

RDFS exercises

Exercise 1

Consider the following RDFS ontology:

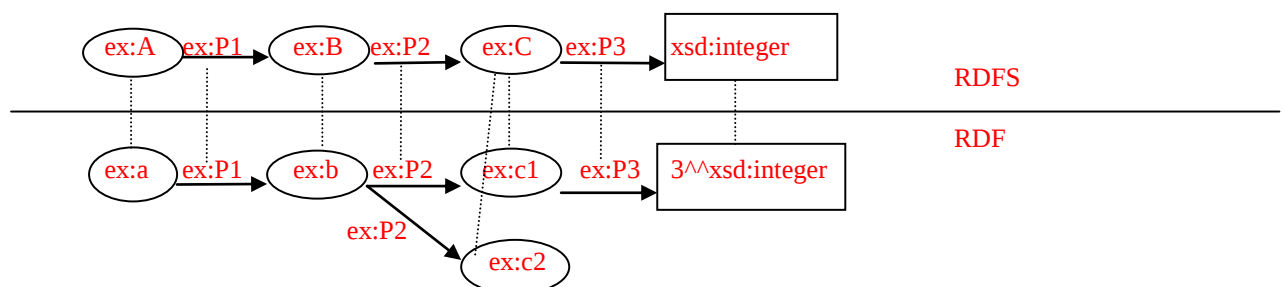
```
prefix ex:, namespace URI: http://www.exemple.org
prefix rdf:, namespace URI: http://www.w3.org/1999/02/22-rdf-syntax-ns#
prefix rdfs:, namespace URI: http://www.w3.org/2000/01/rdf-schema#
prefix xsd:, namespace URI: http://www.w3.org/2001/XMLSchema#
```

```
ex:A rdf:type rdfs:Class .
ex:B rdf:type rdfs:Class.
ex:C rdf:type rdfs:Class.
ex:B rdfs:subClassOf ex:A .
ex:C rdfs:subClassOf ex:B .
```

```
ex:P1 rdf:type rdf:Property .
ex:P1 rdfs:domain ex:A .
ex:P1 rdfs:range ex:B .
ex:P2 rdf:type rdf:Property.
ex:P2 rdfs:domain ex:B .
ex:P2 rdfs:range ex:C .
ex:P2 rdfs:subPropertyOf ex:P1 .
ex:P3 rdf:type rdf:Property .
ex:P3 rdfs:domain ex:C .
ex:P3 rdfs:range xsd:integer .
ex:P3 rdfs:subPropertyOf ex:P2 .
```

```
ex:a rdf:type ex:A .
ex:b rdf:type ex:B .
ex:c1 rdf:type ex:C .
ex:c2 rdf:type ex:C .
ex:a ex:P1 ex:b .
ex:b ex:P2 ex:c1 .
ex:c1 ex:P3 3^^xsd:integer.
```

Draw the corresponding RDFS and RDF graphs.



Exercise 2

Consider the following RDFS ontology:

```
prefix pe:, namespace URI: http://www.personne.org
prefix rdf:, namespace URI: http://www.w3.org/1999/02/22-rdf-syntax-ns#
prefix rdfs:, namespace URI: http://www.w3.org/2000/01/rdf-schema#
prefix xsd:, namespace URI: http://www.w3.org/2001/XMLSchema#
```

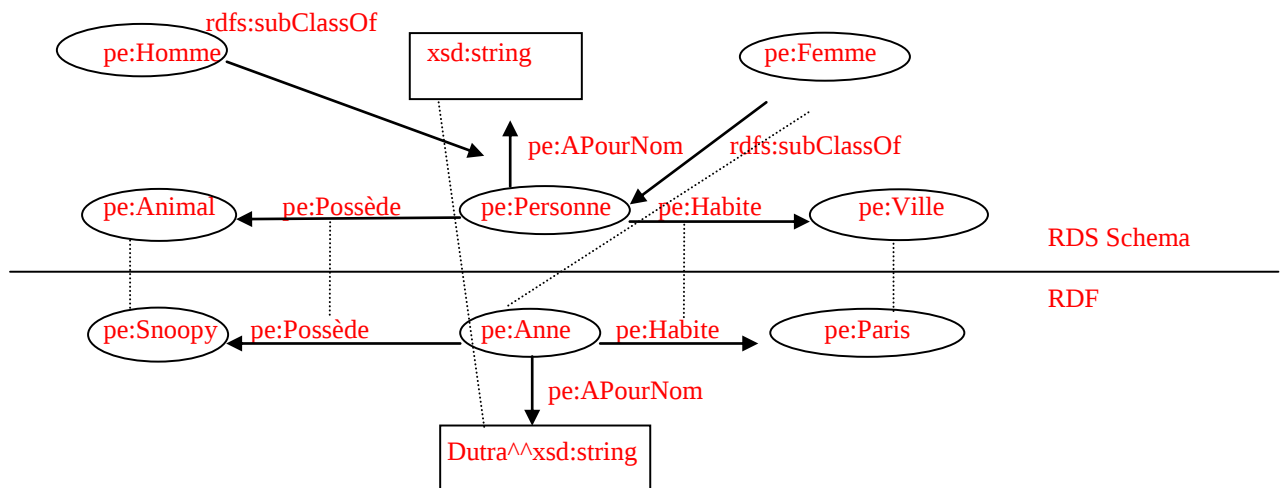
```
pe:Animal rdf:type rdfs:Class .
pe:Personne rdf:type rdfs:Class.
pe:Femme rdf:type rdfs:Class.
pe:Homme rdf:type rdfs:Class.
pe:Ville rdf:type rdfs:Class.
pe:Femme rdfs:subClassOf ex:Personne .
pe:Homme rdfs:subClassOf ex:Personne .
```

```
pe:Habite rdf:type rdf:Property .
pe:Habite rdfs:domain pe:Personne .
pe:Habite rdfs:range pe:Ville .
pe:APourNom rdf:type rdf:Property .
pe:APourNom rdfs:domain pe:Personne .
pe:APourNom rdfs:range xsd:string .
pe:Possède rdf:type rdf:Property.
pe:Possède rdfs:domain pe:Personne .
pe:Possède rdfs:range pe:Animal .
```

```
pe:Snoopy rdf:type ex:Animal .
pe:Anne rdf:type ex:Femme .
pe:Paris rdf:type ex:Ville .
pe:Anne ex:Habite ex:Paris .
pe:Anne ex:APourNom Dutra^^xsd:string .
pe:Anne ex:Possède ex:Snoopy .
```

Draw the corresponding RDFS and RDF graphs.

Draw the corresponding RDFS and RDF graphs.



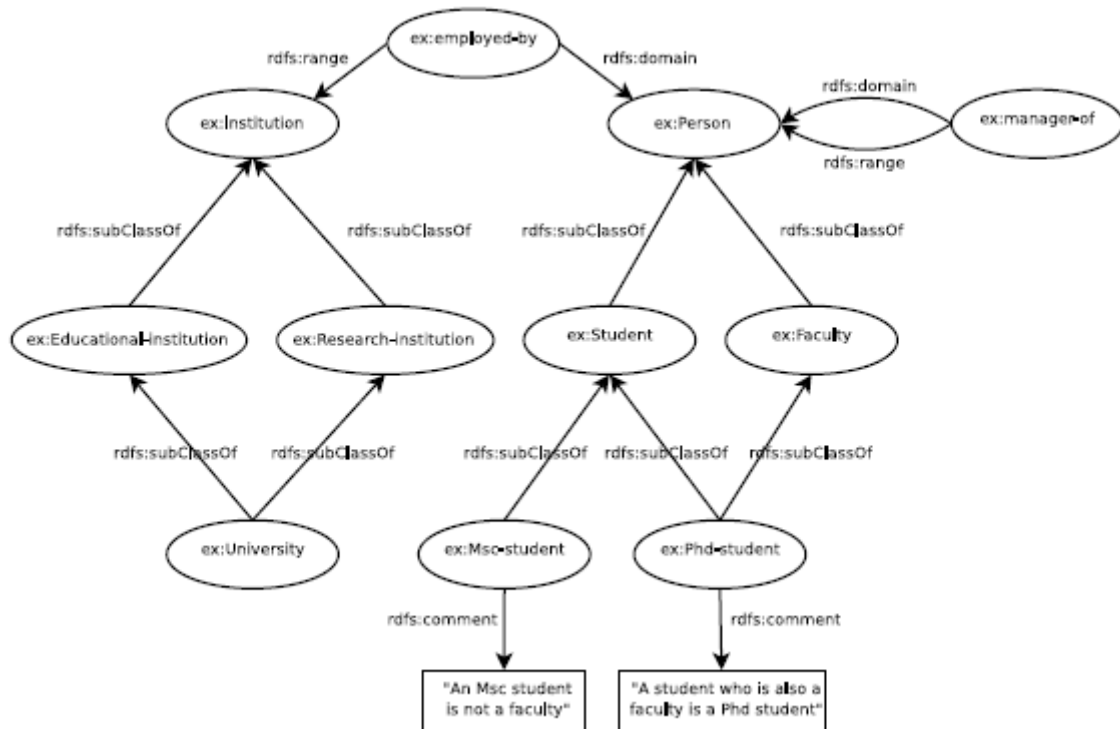
Exercise 3

Create an RDFS ontology (in triple or graph notation) about Persons and Universities. Create at least 3 classes and at least 2 properties; use at least 2 *subClassOf* statements.

```

ex:Research-institution rdfs:subClassOf ex:Institution
ex:Educational-institution rdfs:subClassOf ex:Institution
ex:University rdfs:subClassOf ex:Research-institution
ex:University rdfs:subClassOf ex:Educational-institution
ex:Faculty rdfs:subClassOf ex:Person
ex:Student rdfs:subClassOf ex:Person
ex:Phd-Student rdfs:subClassOf ex:Faculty
ex:Phd-Student rdfs:subClassOf ex:Student
ex:Msc-Student rdfs:subClassOf ex:Student
ex:Msc-Student rdfs:comment "An Msc student is not
a faculty"
ex:Phd-Student rdfs:comment "A student who is also a
faculty is a PhD Student"
ex:employed-by rdfs:domain ex:Person
ex:employed-by rdfs:range ex:Institution
ex:manager-of rdfs:domain ex:Person
ex:manager-of rdfs:range ex:Person

```



```
<ENTITY ex "http://example.org/#">
```

```
<ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#">
```

```
<rdf:RDF
```

```
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:ex="http://example.org/#">
```

```
<rdfs:Class rdf:about="&ex;Research-institution">
  <rdfs:subClassOf rdf:resource="&ex;Institution"/>
</rdfs:Class>
```

```
<rdfs:Class rdf:about="&ex;Educational-institution">
  <rdfs:subClassOf rdf:resource="&ex;Institution"/>
</rdfs:Class>
```

```
<rdfs:Class rdf:about="&ex;University">
  <rdfs:subClassOf rdf:resource="&ex;Research-institution"/>
  <rdfs:subClassOf rdf:resource="&ex;Educational-institution"/>
</rdfs:Class>
```

```
<rdfs:Class rdf:about="&ex;Faculty">
  <rdfs:subClassOf rdf:resource="&ex;Person"/>
</rdfs:Class>
```

```
<rdfs:Class rdf:about="&ex;Student">
  <rdfs:subClassOf rdf:resource="&ex;Person"/>
</rdfs:Class>
```

```

<rdfs:Class rdf:about="&ex;Phd-Student">
  <rdfs:subClassOf rdf:resource="&ex;Student"/>
  <rdfs:subClassOf rdf:resource="&ex;Faculty"/>
  <rdfs:comment>A student who is also a faculty is a PhD Student</rdfs:comment>
</rdfs:Class>

<rdfs:Class rdf:about="&ex;Msc-Student">
  <rdfs:subClassOf rdf:resource="&ex;Student"/>
  <rdfs:comment>An Msc student is not a faculty</rdfs:comment>
</rdfs:Class>

<rdf:Property rdf:about="&ex;employed-by">
  <rdfs:domain rdf:resource="&ex;Person"/>
  <rdfs:range rdf:resource="&ex;Institution"/>
</rdf:Property>

<rdf:Property rdf:about="&ex;manager-of">
  <rdfs:domain rdf:resource="&ex;Person"/>
  <rdfs:range rdf:resource="&ex;Person"/>
</rdf:Property>

</rdf:RDF>

```

Exercise 4

Extend your ontology of exercise 3 to include a set of instances, i.e., a number of persons and a number of universities. You can use either triple, graph or RDF/XML notation. Make sure you include at least one container or collection and include at least one literal.

```

ex:UIBK rdf:type ex:University
ex:josdebruijn rdf:type ex:Phd-Student
ex:josdebruijn ex:employed-by ex:UIBK
ex:josdebruijn rdfs:label "Jos de Bruijn"
ex:dieter ex:manager-of _:x
_:x rdf:type rdf:Bag
_:x rdf:_1 ex:josdebruijn
_:x rdf:_2 ex:holgerlausen

```

Write down all additional statements which can be derived (are entailed by) from your instance data of the previous exercise, combined with the ontology from exercise (1)

```

ex:UIBK rdf:type ex:University
ex:josdebruijn rdf:type ex:Phd-Student
ex:josdebruijn ex:employed-by ex:UIBK
ex:dieter ex:manager-of ex:josdebruijn

```

```

ex:dieter rdf:type ex:Person
ex:josdebruijn rdf:type ex:Student
ex:josdebruijn rdf:type ex:Faculty
ex:josdebruijn rdf:type ex:Person
ex:UIBK rdf:type ex:Research-institution
ex:UIBK rdf:type ex:Educational-institution

```

ex:UIBK rdf:type ex:Institution

Exercise 5

Model the very simple RDFS ontology described below:

- A pizza has a base and a topping.
- We distinguish two kinds of pizza base: Deep pan base, and Thin and Crispy base.
- We distinguish four kinds of pizza topping: Cheese, Meat, Seafood and Vegetable toppings.
- We consider three kinds of pizza: Cheesy, Named and Vegetarian.
- We distinguish four kinds of named pizza: American, AmericanHot, Margherita, and Soho.