

# COMP 474/6741 Intelligent Systems (Winter 2021)

## Worksheet #2: Vocabularies & Ontologies



**Task 1.** Quick refresher: Using the N-Triples serialization format, write an RDF triple describing the *city* Concordia is location in:

.....

**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 and add it to your graph above:

.....

Construct	Syntactic form	Description
<a href="#">Class</a> (a class)	<b>C</b> <b>rdf:type</b> <b>rdfs:Class</b>	<b>C</b> (a resource) is an RDF class
<a href="#">Property</a> (a class)	<b>P</b> <b>rdf:type</b> <b>rdf:Property</b>	<b>P</b> (a resource) is an RDF property
<a href="#">type</a> (a property)	<b>I</b> <b>rdf:type</b> <b>C</b>	<b>I</b> (a resource) is an instance of <b>C</b> (a class)
<a href="#">subClassOf</a> (a property)	<b>C1</b> <b>rdfs:subClassOf</b> <b>C2</b>	<b>C1</b> (a class) is a subclass of <b>C2</b> (a class)
<a href="#">subPropertyOf</a> (a property)	<b>P1</b> <b>rdfs:subPropertyOf</b> <b>P2</b>	<b>P1</b> (a property) is a sub-property of <b>P2</b> (a property)
<a href="#">domain</a> (a property)	<b>P</b> <b>rdfs:domain</b> <b>C</b>	domain of <b>P</b> (a property) is <b>C</b> (a class)
<a href="#">range</a> (a property)	<b>P</b> <b>rdfs:range</b> <b>C</b>	range of <b>P</b> (a property) is <b>C</b> (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?

.....

**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):
- .....

2. Again using FOAF, model that *Jane* is 22 years old:
- .....