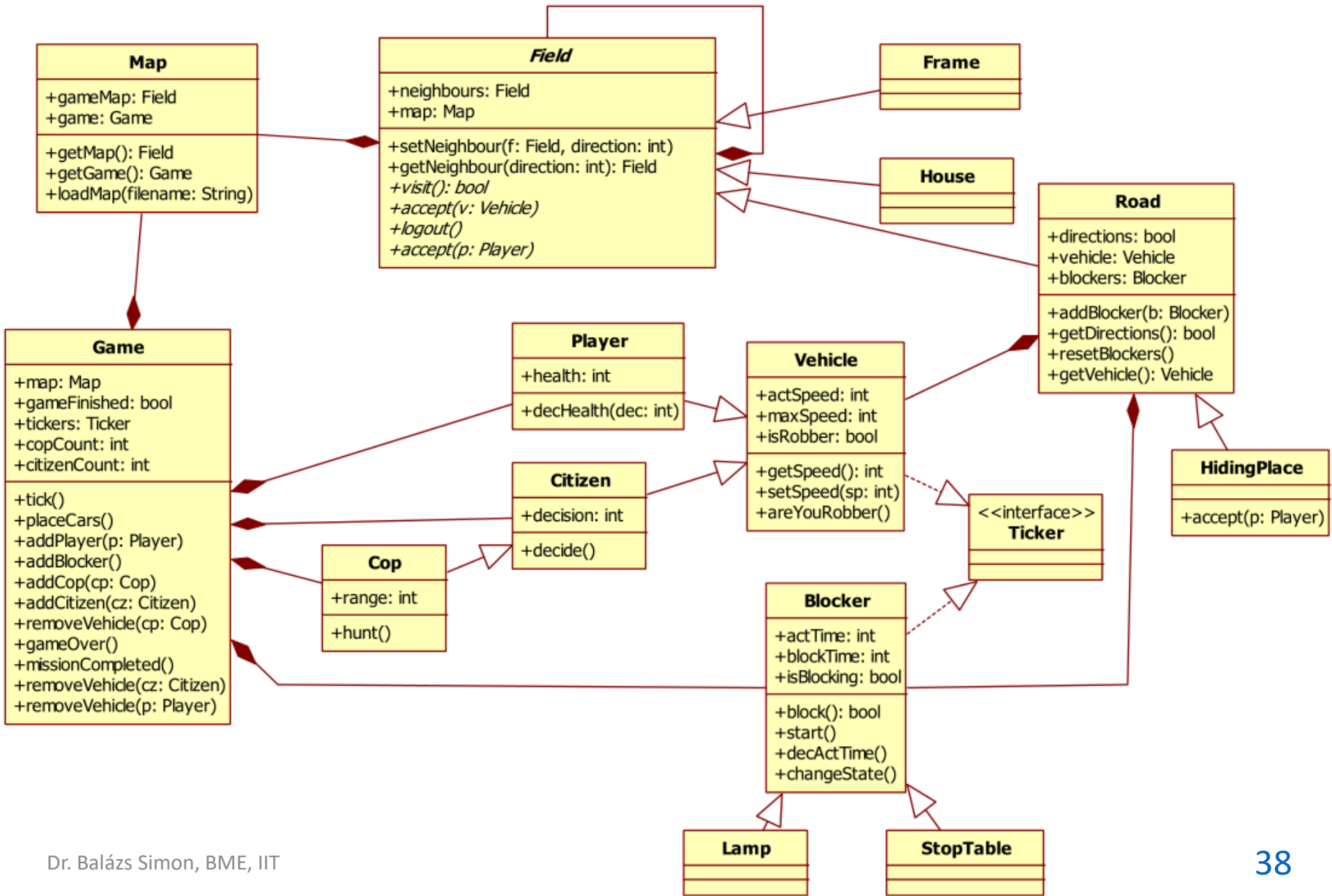


Which classes violate the following OO design heuristic?

"Avoid god classes!"

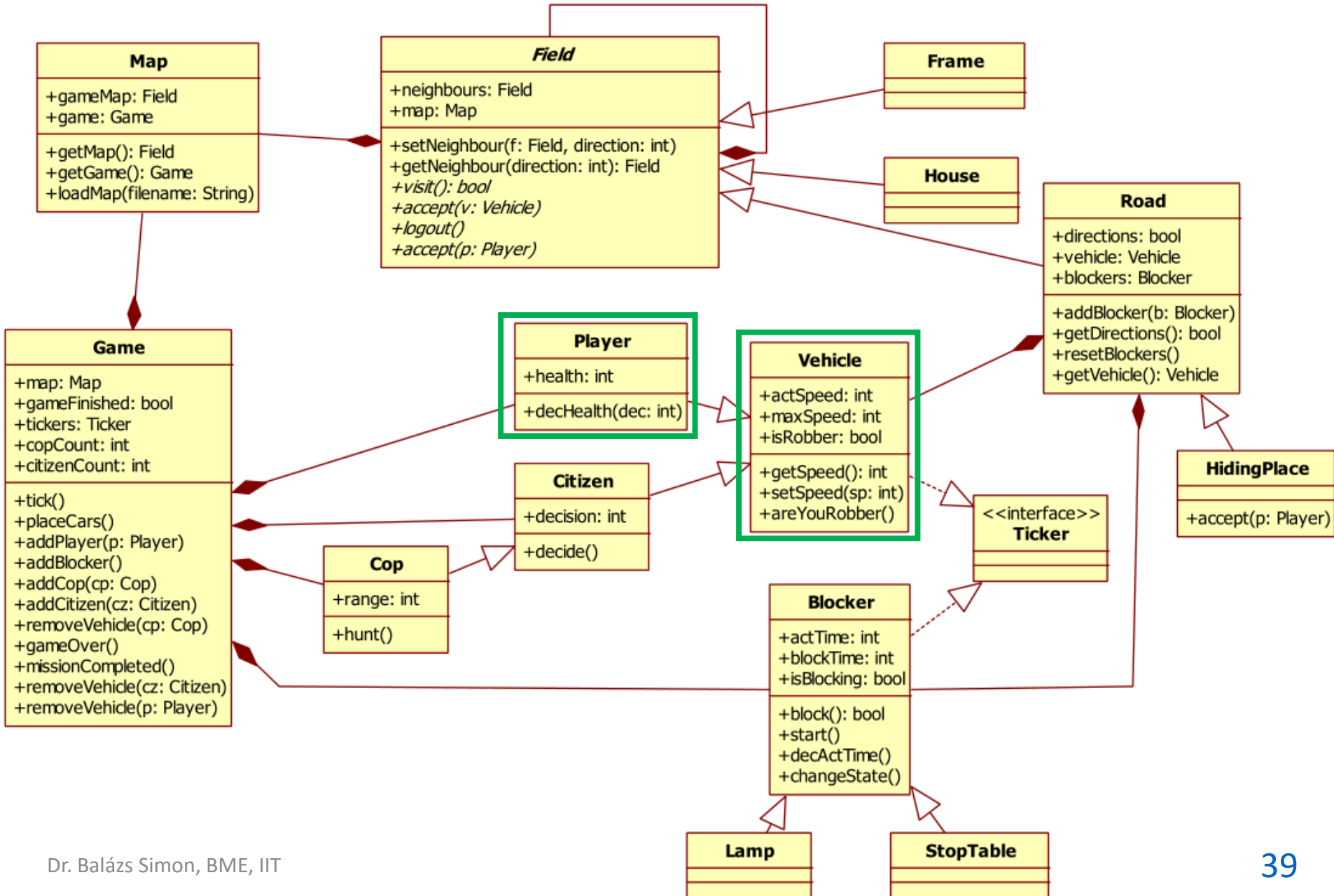


Which classes violate the following OO design heuristic?
"Avoid classes with only accessor methods!"



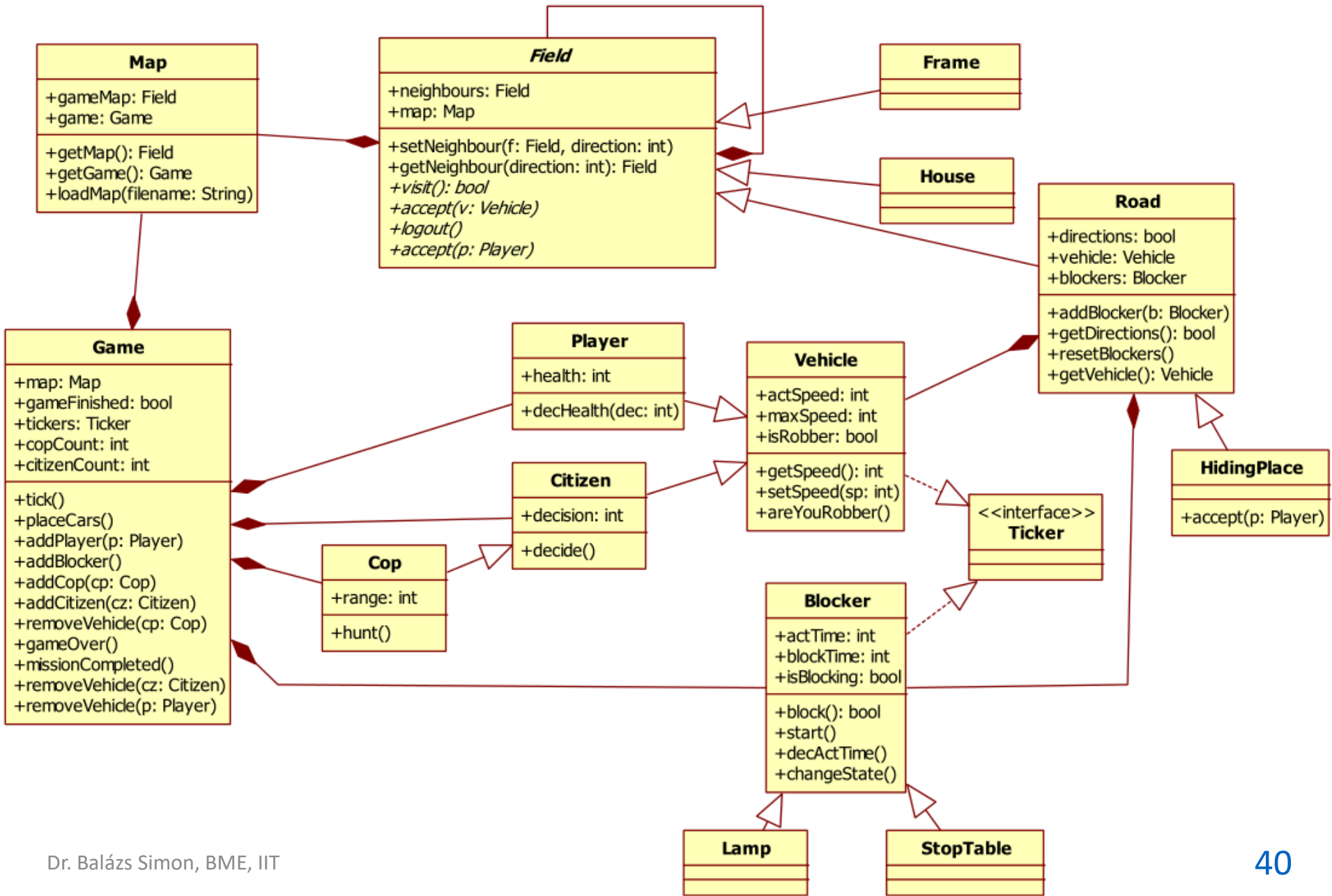
Which classes violate the following OO design heuristic?

"Avoid classes with only accessor methods!"



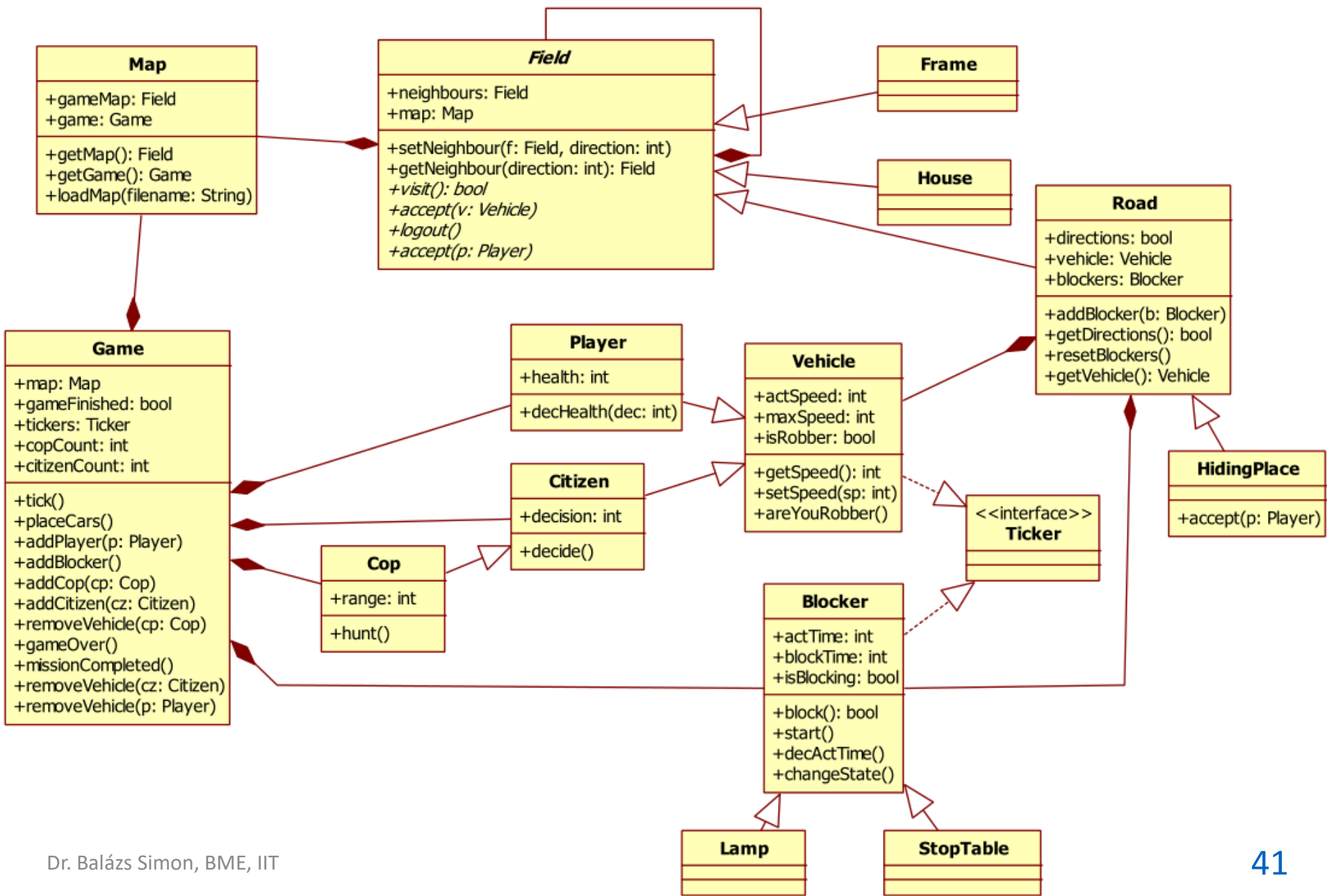
Which classes violate the following OO design heuristic?

"Prefer containment over association!"

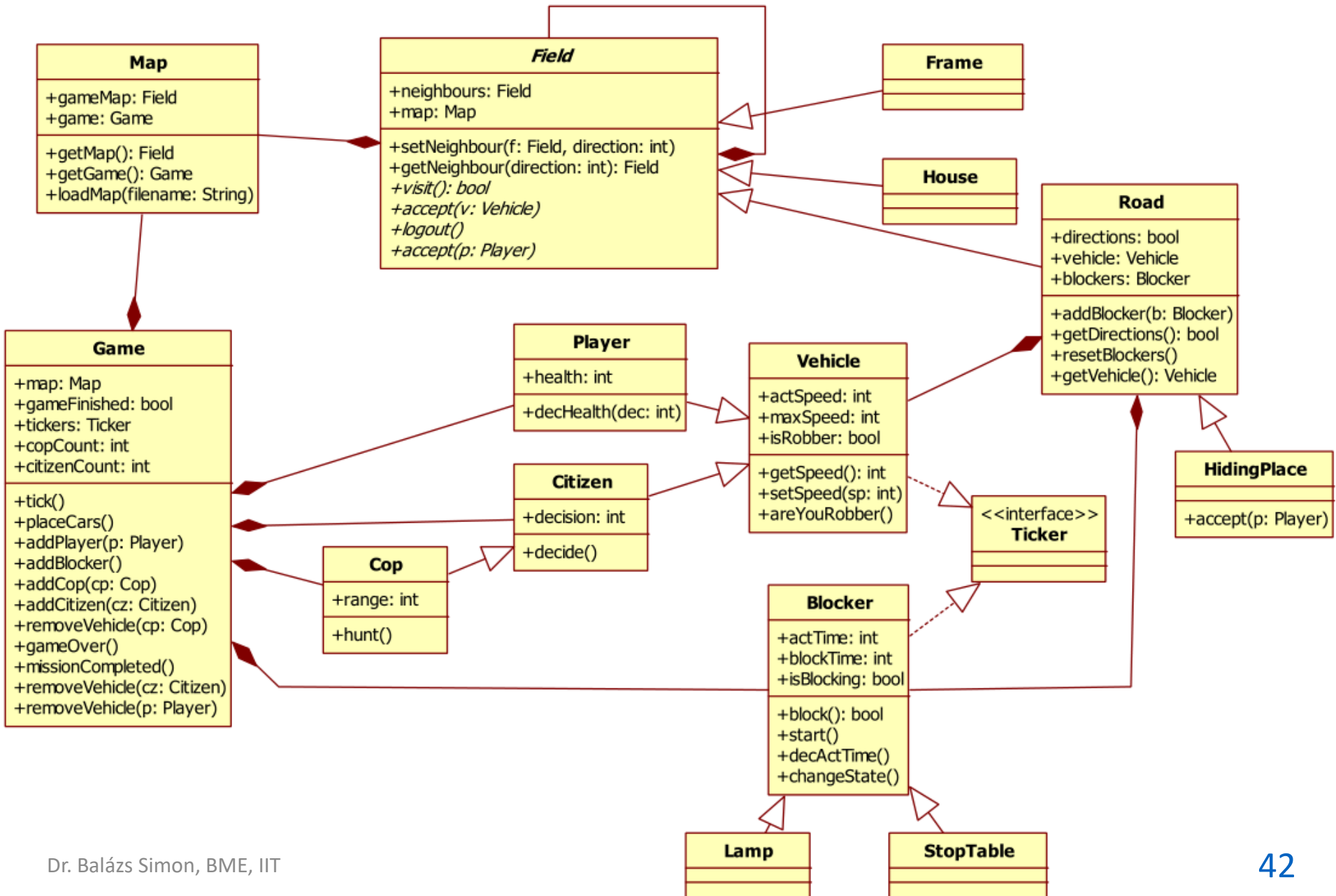


Which classes violate the following OO design heuristic?
"Prefer containment over association!"

Solution:
none of them

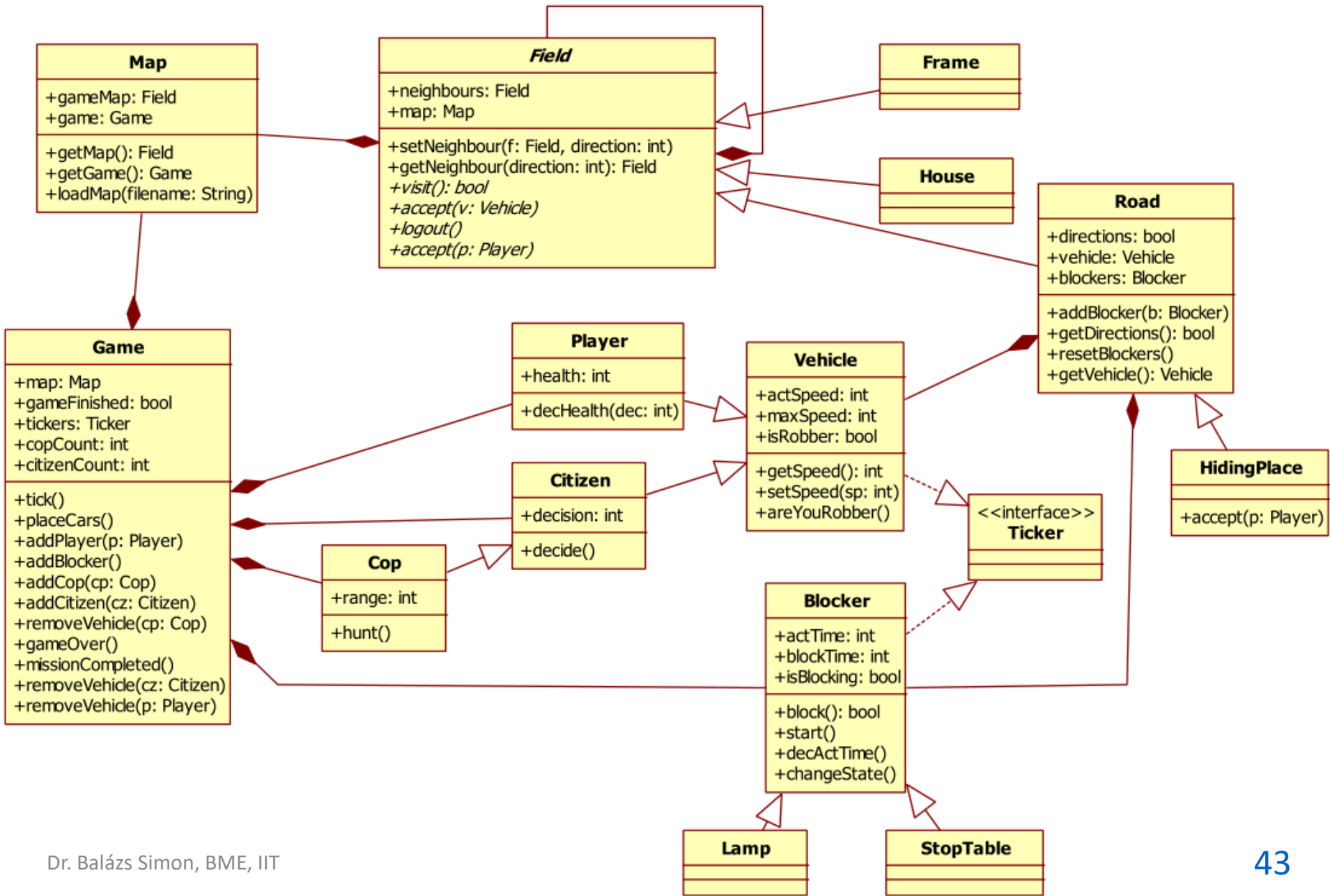


Which classes violate the following OO design heuristic?
"A container object should use the contained objects!"



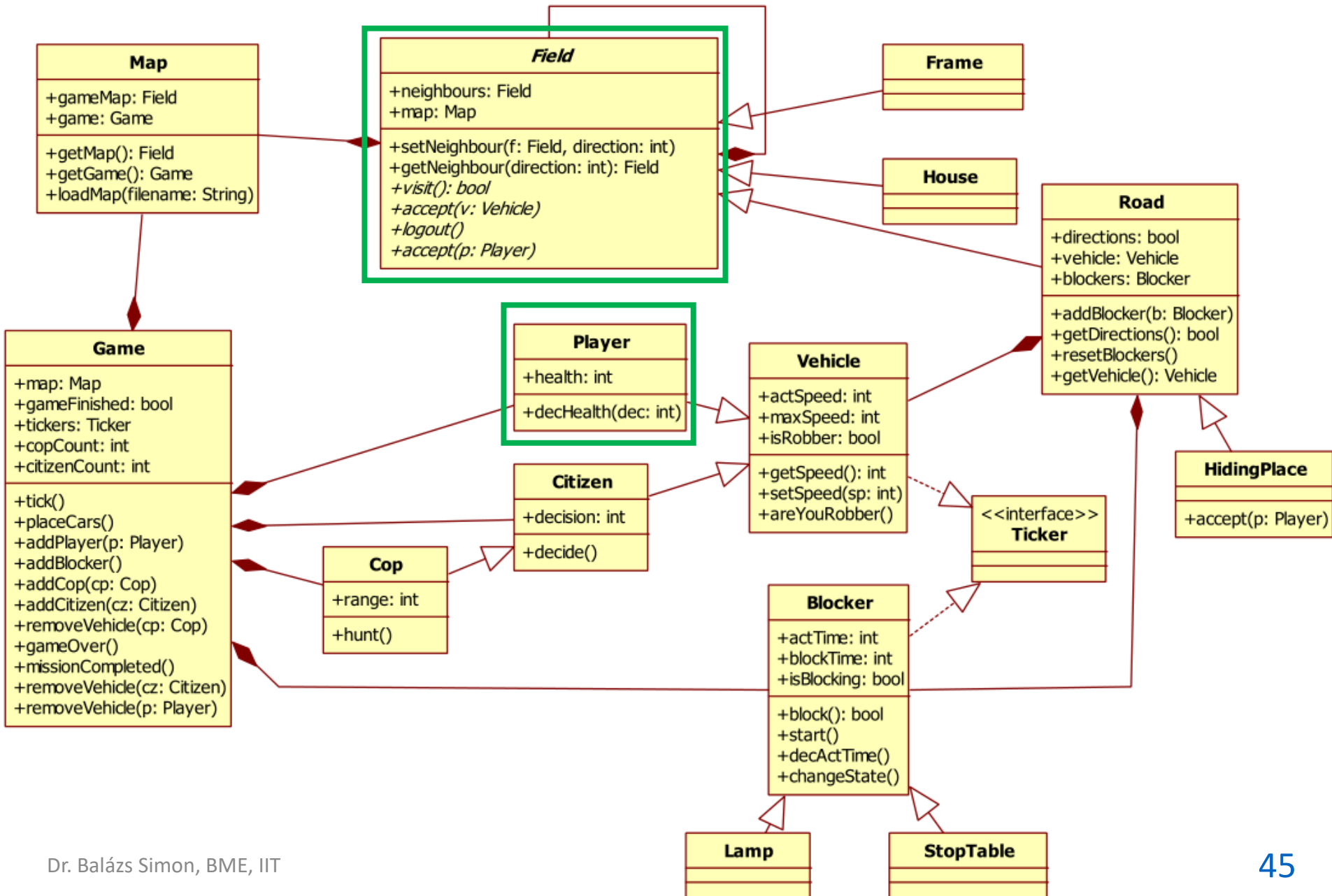
Which classes violate the following OO design heuristic?
"A container object should use the contained objects!"

Solution:
none of them

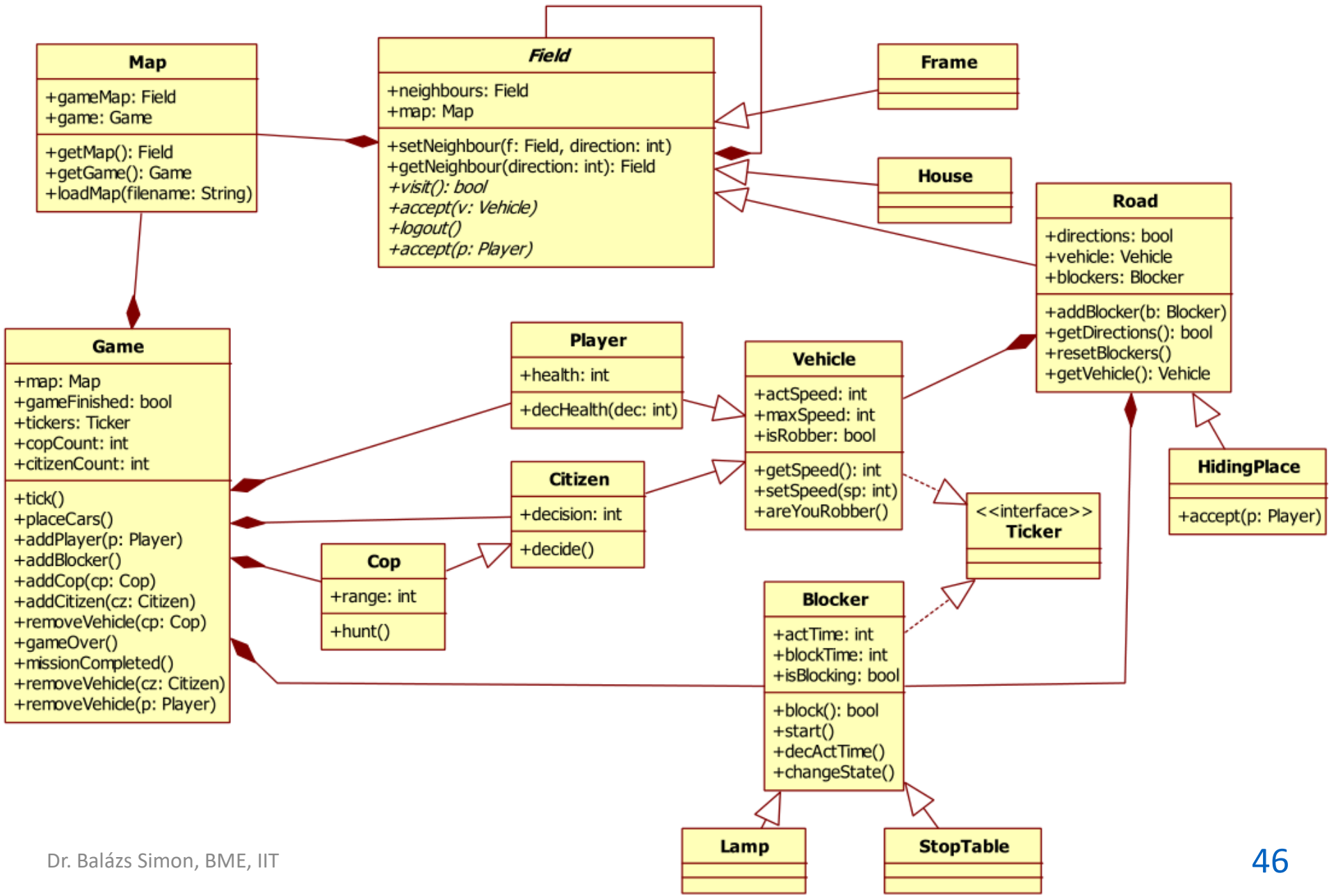


"A contained object should not use its container object!"



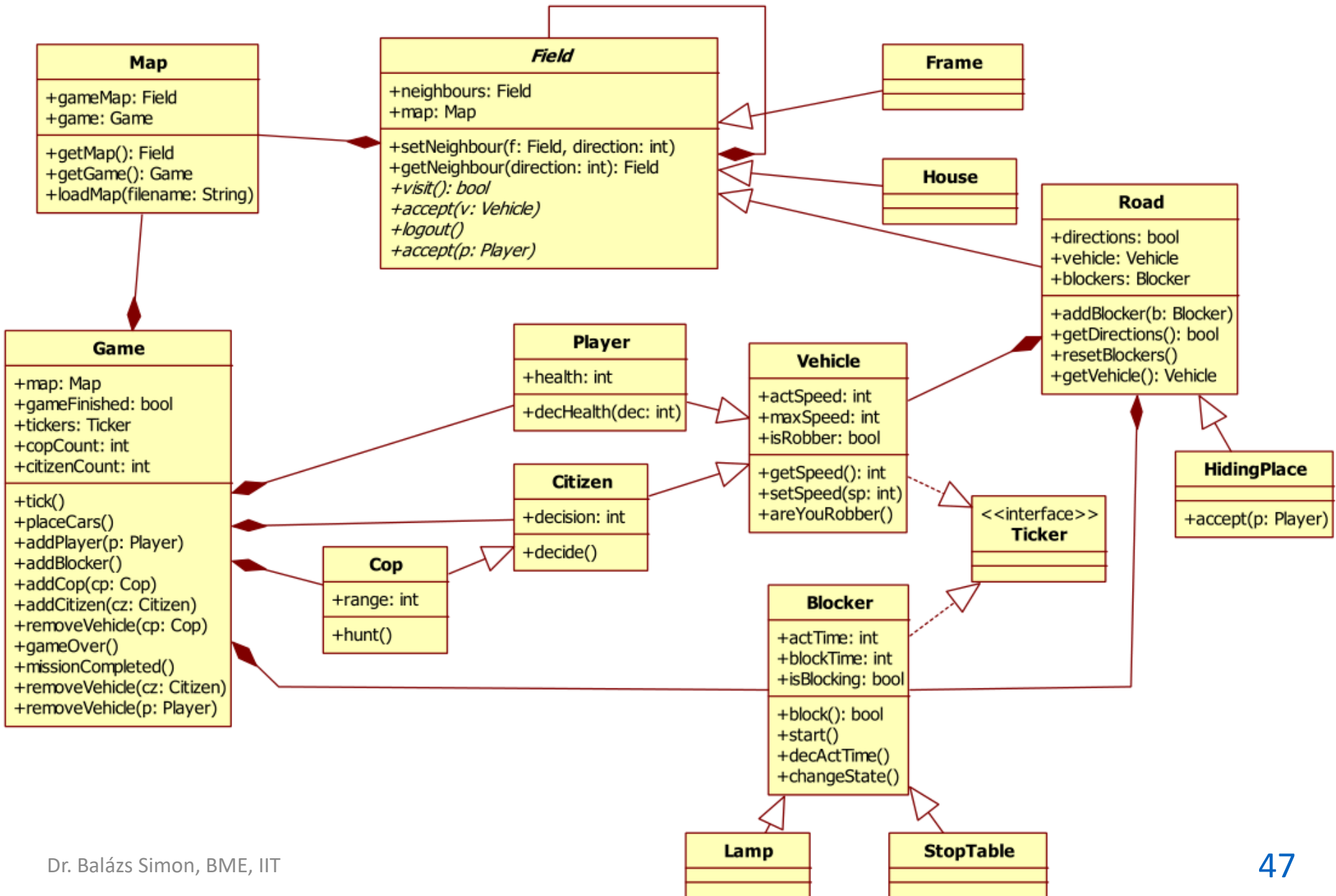


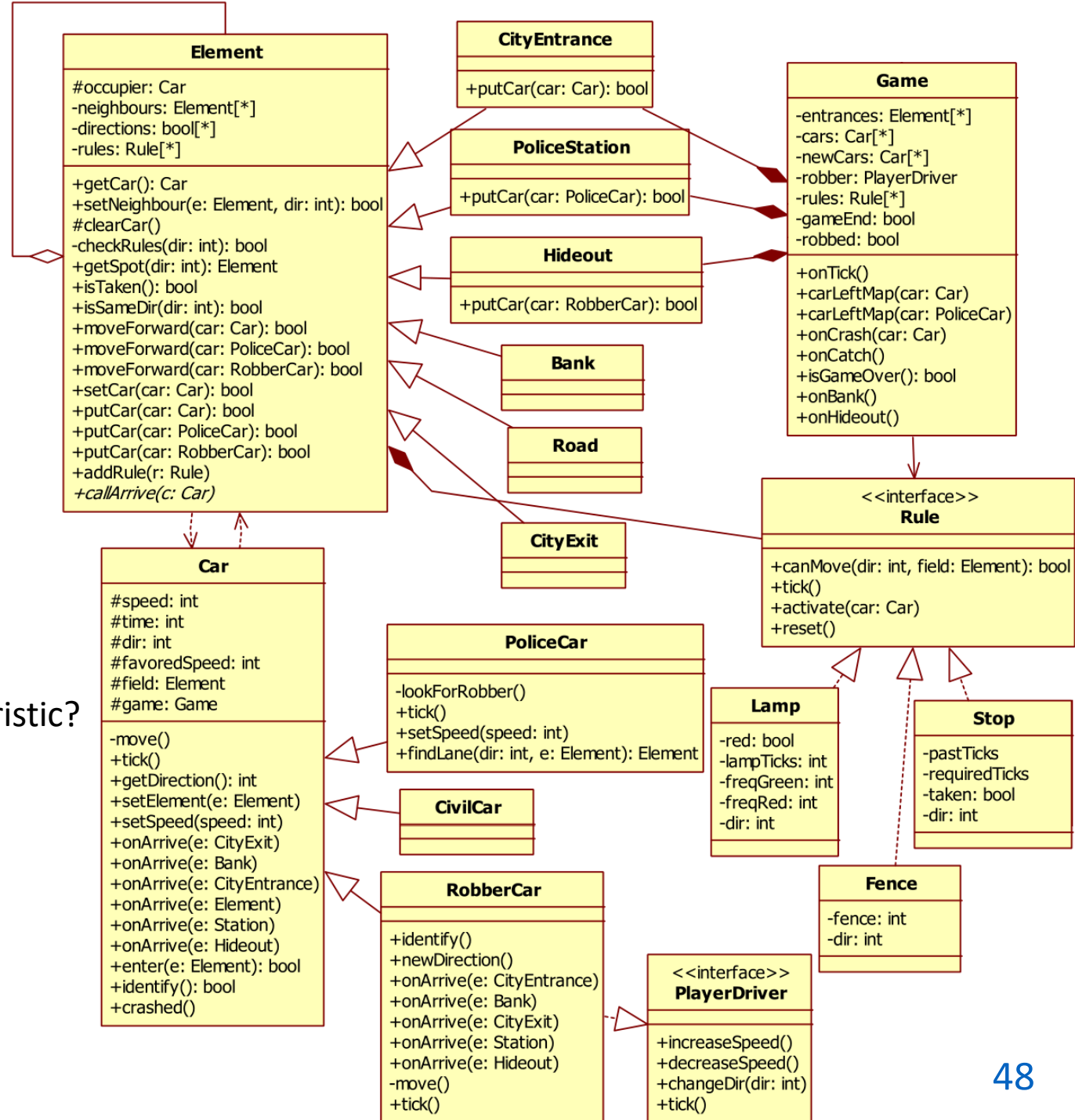
Which classes violate the following OO design heuristic?
"Contained objects should not communicate with each other directly!"



Which classes violate the following OO design heuristic?
"Contained objects should not communicate with each other directly!"

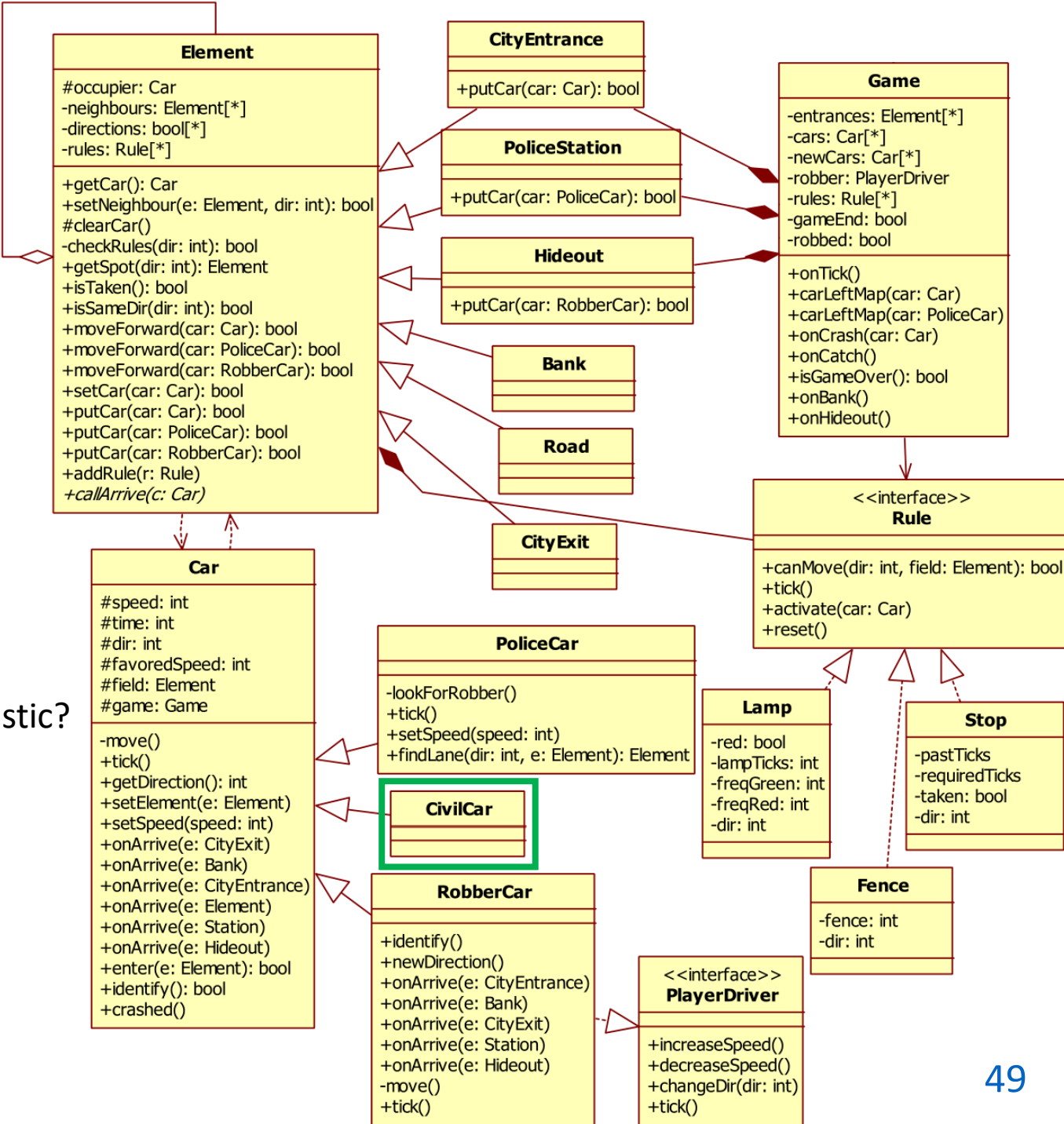
Solution:
none of them





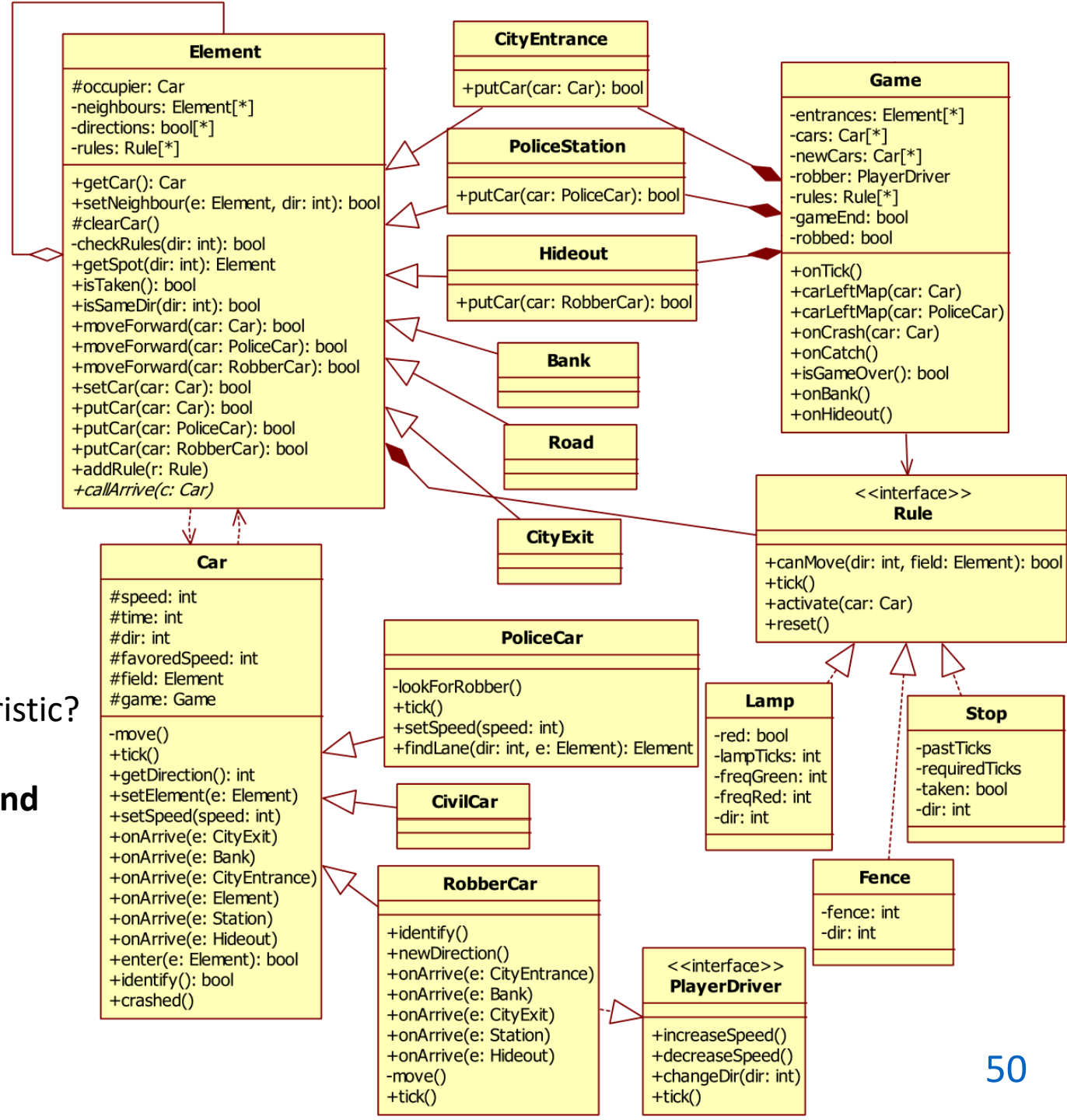
Which classes violate the following OO design heuristic?

"Model for behavior not for roles!"



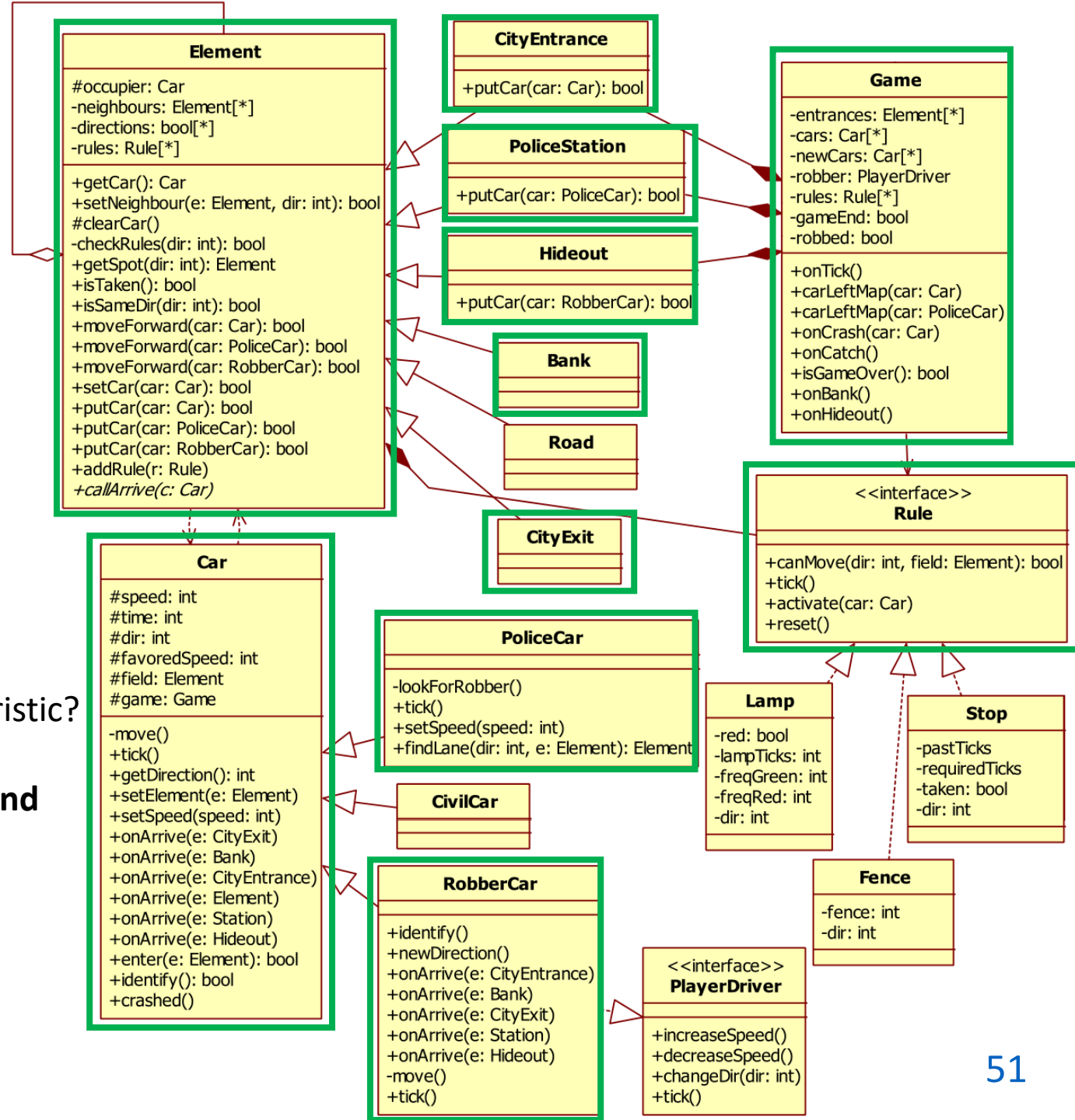
Which classes violate the following OO design heuristic?

"Model for behavior not for roles!"



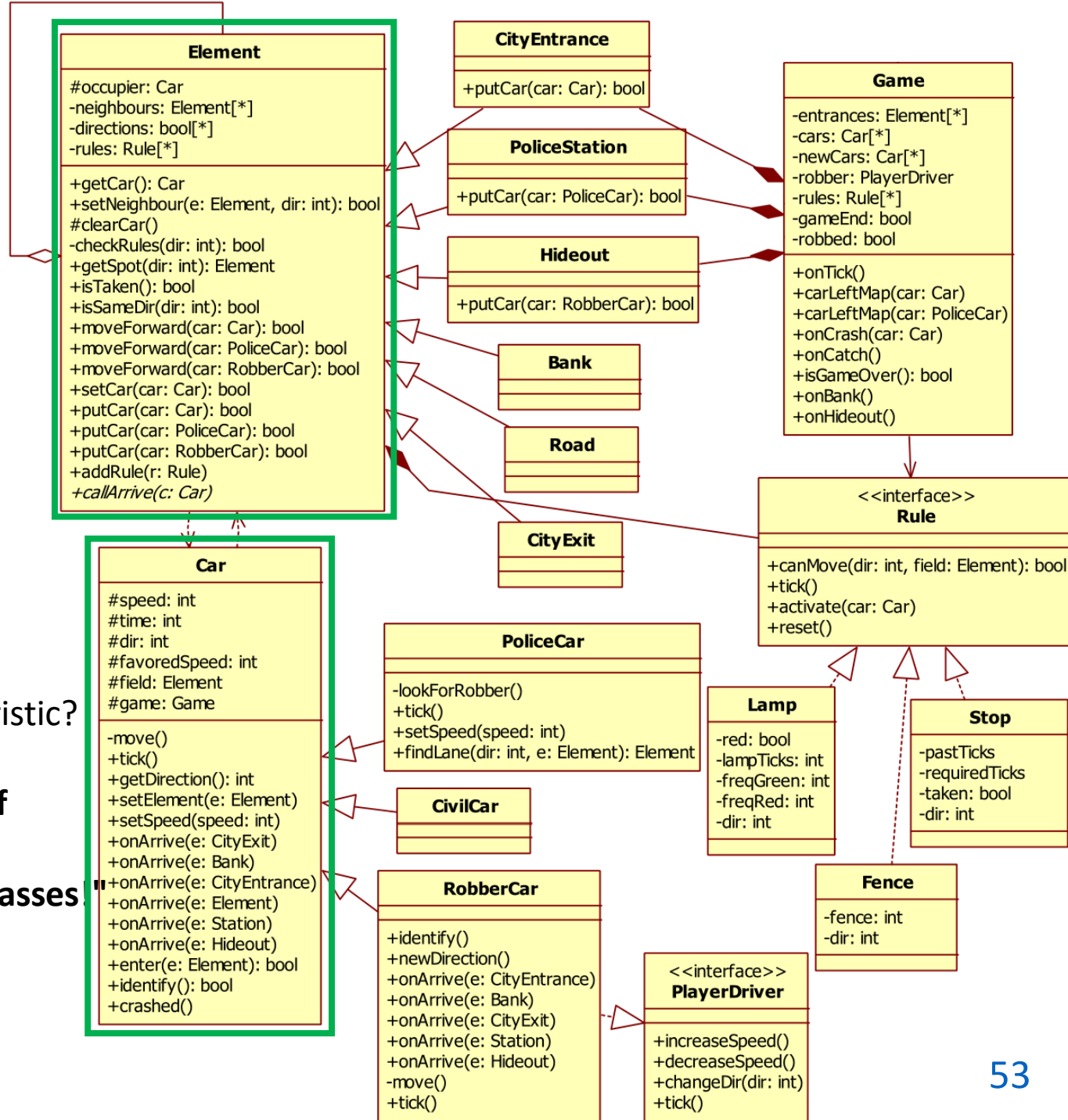
Which classes violate the following OO design heuristic?

"A class should not depend on its users!"



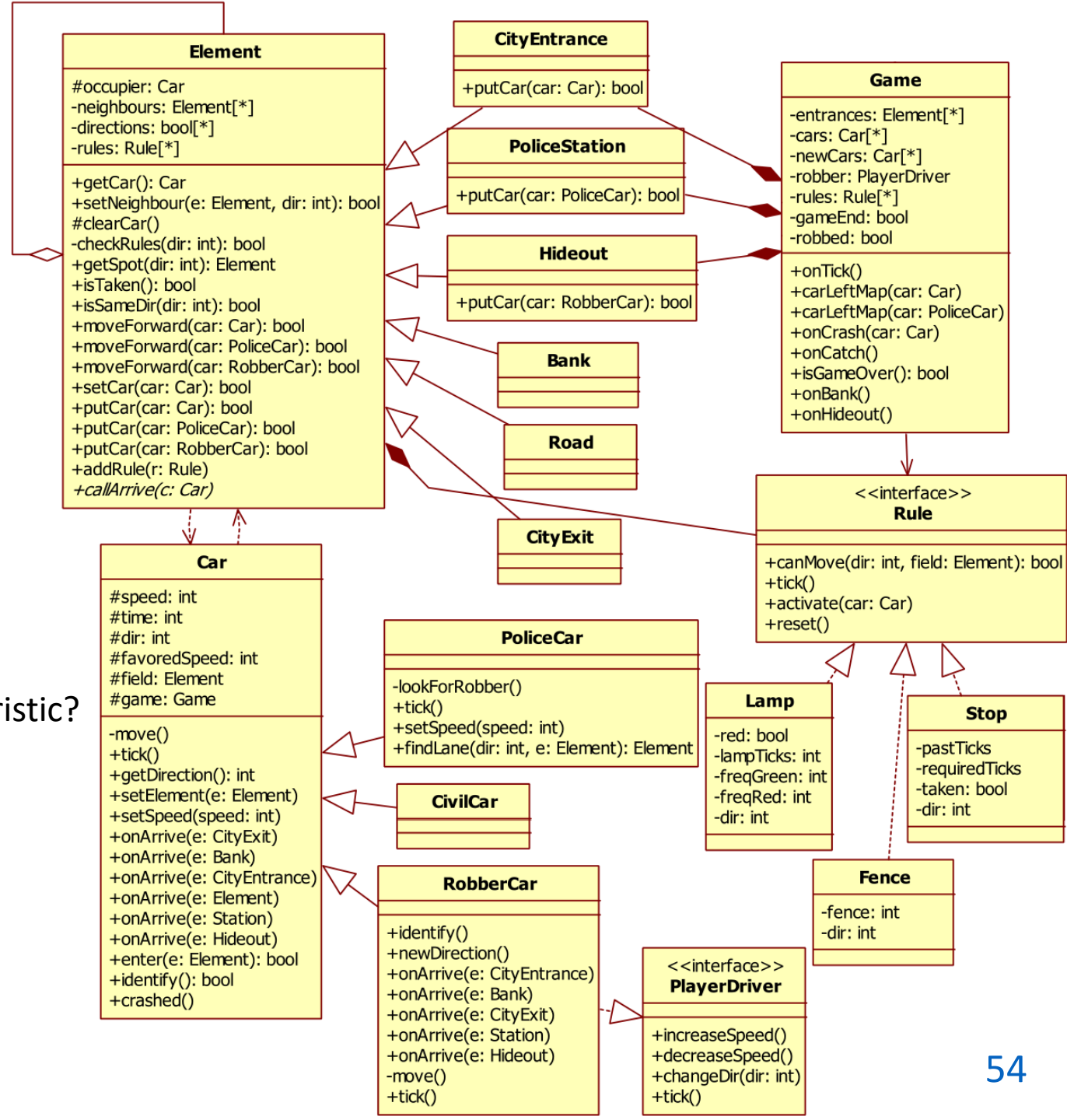
Which classes violate the following OO design heuristic?

"A class should not depend on its users!"



Which classes violate the following OO design heuristic?

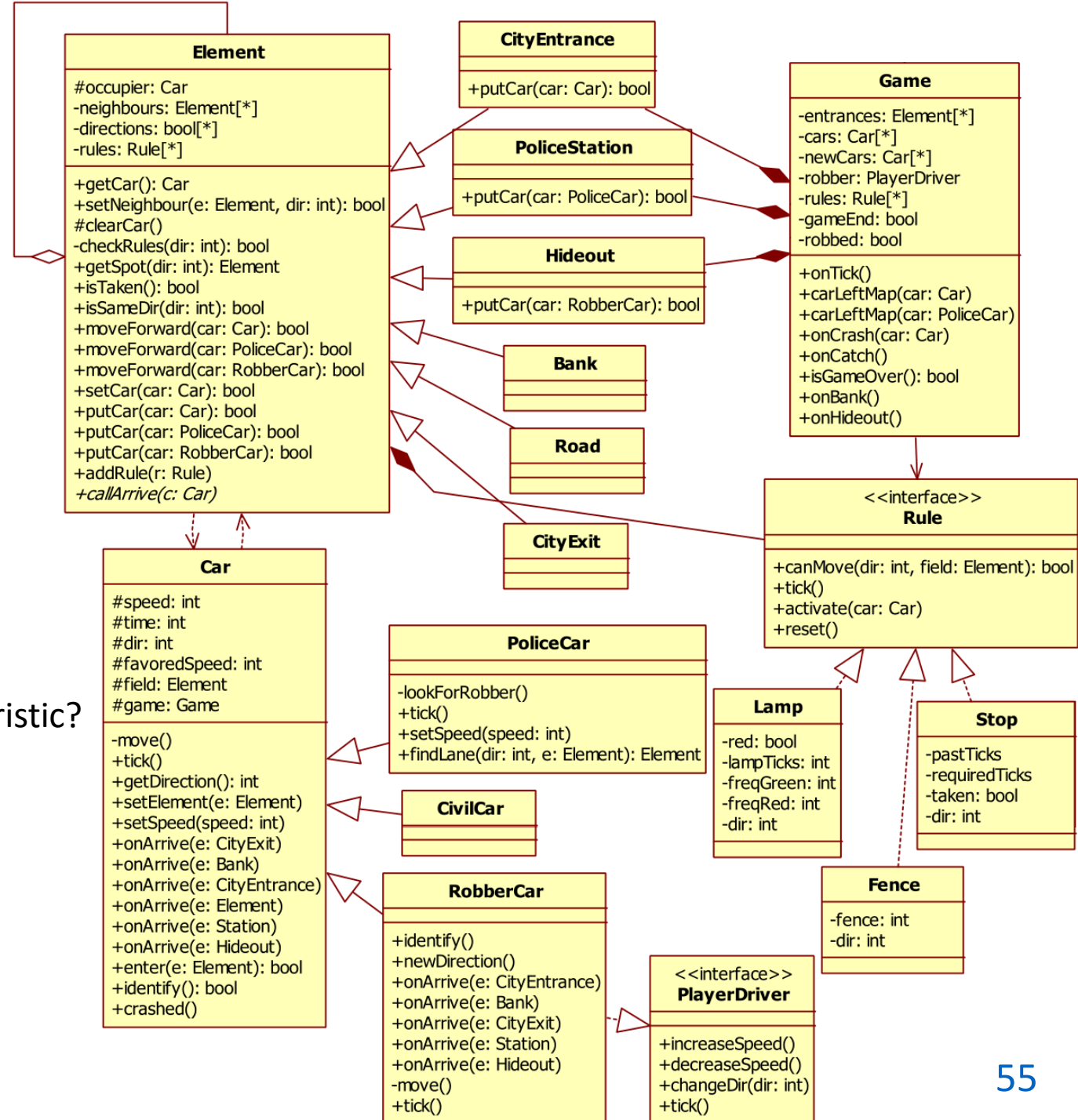
"Minimize the number of different method calls between collaborating classes"



Which classes violate the following OO design heuristic?

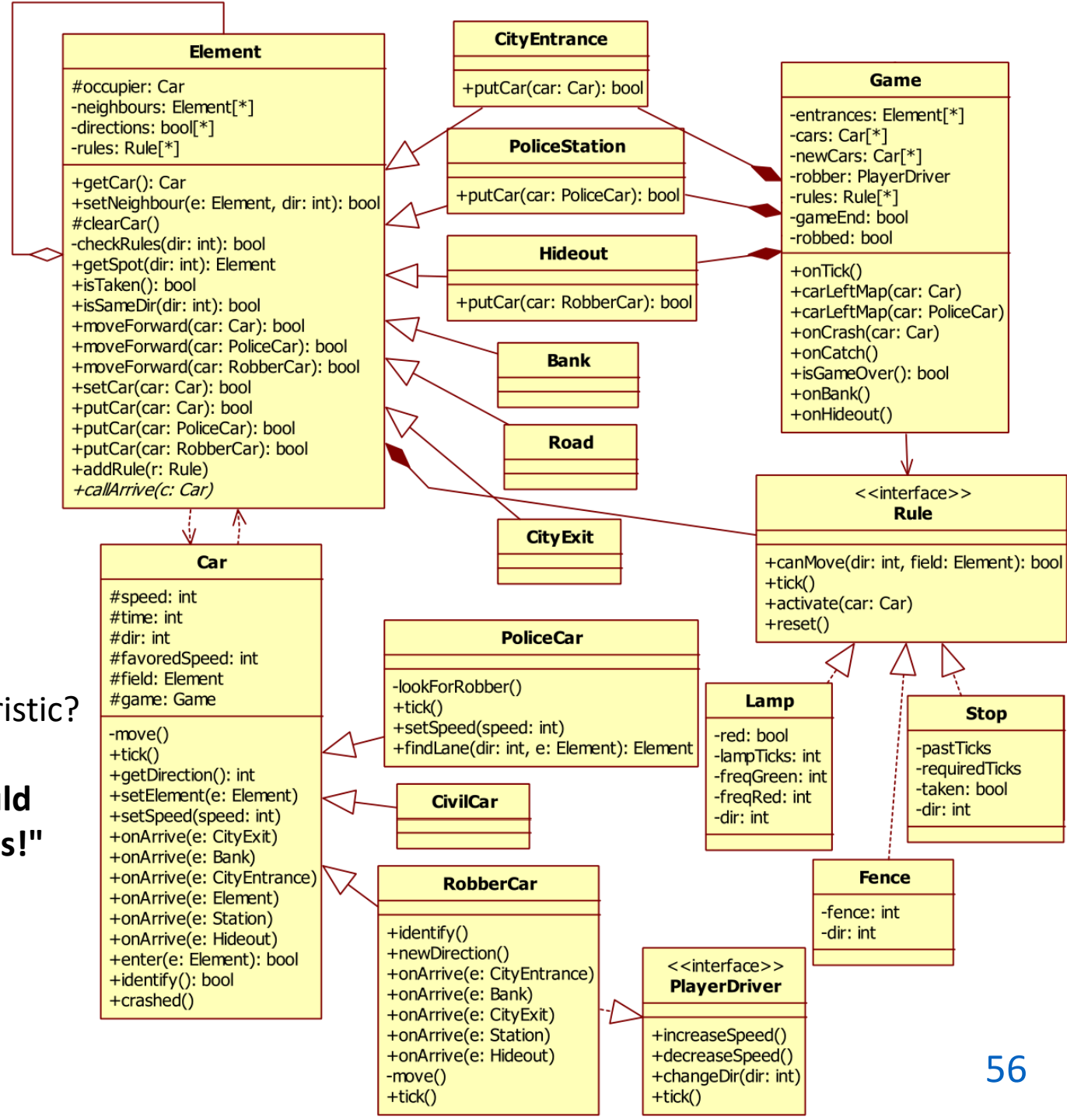
"Avoid classes with only accessor methods!"

Solution:
none of them



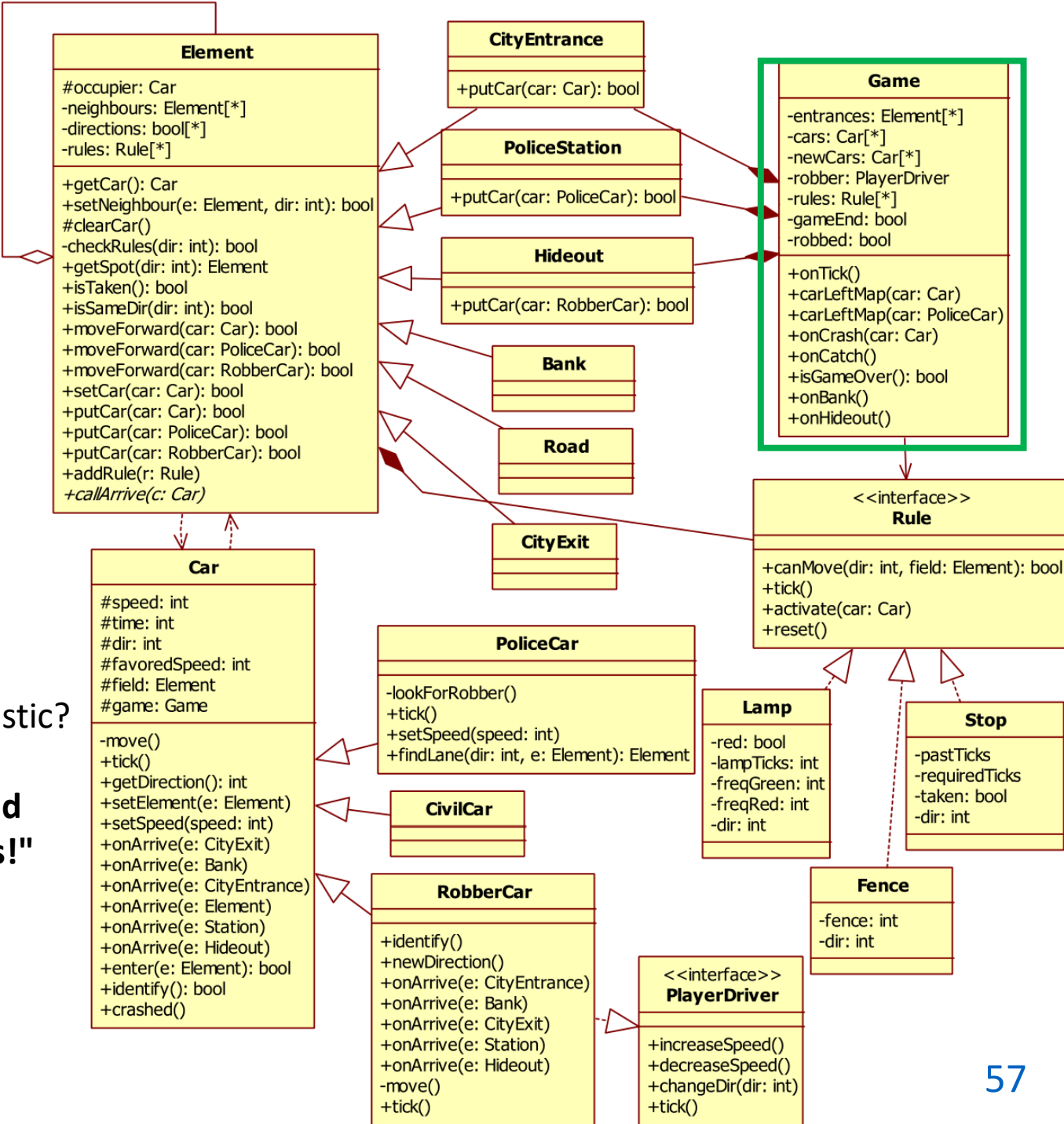
Which classes violate the following OO design heuristic?

"Avoid classes with only accessor methods!"



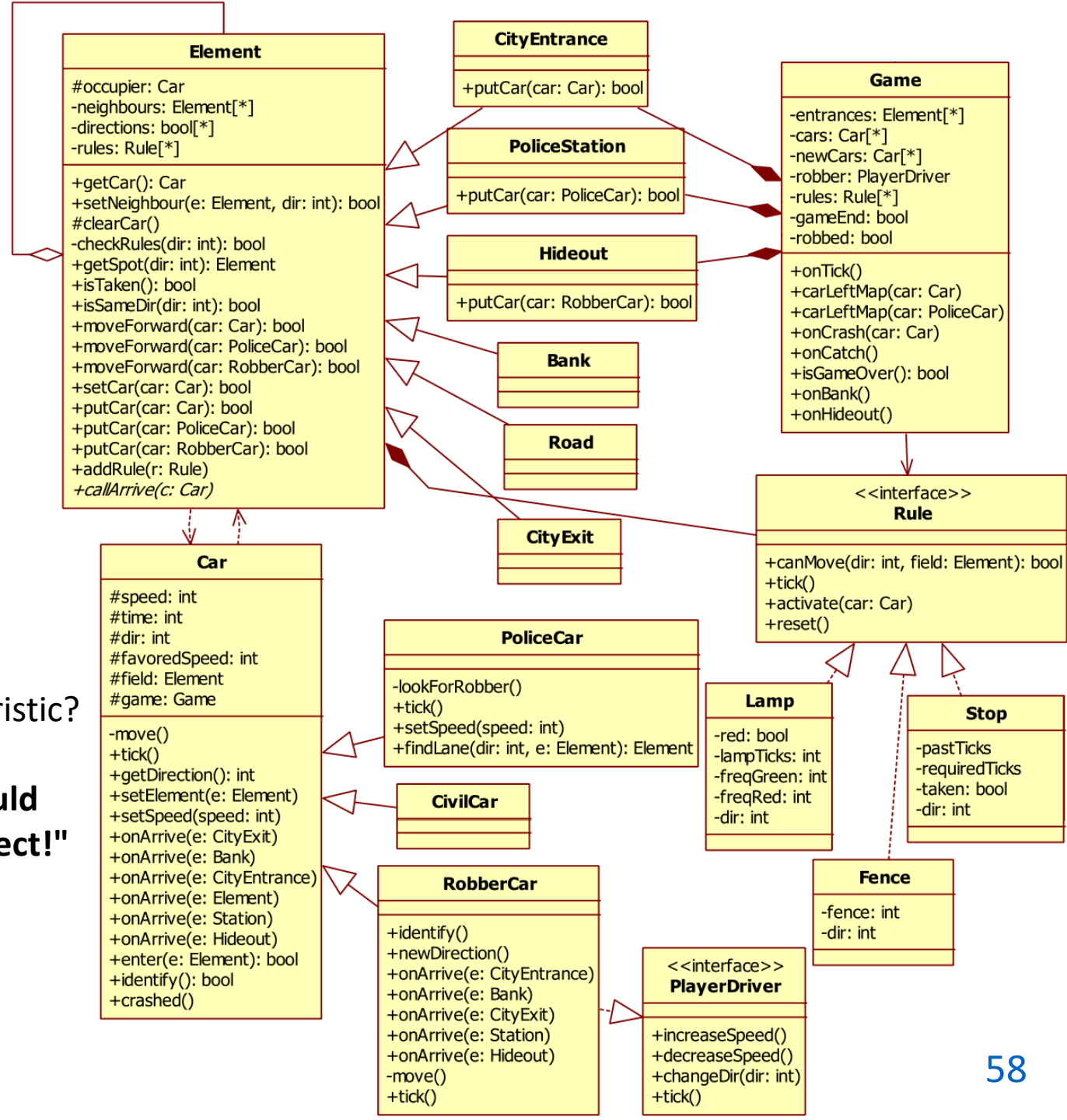
Which classes violate the following OO design heuristic?

"A container object should use the contained objects!"



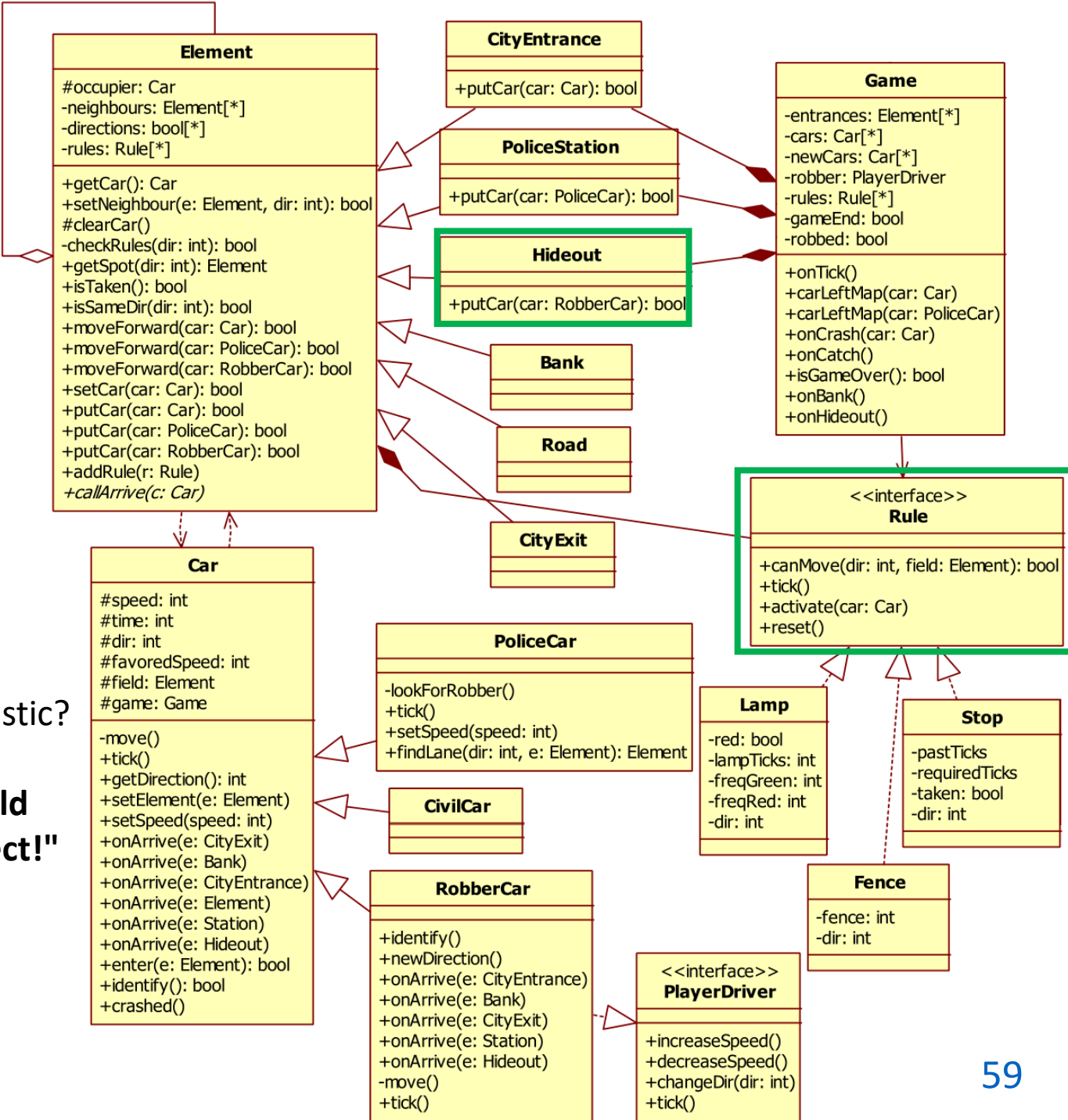
Which classes violate the following OO design heuristic?

"A container object should use the contained objects!"



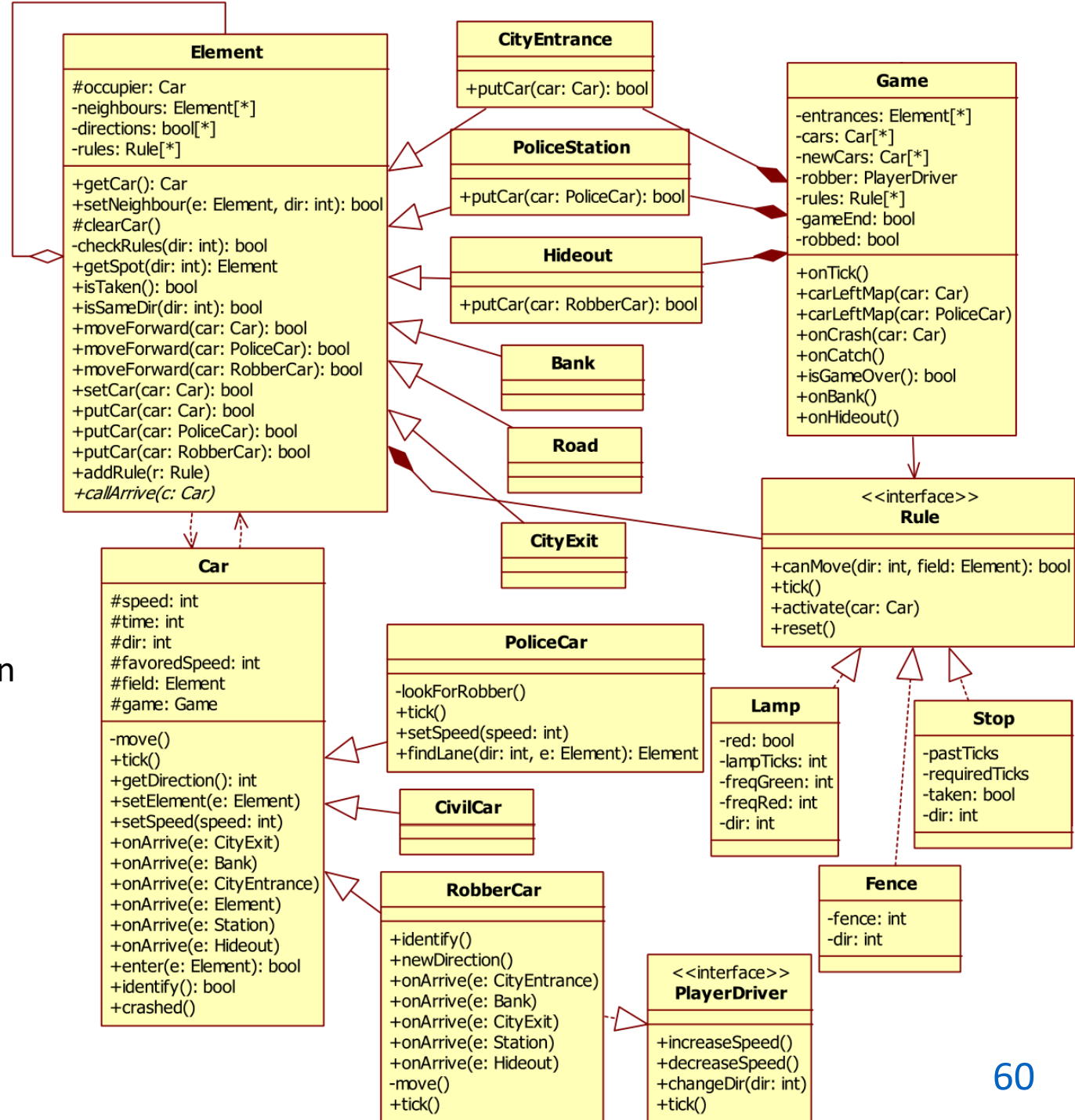
Which classes violate the following OO design heuristic?

"A contained object should not use its container object!"



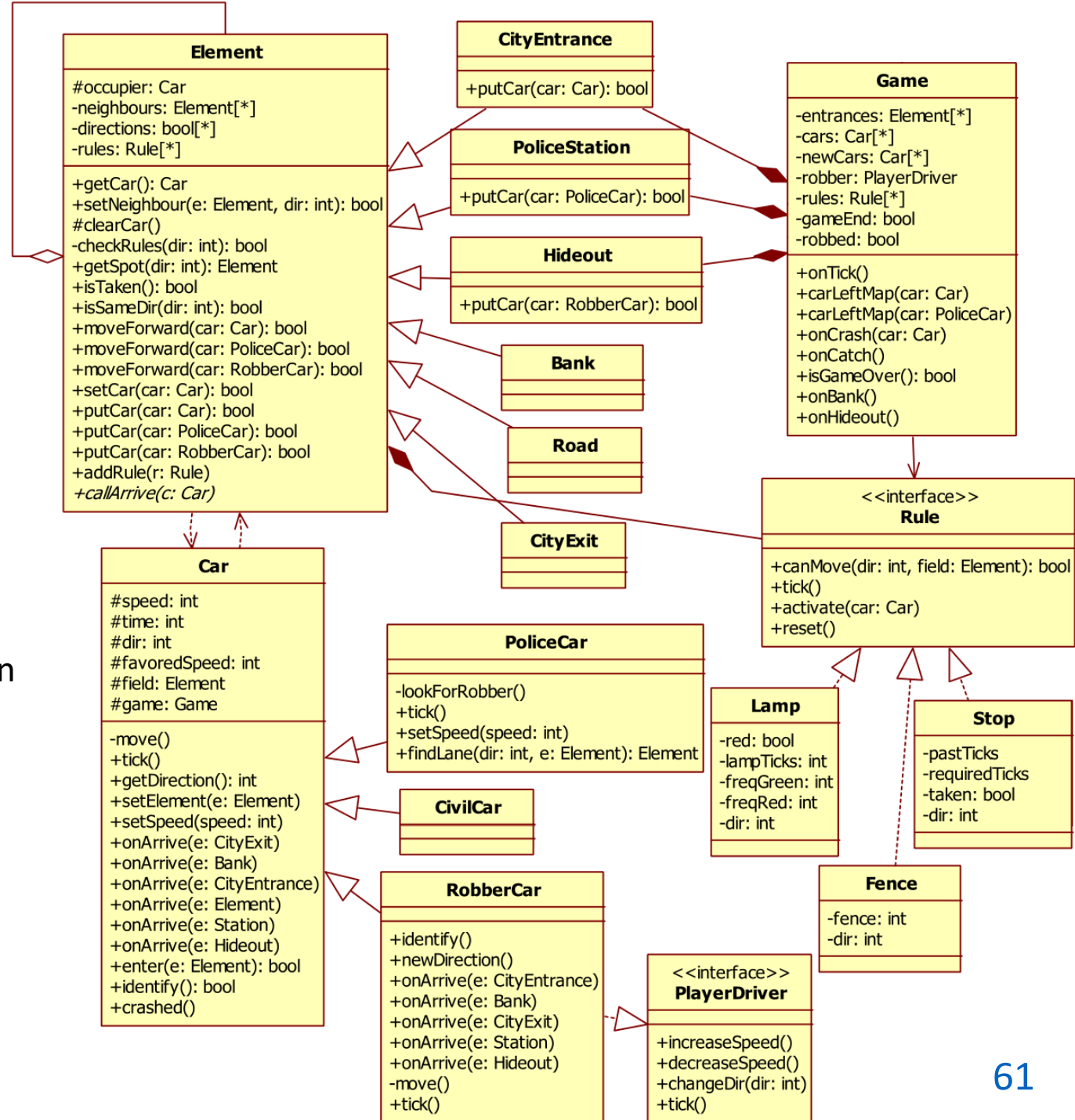
Which classes violate the following OO design heuristic?

"A contained object should not use its container object!"



Is the following OO design decision correct?

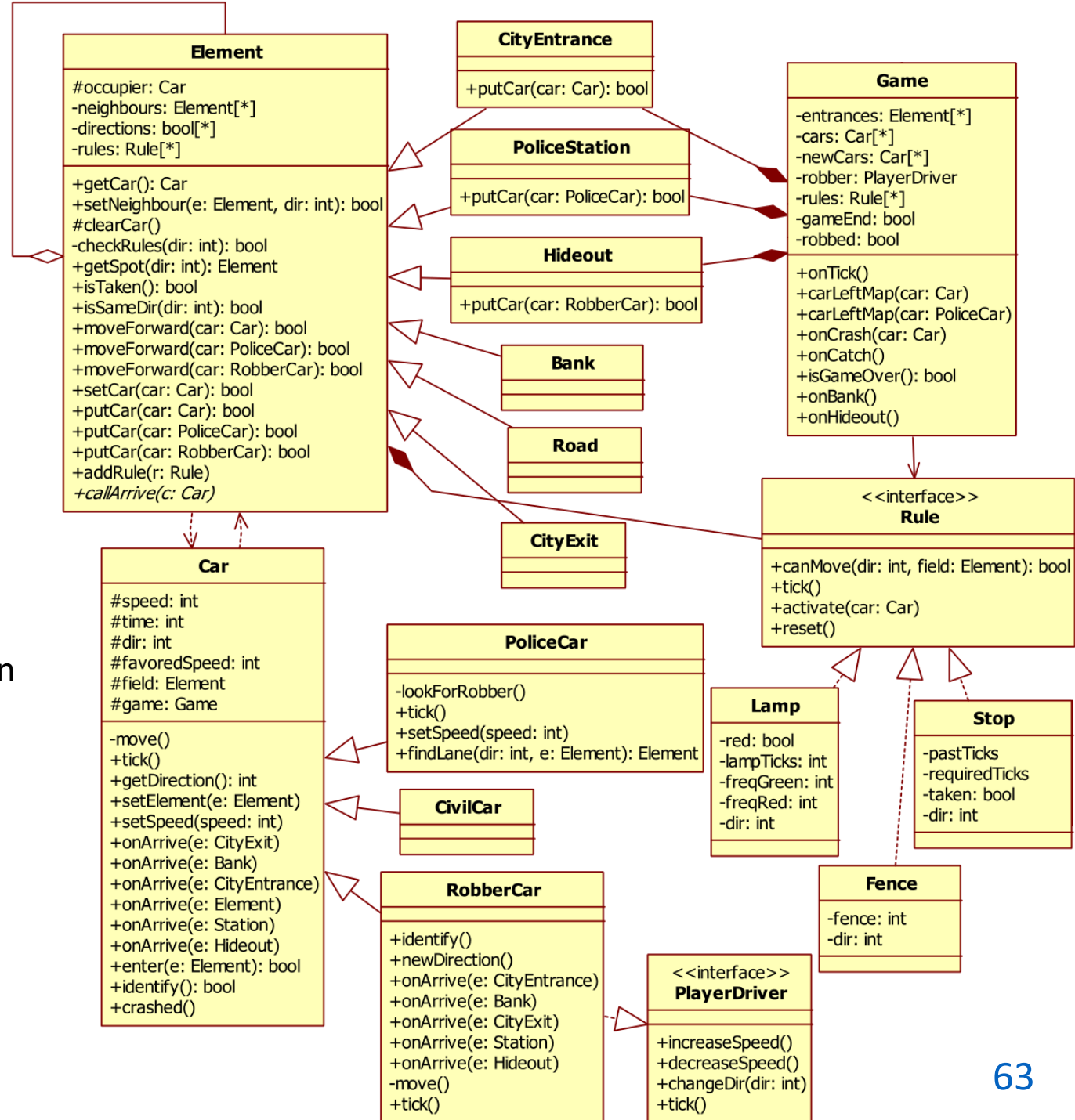
"Road is a descendant of Element."



Is the following OO design decision correct?

"Road is a descendant of Element."

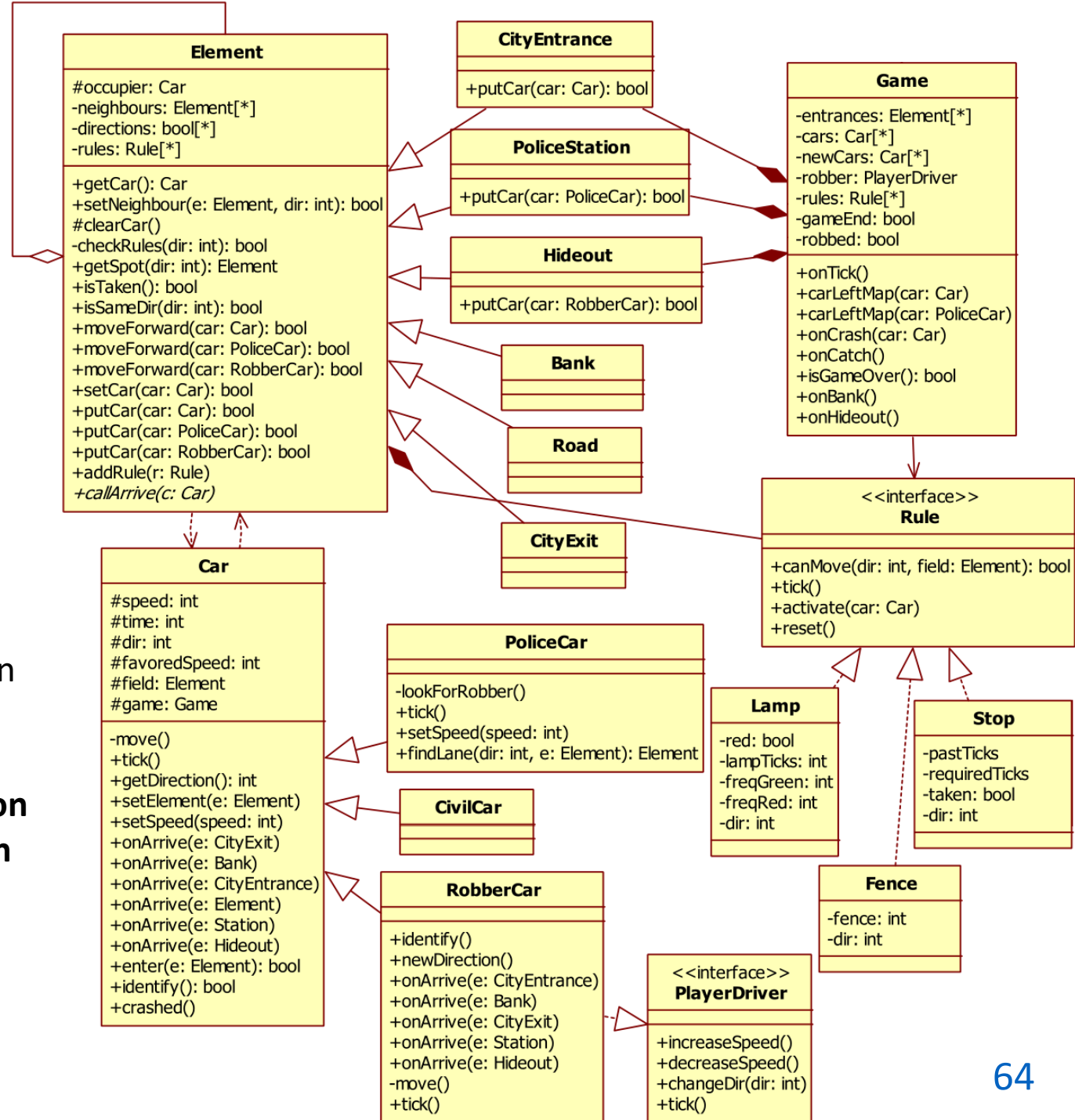
Solution: Correct



Is the following OO design decision correct?

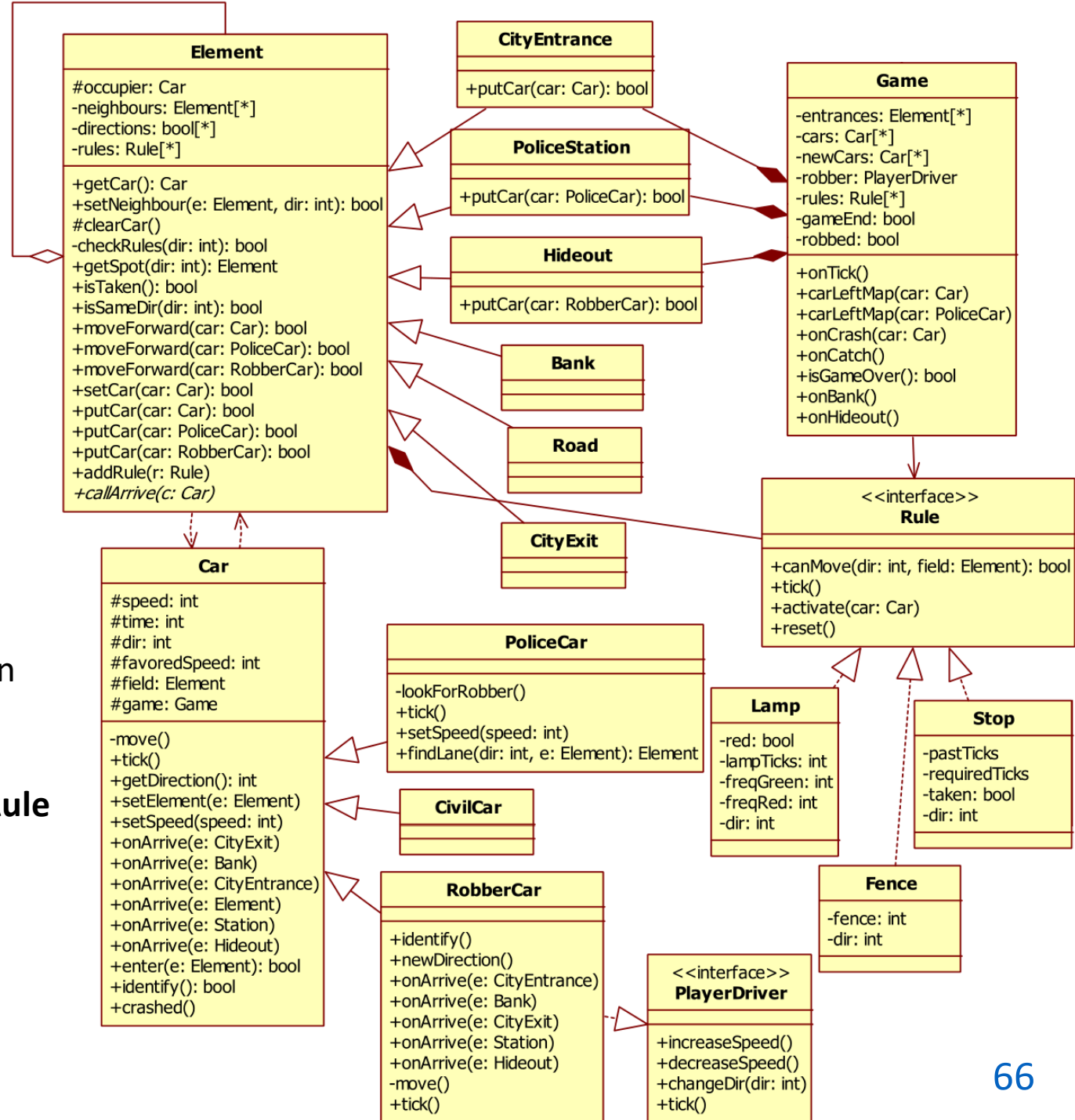
"Game does not store Elements."

Solution: Incorrect



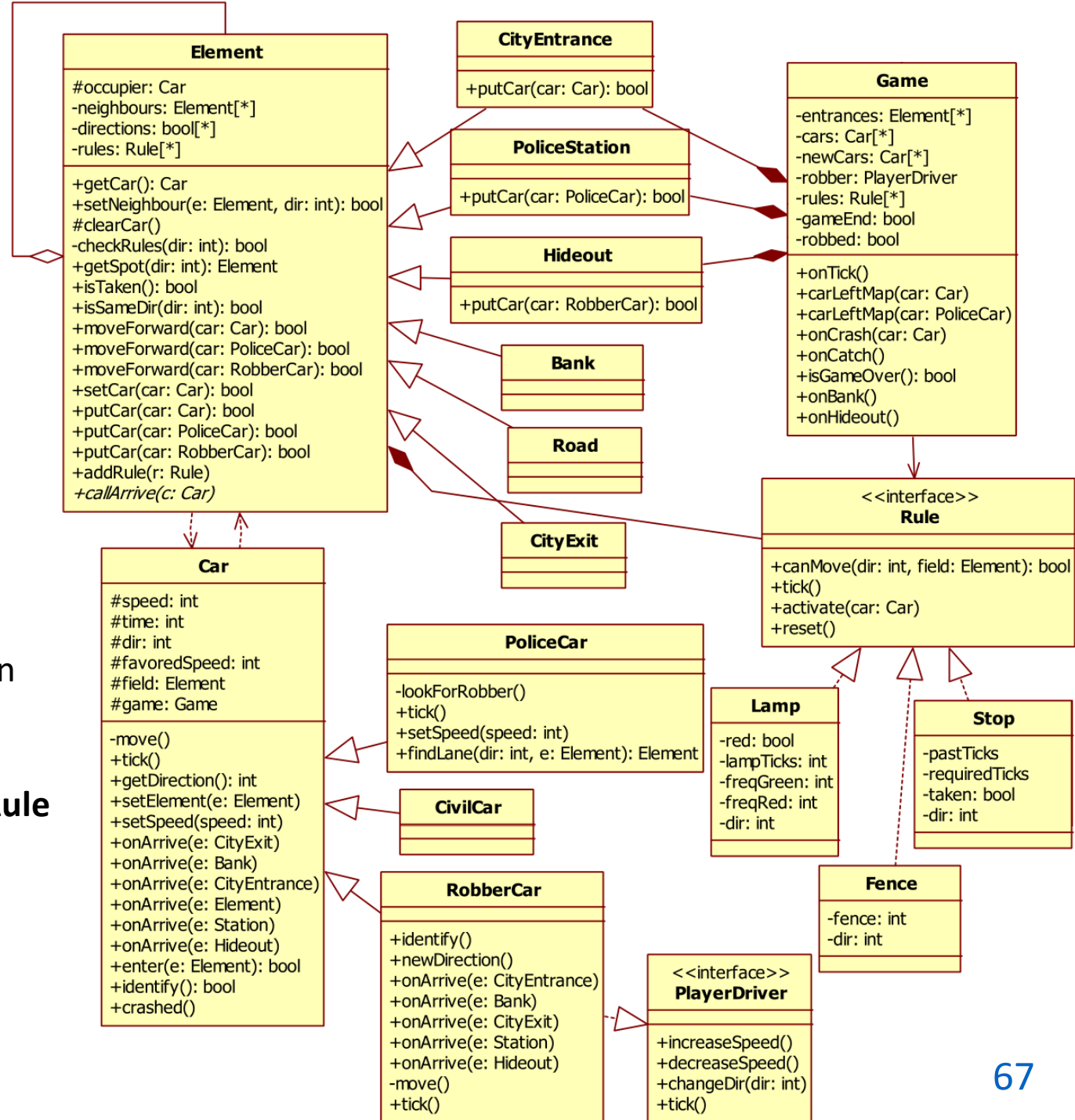
Is the following OO design decision correct?

"Element only depends on Car, but does not have an association for a Car. "



Is the following OO design decision correct?

"Lamp implements the Rule interface."



Is the following OO design decision correct?

"Lamp implements the Rule interface."

Solution: Correct