Oblig 5

IN3060

1.Model Semantics

1.1 Exercise: Interpretation

1. Create an interpretation I_1 such that $I_1 \models \Gamma_1$.
   $\Delta^I = \{A,B,C,D,E\}$
   :Tweety^I = A, :Bruce^I = B, :JollyJumper^I = C
   :Animal^I = {A, B, C}
   :Vegetable^I = :Food^I = {D, E}
   :Penguin^I = :Bird^I = {A}, :Fish^I = {B}, :Horse^I = {B,C}
   :favouriteFood^I = :eats^I = {⟨A,B⟩, ⟨C,E⟩}
   :likes^I = {⟨C,A⟩}
   :hasNickname^I = {⟨C, "JJ"⟩, ⟨B,"Alonso"⟩}

2. Create an interpretation $\mathcal{I}_2$ such that $\mathcal{I}_2$ |=(not) Γ_1.
   -Not sure how to do this, but I just switched some of the symbols.
   $\Delta^I = \{A,B,C,D,E\}$
   :Tweety^I = A, :Bruce^I = B, :JollyJumper^I = C
   :Animal^I = {D, E}
   :Vegetable^I = :Food^I = {A, B, C}
   :Penguin^I = :Bird^I = {A}, :Fish^I = {B}, :Horse^I = {B,C}
   :favouriteFood^I = :eats^I = {⟨B,A⟩, ⟨E,C⟩}
   :likes^I = {⟨C,A⟩}
   :hasNickname^I = {⟨C, "JJ"⟩, ⟨B,"Alonso"⟩}

1.2 Exercise: Entailment

1. <u>:Tweety is an animal.</u>
   - :Penguin rdfs:subClassOf :Bird – P
   - :Tweety a :Penguin – P
   - :Tweety a :Bird – 1, 2, rdfs 9
   - :Bird rdfs:subClassOf :Animal – P
   - :Tweety a :Bird – P
   - :Tweety a :Animal – 4, 5, rdfs9
2. <u>:Tweety likes :JollyJumper.</u> - Countermodel
   Interpretation in Ex 1.1.1:
   - :likes^I = {⟨C,A⟩}.

   Interpretation of ":Tweety likes :JollyJumper":
   - :likes^I = {⟨A,C⟩}

   ⟨A,C⟩ is not in :likes^I in the interpretation in Exercise 1.1.1, so the interpretation does not entail the statement :Tweety likes :JollyJumper.

3. :Food is the range of :favouriteFood.
   {rg(:eats, :Food), :favouriteFood ‘subPropertyOf’ :eats} |= rg(:favouriteFood, :Food).

4. :Bruce has some favourite food. – Countermodel
   Interpretation in Ex 1.1.1:
   - :favouriteFood^{I} = {⟨A,B⟩, ⟨C,E⟩}

   Interpretation of ":Bruce has some favourite food":
   - :favouriteFood^{I} = ⟨B,E⟩

   ⟨B,E⟩ is not in :favouriteFood^{I} in the interpretation in Exercise 1.1.1, so the interpretation does not entail the statement ":Bruce has some favourite food".

5. :Bruce is a vegetable. – Countermodel
   Interpretation in Ex 1.1.1:
   - :Vegetable^{I} = {D, E}

   Interpretation of ":Bruce is a vegetable":
   - :Vegetable^{I} = B

   B is not in :Vegetable^{I} in the interpretation in Exercise 1.1.1, so the interpretation does not entail the statement ":Bruce is a vegetable".

6. :Bruce is a horse.
   :hasNickname rdfs:domain Horse – P
   :Bruce :hasNickname "Alonso"^^xsd:string – P
   :Bruce a :Horse – 1, 2, rdfs2
7. :Bruce is a fish.
   :Bruce rdf:type :Fish

2.Semantic web and reasoning

1. "Closed world assumption" is an assumption that what we know is true and what we don't know to be true is false. "Open world assumption" is the opposite of the "closed world assumption", and it states that the lack of knowledge of something to be false, doesn't imply that it is false.
I think the "Closed world assumption" may be used in the semantic web, because we have the negation to state that something is false if it isn't true.

2. "Unique name assumption" is the assumption that different names *always* refer to different things, while "Non-unique name assumption" is the assumption that different names do not need to refer to different things. The "non-unique name assumption" is used in the semantic web, because we have different methods for expressing whether different names refer to the same or different entities.

3. "Forward rule chaining" is reasoning beginning with premises that leads to conclusions and facts are added to be stored and reused. "Backward rule chaining" is reasoning from conclusions to the premises and finding out what needs to be true for the conclusion to hold.

4. That the RDFS entailment rules are sound with respect to the RDFS semantics means that every conclusion P derivable in the calculus from a set of premises Γ is true in all interpretations that satisfy Γ.

5. That the RDFS entailment rules are not complete with respect to the RDFS semantics means that the every statement P entailed by Γ-interpretations is not derivable in the calculus when the elements of Γ are used as premises.