ISIT315 Tutorial Task for Week 8

The following exercises consider some challenges that you want to consider when modelling ontology.

Task 1: Vegetarian ontology (Reference for this exercise see p.237-240 in on Chapter 11 of Semantic Web for the working ontologist: effective modeling in RDFS and OWL / Dean Allemang, Jim Hendler)

Using Protégé add the following:
:Person a owl:Class .
:Food a owl:Class .
:eats rdfs:domain :Person .
:eats rdfs:range :Food .

Now add two individuals to the class Thing:
Maverick
Steak

Add an object property assertion for Maverick:
:Maverick :eats :Steak

Run the reason? What is the result? Explain how the conclusion arrives? (hint: consider domain and range of object property eats)

Now add the following
:Vegetarian a owl:Class;
    rdfs:subClassOf :Person .
:VegetarianFood a owl:Class;
    rdfs:subClassOf :Food .

Now add the following:
:Jen a :Vegetarian;
    eats :Marzipan .

Run the reason? What is the result?
Question: Can you infer that Marzipan is a vegetarian food? (Yes/No) Explain your answer.

Task 2
Continue from Task 1, now we want to be able to infer that if
:Jen a :Vegetarian;
    eats :Marzipan .
then
:Marzipan a :VegetarianFood.

Your task: How do you change the ontology such that the above conclusion can be inferred? (hint: Use defined class)

Task 3
Using Protégé implement the following:
:City a owl:Class .
:Ocean a owl:Class .
:Paris a :City .
:Zurich a :City .
:SanDiego a :City .
:OceanPort rdfs:subClassOf :City .

:OceanPort owl:equivalentClass
[a owl:Restriction;
owl:onProperty :connectsTo;
owl:someValueFrom :Ocean] .
Add the following facts
:Zurich :connectsTo :RiverLimmat .
:Zurich :locatedIn Switzerland .
:Switzerland :borders :France .
:Paris :connectsTo :LaSeine .
:Paris :locatedIn :France .
:France :connectsTo :Mediterranean .
:France :connectsTo :AtlanticOcean .
:SanDiego :connectsTo :PacificOcean .
AtlanticOcean a :Ocean .
PacificOcean a :Ocean .

(note 1: you need to add properties and individuals such as France etc. If an individual is not specified as to which class it associated with, then assume that individual is a Thing.)
(note 2: put this rule in the Equivalent To section in the OceanPort class (do not use “Convert to Defined Class”)
:OceanPort owl:equivalentClass
[a owl:Restriction;
owl:onProperty :connectsTo;
owl:someValueFrom :Ocean] .)

Run the reasoner. What is the inference? (hint: you should see that France is inferred as an instance of OceanPort)
How do you fix it so that the correct inference is drawn? (i.e. France should not be inferred as an OceanPort because France is not a City.)

Task 4

Create an ontology model based on the following Figure 14.1 p.314 in on Chapter 14 of Semantic Web for the working ontologist: effective modeling in RDFS and OWL / Dean Allemang, Jim Hendler, you can download this book from library.

a). What is the problem that you can identify from this model?
b). Can you make any inference as a result of inferencing?
c). If you want to specify that Poets only wrote Poems, how do you change it?
d). Add the following facts:
:Homer a :Poet .
:Homer :wrote :TheIliad .
(note: TheIllid should be an instance of the :Thing)
Run the reasoner, what inference can you made?
e). Add the following facts (before continue, remove the instance Homer and TheIlliad from the ontology):
:Poet owl:equivalentClass [a owl:Restriction;
owl:OnProperty :wrote;
owl:someValuesFrom :Poem] .
:TheIliad a :Poem
:Homer :wrote :TheIliad .
(note: Homer should be an instance of the :Thing)
Run the reasoner, what inference can you made? Why do you need to add the equivalentClass in this example?

f). What other inferred assertions you can see after (e) is run? (hint: look at Shakespeare class and instance for :Thing).
g). In this example, do you think Shakespeares should be a class or an instance? Explain your answer.