Remember that you can use your Laptop, i.e. you can use your Laptop to look up the lecture slides, the Internet to look up RDFS or OWL2 Definitions or validate your RDFS, or Protégé to generate valid Functional Syntax. Because of this, we also expect correct syntax from you!

1) Express the following statements about the Best Exotic Majpoor Home for the Elderly and Beautiful in RDFS:

   a) Residents as well as Carers are Persons (1pt)

   Ex:Resident rdfs:SubClassOf ex:Person
   Ex:Carer rdfs:SubClassOf ex:Person

   b) Residents inhabit Suites (1pt) Hint: Use a domain and range statement on the property “inhabits”

   Ex:inhabits rdfs:domain ex:Resident
   Ex:inhabits rdfs:range ex:Suite
2) Express the following statement about the Best Exotic Majpoor Home for the Elderly and Beautiful in OWL2 using the Functional Syntax used also in the lecture. Hint: You can use Protégé 4.1 to express the statements and transcribe the functional syntax, or you look up the functional syntax in the web) (3pt):

Every Care Home Resident inhabits exactly one Suite, and each Suite is inhabited by 3-5 residents.

Use the following class names: “ex:Resident” for care home residents, “ex:Suite” for care home suites. Use the following property names: “ex:inhabits” and “ex:is-inhabited-by”

Make sure to express cardinality and existence.

Hint: Express Care Home Resident as subclass of the class of things that inhabit exactly one Suite, and in analogy Suites as subclass of things that are inhabited by 3-5 residents.

| Every Care Home Resident inhabits exactly one Suite: |
| SubClassOf(:Resident ObjectExactCardinality(1 inhabits :Suite)) |
| or |
| SubClassOf(:Resident ObjectMinCardinality(1 inhabits :Suite)) |
| SubClassOf(:Resident ObjectMaxCardinality(1 inhabits :Suite)) |

| Each Suite is inhabited by 3-5 residents: |
| SubClassOf(:Suite ObjectMinCardinality (3 is-inhabited-by Resident)) |
| SubClassOf(:Suite ObjectMaxCardinality (5 is-inhabited-by Resident)) |
3) In the two examples below, you are shown RDFS triples. In each example, one entity is bold. Please state the type(s) of this entity. (2pts)

a) `ex:talk` rdfs:subPropertyOf `ex:talk`

- `rdf:Property`
- `rdfs:Resource`

b) `ex:talk` rdfs:domain `ex:Person`

- `rdfs:Class`
- `rdfs:Resource`
4) Given the following data, and the chosen ER model: Which of the RDFS triples below express the chosen ER model? Which of the OWL2 axioms below express the chosen ER model? (Note that the triples and axioms do not fully express the graphical ER model) (6pts)

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### RDFS

**a)** `ex:Library rdfs:subClassOf ex:PublicInstitution` ✗

**b)** `ex:PublicInstitution rdfs:subClassOf ex:Library` ❏

**c)** `ex:has-coordinates rdfs:domain ex:PublicInstitution` ✗

**d)** `ex:has-coordinates rdfs:domain ex:Coordinate` ❏

**e)** `ex:has-coordinates rdfs:range ex:PublicInstitution` ❏

**f)** `ex:has-coordinates rdfs:range ex:Coordinate` ✗
VU Semantic Technologies, RDFS and OWL

**OWL2**

- g) SubClassOf(ex:Library ex:PublicInstitution)
- h) SubClassOf(ex:PublicInstitution ex:Library)
- i) ObjectPropertyDomain(ex:has-coordinate ex:PublicInstitution)
- j) ObjectPropertyDomain(ex:has-coordinate ex:Library)
- k) ObjectPropertyRange(ex:has-coordinate ex:PublicInstitution)
- l) ObjectPropertyRange(ex:has-coordinate ex:Coordinate)