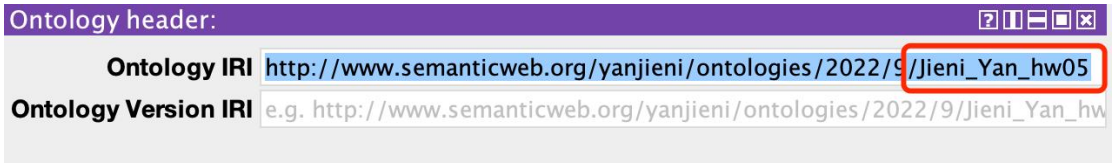
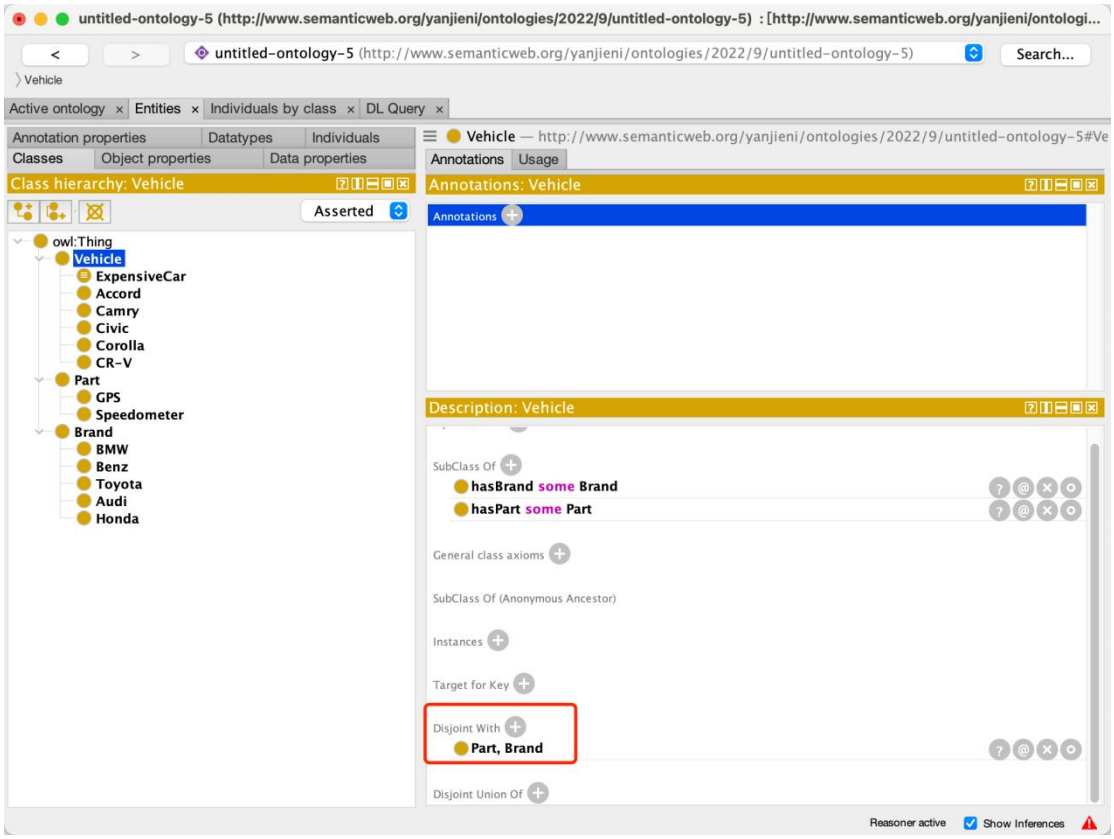
Task 1:

Task 1.1:

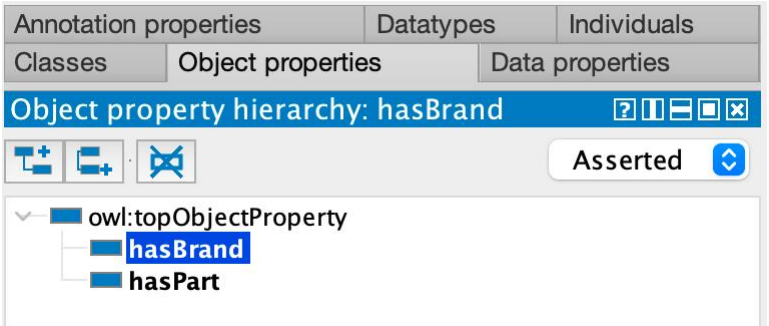
Rename the Ontology IRI. Since the instruction doesn't declare rename this IRI to which name, so I just rename it to Jieni_Yan_hw05.



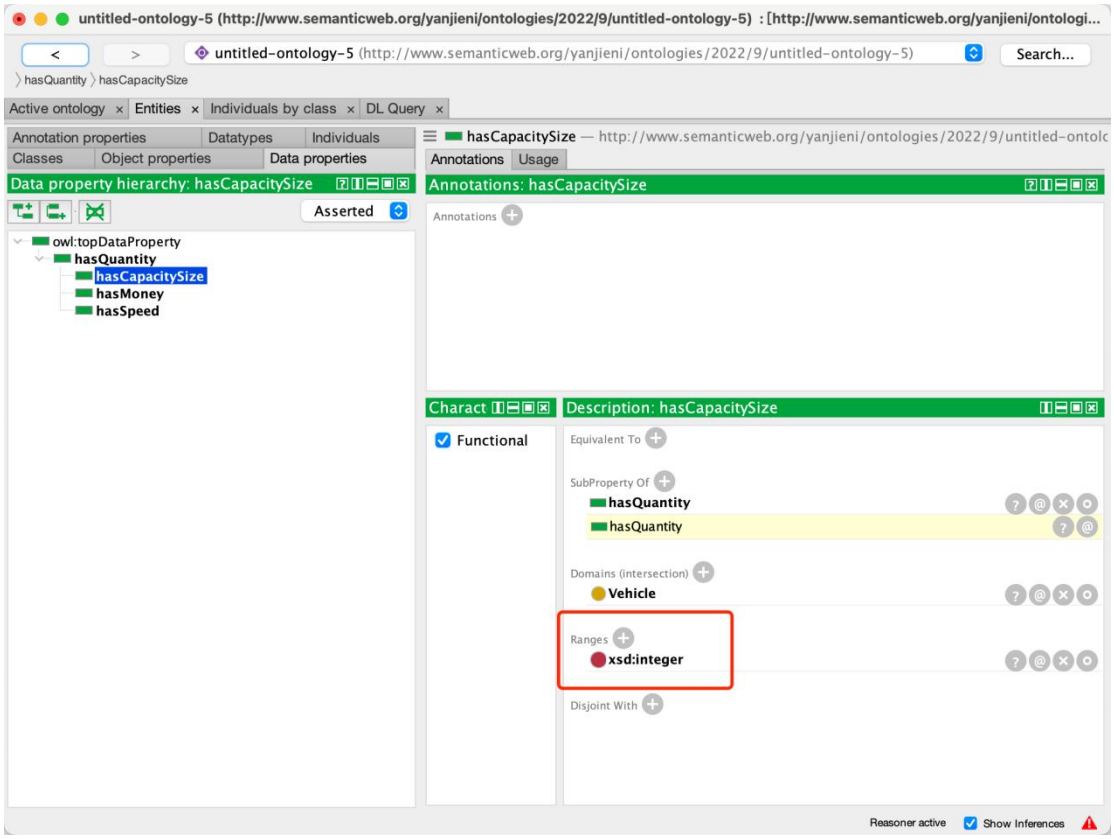
In Classes tab, using "create class hierarchy" to create Vehicle, Brand, Part, and the sub-classes under them. In Vehicle's description, click + button near "Disjoint with", and select Brand and Part as disjoint relation with Vehicle. After clicking synchronize reasoner, in Brand and Part's Description, the "Disjoint with" part is set automatically according to Vehicle.



In Object properties tab, using "create object properties hierarchy" to create hasBand and hasPart properties.

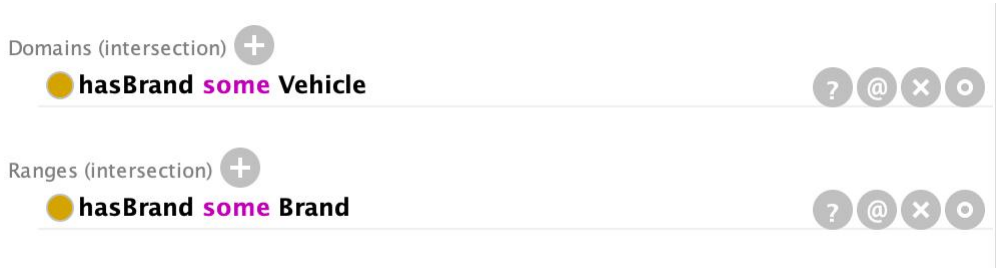


In Data properties tab, using “create data properties hierarchy” to create hasQuantity property and hasCapacitySize, hasMoney, hasSpeed under hasQuantity. For each property under hasQuantity, click + button near “Ranges” and add xsd:integer in build in datatype.



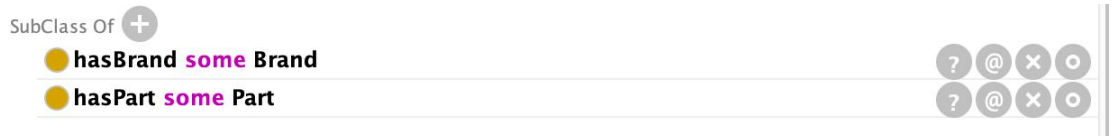
Task 1.2:

For hasBrand, click + button near “Domains” to add hasBrand some Vehicle. And click + button near “Ranges” to add hasBrand some Brand. Do similar thing for hasPart property. Although the instruction doesn't ask to set hasPart, I’d like to set it for consistent.



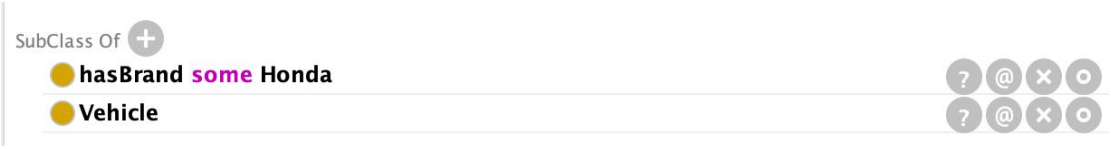
Then, set the Domains for hasSpeed properties as the instruction ask. Also for consistent, I set the Domains for hasCapacitySize and hasMoney.

To add a a restriction, in the class tab, click “SubClass of” in description in Vehicle. Add “hasBrand some Brand” and “hasPart Some Part”.

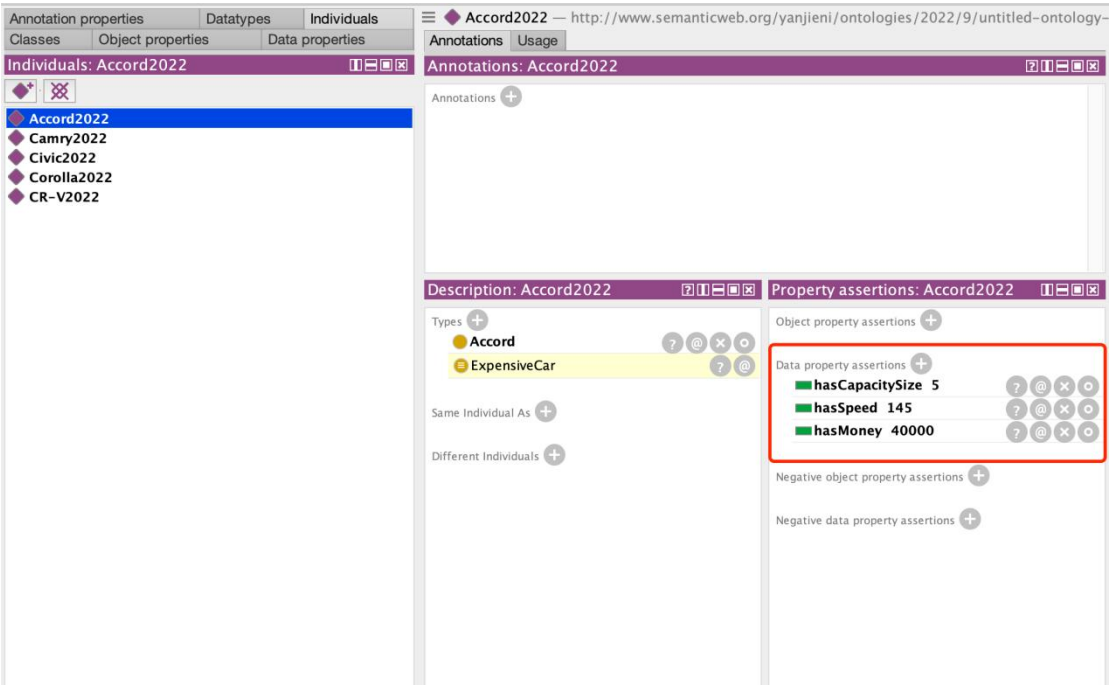


Task 1.3:

To add object property for each vehicle, I click the + button near the “SubClass of”. For Civic, Accord and CR-V, I add “hasBrand some Honda” to make sure it’s brand is Honda. For Camry and Corolla, I add “hasBrand some Toyota” to make sure it’s brand is Toyota.



To add data instance and data properties for each vehicle, I use the individuals tab. In this tab, I add Civic2022, Accord2022, Camry2022, Corolla2022, and CR-V2022. For each individual, in “Data property assertions”, I set the “hasCapacitySize”, “hasSpeed”, and “hasMoney” properties to the number as instruction ask.



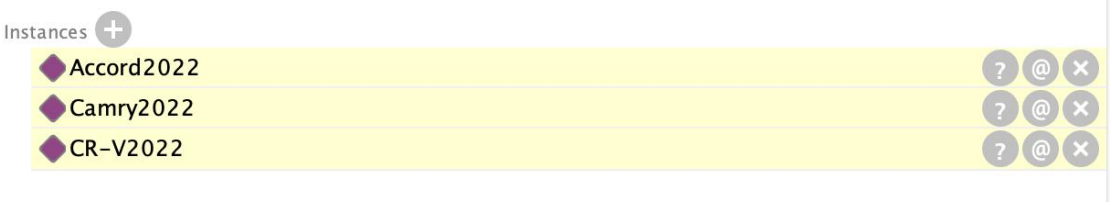
Then go back to class tab, for each vehicle, I click the + button near “Instances” and add the correct individual.

Task 1.4:

I create an ExpensiveCar class under Vehicle. Then I click the + button near “Equivalent

to" and add "Vehicle and (hasMoney some xsd:integer[>=40000])" in "class expression editor" tab.

Then, I click synchronize reasoner, three qualified instances automatically show up under "Instances".



Task 2.3:
F1 score = 0.94