

COMP 474/6741 Intelligent Systems (Winter 2022)

Worksheet #2: Vocabularies & Ontologies



Task 1. Quick refresher: Using the N-Triples serialization format, write an RDF triple describing Concordia's homepage:

.....

Task 2. Define the fact that `Student` is a `class` (as opposed to an instance, like *Jane*). Use Turtle format with the following prefix definitions and define `Student` as part of the `ex` namespace (`ex:Student`):

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .  
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .  
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .  
@prefix ex: <http://example.org/> .
```

Add the triple:
and draw the resulting graph:

Task 3. Now add another triple stating that Jane (`ex:jane#me`) is of type `ex:Student`:

.....

and add it to the graph above.

Task 4. It is good practice to give every IRI a human-readable label (where appropriate). Add two `rdfs:label` triples (in English and French) for “Student”:

1.
2.

(Similarly, you would define an `rdfs:comment` to explain what it means to be a student.)

Task 5. For now at least, every *Student* is a *Person* (sorry, robots!). Define this fact as a triple (use `foaf:Person`) and add it to your graph above:

.....

Construct	Syntactic form	Description
Class (a class)	C rdf:type rdfs:Class	C (a resource) is an RDF class
Property (a class)	P rdf:type rdf:Property	P (a resource) is an RDF property
type (a property)	I rdf:type C	I (a resource) is an instance of C (a class)
subClassOf (a property)	C1 rdfs:subClassOf C2	C1 (a class) is a subclass of C2 (a class)
subPropertyOf (a property)	P1 rdfs:subPropertyOf P2	P1 (a property) is a sub-property of P2 (a property)
domain (a property)	P rdfs:domain C	domain of P (a property) is C (a class)
range (a property)	P rdfs:range C	range of P (a property) is C (a class)

Task 6. Ok, let's look at these three triples (written in pseudocode for brevity):

```
<LS-210> <teaches> <COMP472/6721> .
<professor> <is a> <slide> .
<student> <handed in by> <assignment> .
```

Are these *syntactically* legal triples? (Spoiler alert: yes, we could write each of them using perfectly fine RDF URIs.) So what exactly is wrong here?

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Task 7. We now define a *property*, **studiesAt**, so that we can indicate at which university a student is studying. Write the triple defining **studiesAt** as a property (again using the **ex:** namespace):

.....

(Note: properties should also have labels & comments, but we omit this here.)

Task 8. We now have to add *domain and range restrictions* for our property to avoid problems like the ones in Task 6 above. For the *domain* of our **studiesAt** property, we only permit **ex:Student** resources and for the *range*, we only admit **ex:University** resources. Write the two triples:

1.
2.



Task 9. A widely used vocabulary for describing people and their (social) networks is *Friend-of-a-Friend* (FOAF), which you've seen before:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

1. Assume *Joe* has a photo of him published under **http://facebook.me/joe.png** (not a real URL). How can you add this information to the knowledge graph using FOAF (hint: look up the vocabulary using the prefix URL above):
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2. Again using FOAF, model that *Jane* is 22 years old:
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