

# Web semantics – Homework assignment

Due by May 3<sup>rd</sup>

*(The three parts A, B and C are independant.)*

Consider the ontology described by the following triplet model :

```
(Guitar,is_subclass_of,Instrument)
(i3,is_of_class,Violin)
(p2,has_name,"Arthur")
(p1,is_of_class,Person)
(Violin,is_subclass_of,Instrument)
(i2,is_of_class,Bass)
(i2,has_color,"red")
(p2,plays,i3)
(Instrument,is_subclass_of,Object)
(p1,has_name,"Sarah")
(i1,is_of_class,Guitar)
(p2,is_of_class,Person)
(p1,is_friend_with,p2)
(p1,plays,i1)
(i1,has_number_of_strings,7)
(p2,is_friend_with,p1)
(Person,is_subclass_of,Object)
(Bass,is_subclass_of,Instrument)
(p1,plays,i2)
```

## Preliminaries

1. List all the individuals, all the properties, and all the classes used in this ontology.

## Part A – Properties of properties

2. Give an example of symmetric property in this ontology.
3. Is the property `plays` functional here? Justify. Is it inverse functional?
4. Explain why `is_subclass_of` is not transitive in this ontology. Which triplets should be added to make it transitive?

## Part B – Conversion to Description Logic

In this part, all individuals, properties, and classes found in question 1. are considered to be respectively individual names, relations and atomic concepts in a Description Logic.

5. Write a TBox encoding the hierarchy of classes in the ontology.
6. Write a ABox encoding the relations between individuals and the class membership of individuals in the ontology.

## Part C – Extending the model

7. There is a person whose name is Bart and who plays a five string bass; and Sarah and he are friends. Write some triplets to add this new information into the ontology.
8. We want to refine the classification of instruments in the ontology by stating that guitar and bass are plucked string instruments, while violin is a bowed string instrument; both new classes being subclasses of **Instrument**. Write some triplets to encode this new classification.