Semantic Days 2011 Tutorial
Semantic Web Technologies
Lecture 4: OWL, the Web Ontology Language

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Outline

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  - Useful functionality to *align vocabularies*

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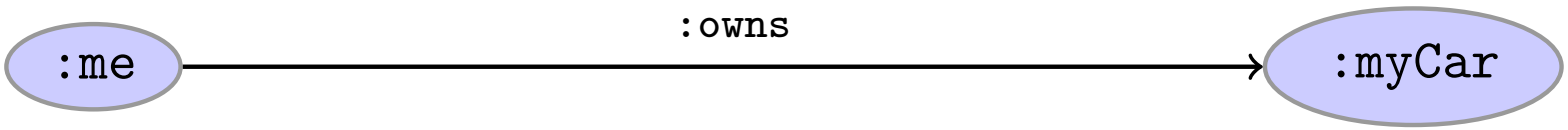

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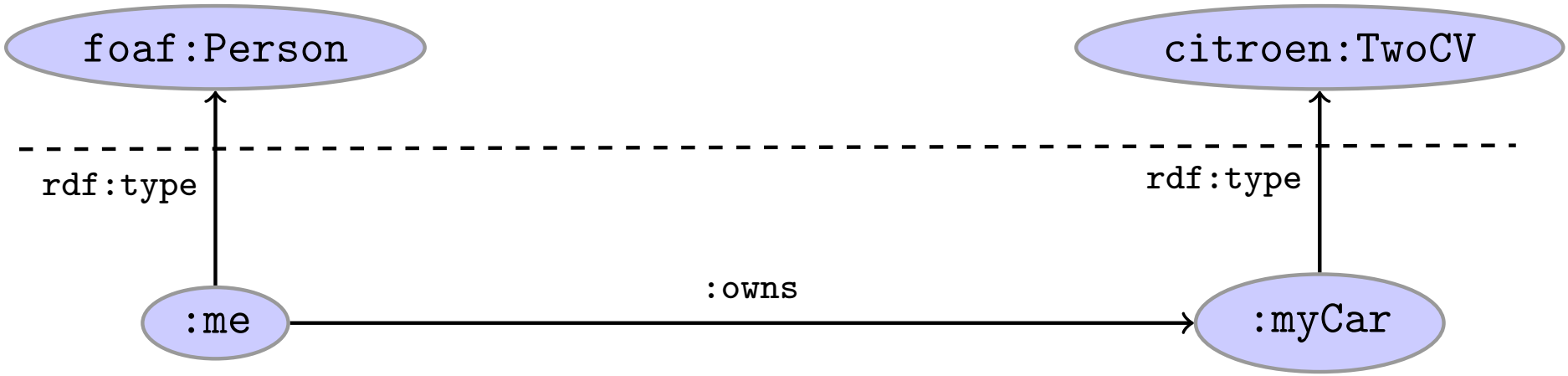

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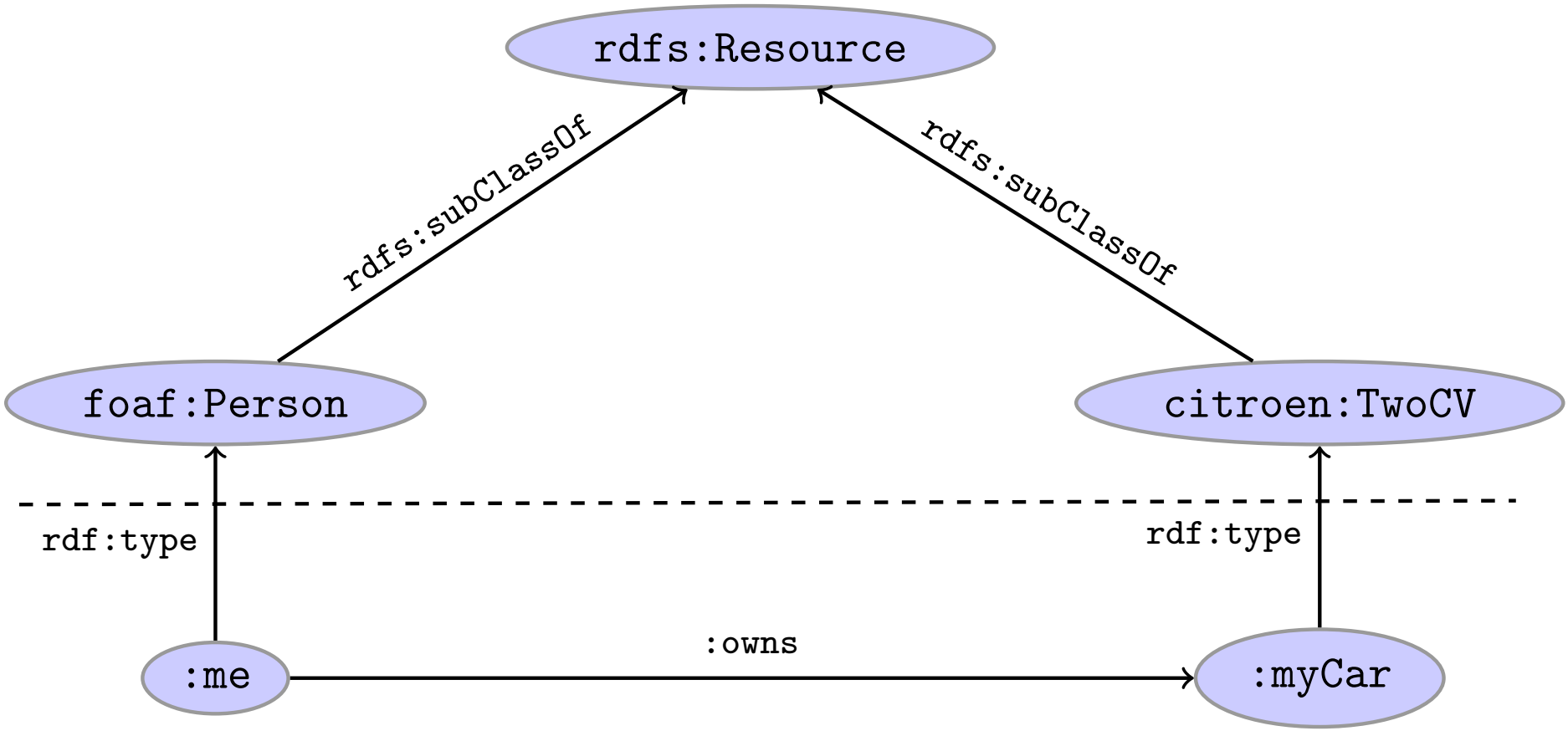
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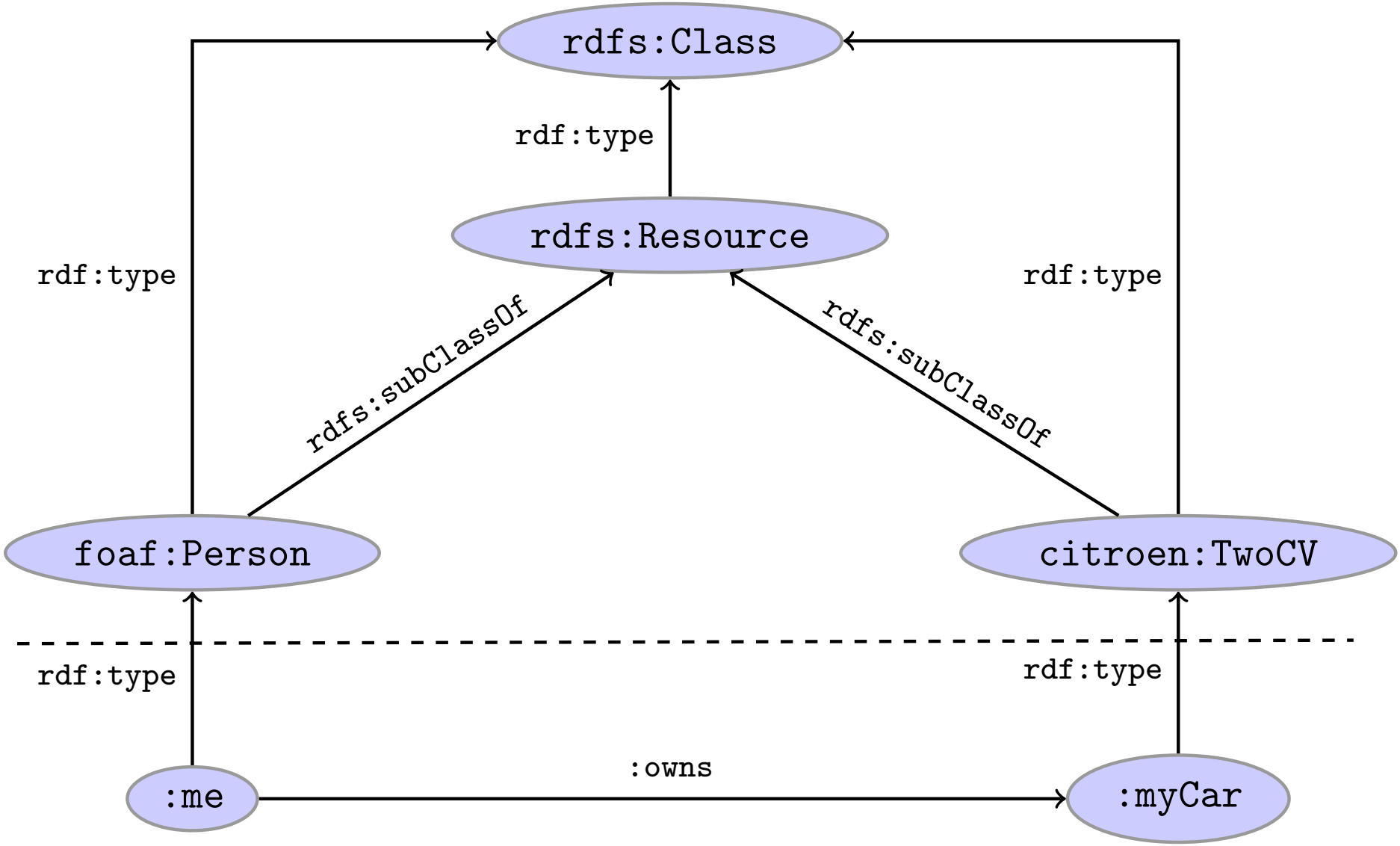
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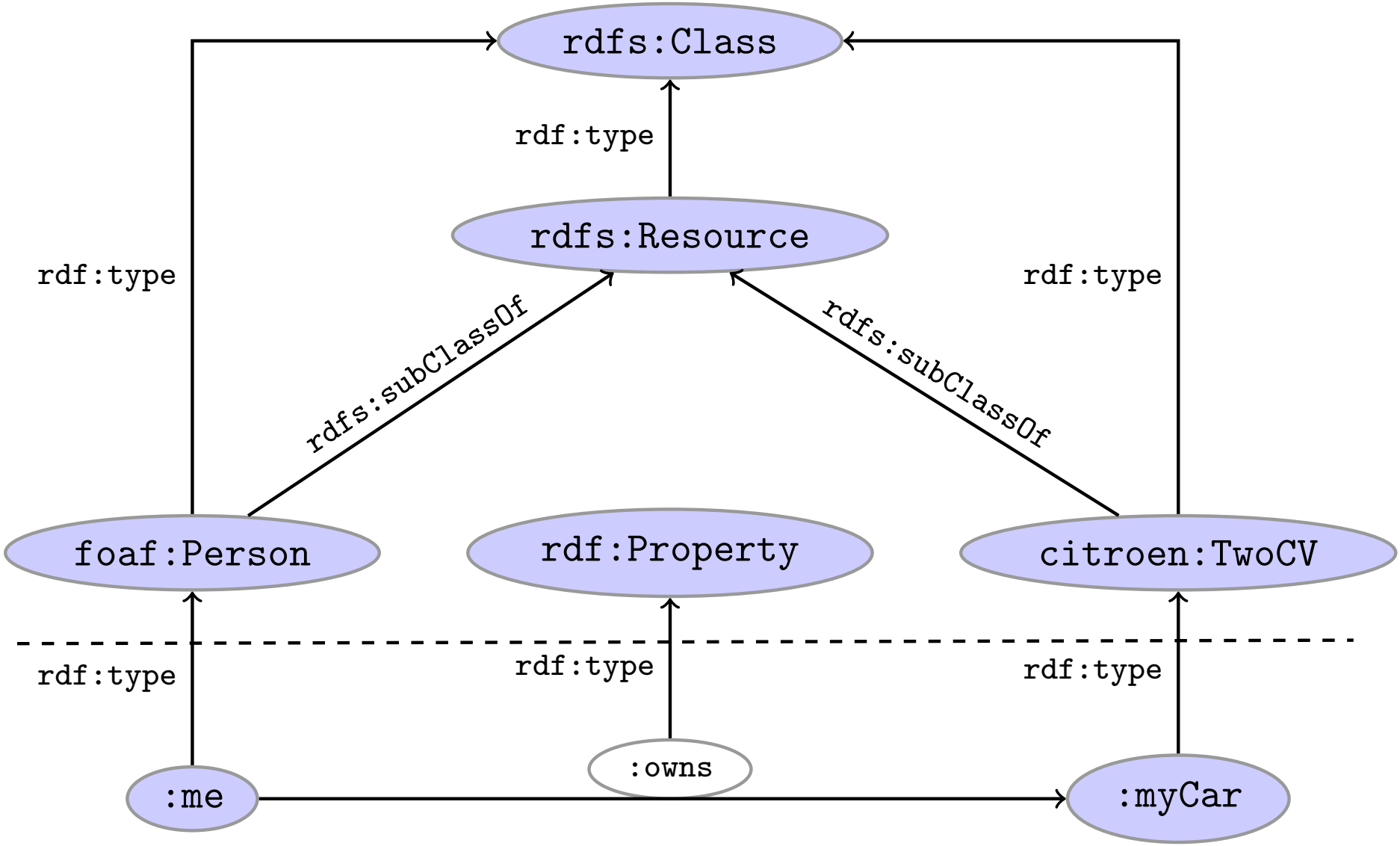
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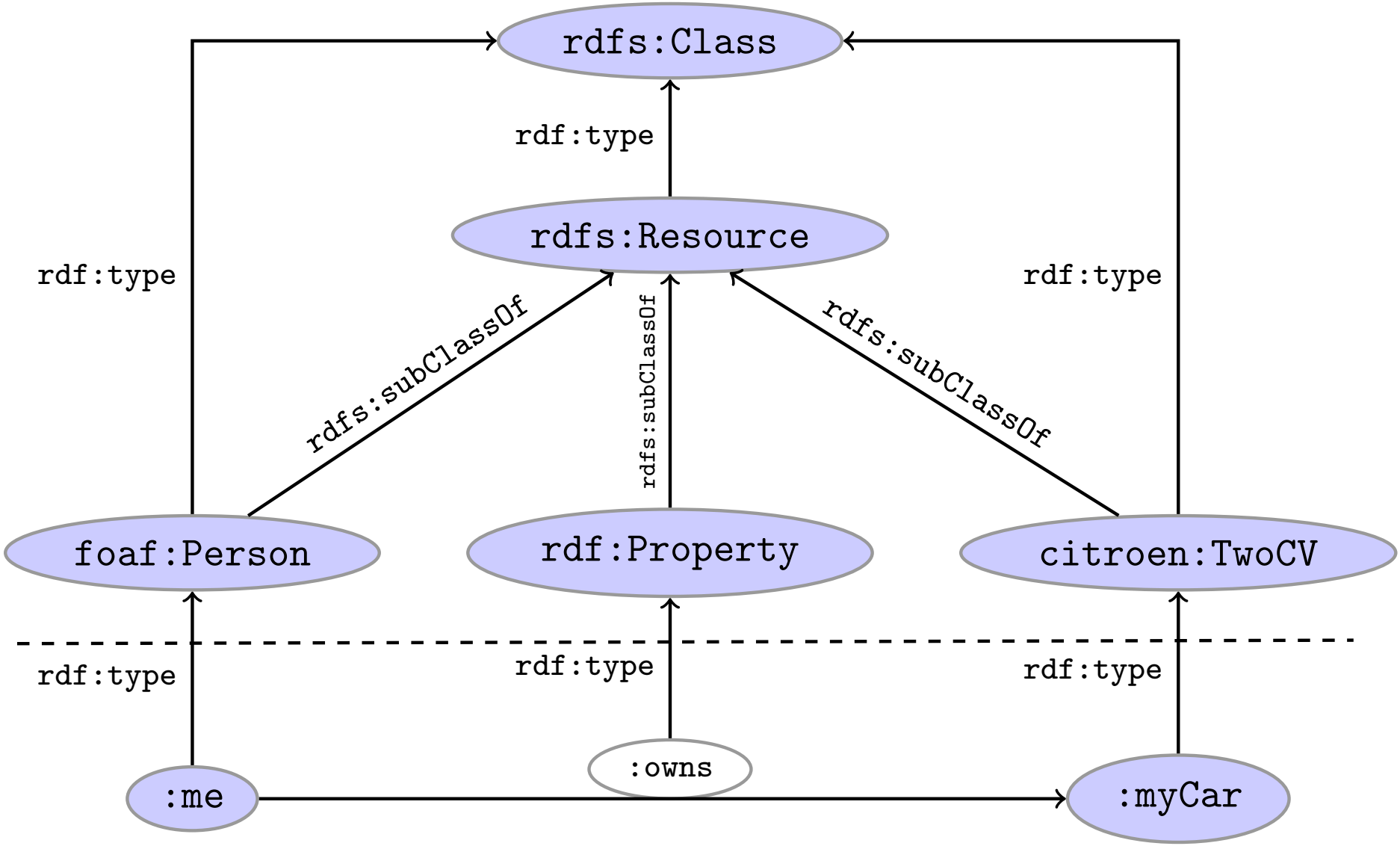
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- Extends RDFS with boolean operations, universal/existential restrictions, etc.

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- In OWL, classes can be combined to form new concepts
- Boolean combinations:
  - (foaf:Person and not gender:Female) or rodents:Mouse
  - All things which are either persons and not female or mice
- Existential restrictions:
  - foaf:knows some gender:Female
  - All things which know some (at least one) female being
- Universal restrictions:
  - foaf:knows only gender:Female
  - All things which know *only* female beings
- And a few more.

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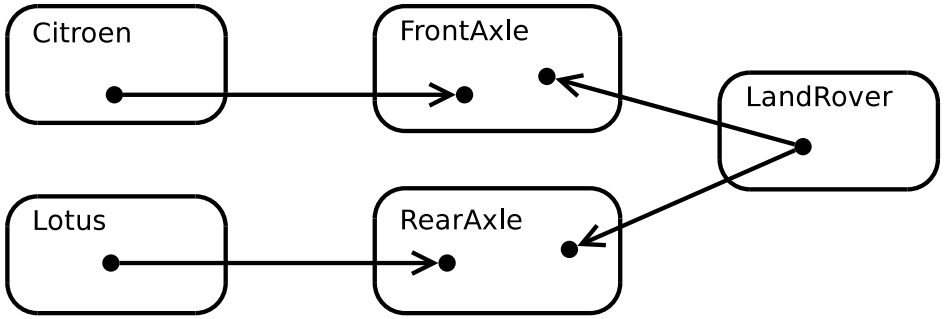
  - `:Woman owl:equivalentClass` (foaf:Person and gender:Female)

Example: Cars

- Assume:
  - All *Citroen* cars have one drive axle and that is the front axle
  - All *Lotus* cars have one drive axle and that is the rear axle
  - All *LandRover* cars have two drive axles, one front and one back



- Then the following axioms hold:
  - `:Citroen rdfs:subClassOf` (:driveAxle only :FrontAxle)
  - `:Lotus rdfs:subClassOf` (:driveAxle only :RearAxle)
  - `:LandRover rdfs:subClassOf` (:driveAxle some :FrontAxle and :driveAxle some :RearAxle)

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- Doesn't hurt

Demo: Using Protégé

- Create a Car class
- Create an Axle class
- Create FrontAxle and RearAxle as subclasses
- Make the axle classes disjoint
- Add a driveAxle object property
- Add domain Car and range Axle
- Add 2CV, subclass of Car
- Add superclass driveAxle only FrontAxle
- Add Lotus, subclass of Car
- Add superclass driveAxle only RearAxle
- Add LandRover, subclass of Car
- Add superclass driveAxle some FrontAxle
- Add superclass driveAxle some RearAxle
- Add 4WD as subclass of Thing
- Make equivalent to driveAxle some RearAxle and driveAxle some FrontAxle
- Classify.
- Show inferred class hierarchy: Car $\sqsupseteq$ 4WD $\sqsupseteq$ LandRover
- Tell story of 2CV Sahara, which is a 2CV with two motors, one front, one back
- Add Sahara as subclass of 2CV
- Add 4WD as superclass of Sahara
- Classify.
- Show that Sahara is equivalent to bottom.
- Explain why. In particular, disjointness of front and rear axles

Protégé Recap

- Almost like using an OO modeling tool
- Remember: In the end it's
  - OWL concept descriptions
  - `rdf:type`
  - `rdfs:subClassOf`
- Many ways of saying things in OWL, more in Protégé