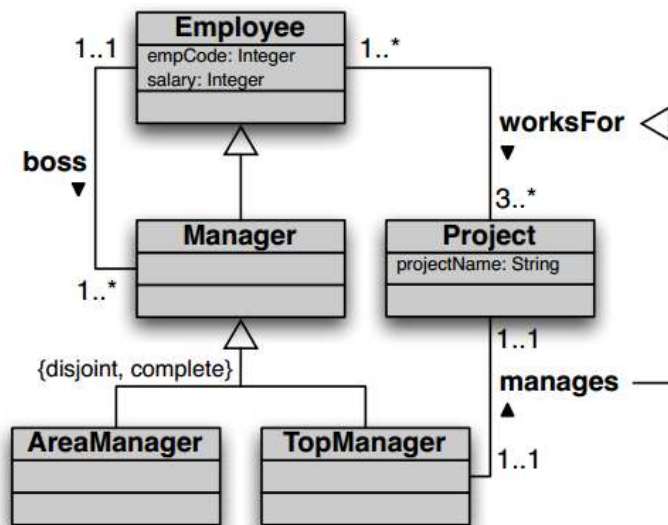


Translate to OWL the following constraints represented in the UML class diagram below:



First, you must be aware that OWL is nothing else than syntactic sugar for Description Logics. OWL is a knowledge graph Language and therefore, uses the URI and triple concepts introduced by RDF and reuses the `rdfs:subClassOf`, `rdfs:subPropertyOf`, `rdfs:domain` and `rdfs:range` RDFS properties. It also introduces its own metamodel with several new classes such as `owl:Class` and `owl:datatypeProperty` and `owl:objectProperty`.

Following the OWL slides, given a DL solution, you can straightforwardly generate the OWL representation. Thus, first check and understand the DL solution for the exercise above previously discussed in the course.

OWL Solution

Consider the URL <https://www.upc.edu/sdm/> (alias *sdm*) to be used in this exercise.

1) Class taxonomies

`sdm:Manager rdfs:subClassOf sdm:Employee`

`sdm:AreaManager rdfs:subClassOf sdm:Manager`

`sdm:TopManager rdfs:subClassOf sdm:Manager`

- Disjointness:

`_:c owl:complementOf sdm:TopManager`

`sdm:AreaManager rdfs:subClassOf _:c`

- Completeness:

`_:b owl:unionOf (sdm:AreaManager, sdm:TopManager)`

`sdm:Manager rdfs:subClassOf _:b`

2) Property taxonomies

`sdm:manages rdfs:subPropertyOf sdm:worksFor`

3) Relationships / roles

We will take as example the sdm:worksFor role. You should proceed similarly with the other roles.

- Domain:

sdm:worksFor rdfs:domain sdm:Employee

- Range:

sdm:worksFor rdfs:range sdm:Project

- An employee related to at least 3 projects (cardinality constraint):

__a rdfs:subClassOf owl:Restriction

__a owl:onProperty sdm:worksFor

__a owl:minCardinality 3

Sdm:Employee rdfs:subClassOf __a

- A project having at least one employee (cardinality constraint):

sdm:hasEmployee owl:inverseOf sdm:worksFor

__d rdfs:subClassOf owl:Restriction

__d owl:onProperty sdm:hasEmployee

__d owl:minCardinality 1

sdm:Project rdfs:subClassOf __d

sdm:worksFor rdf:type owl:objectProperty (not needed if inference is activated and domain / range defined)

Note: Remember UML attributes are represented with owl:datatypeProperty (thus, as roles)

