

## Exercise 4

- (a) Write an RDF/RDFS model representing the following statements about URIs Employee, Manager, Division, TopManager, Person, Man, Woman, City, livesIn, worksWith, isManagerOf, leadsDivision, worksInDivision, locatedIn, Ann, Bob, Jane, Joe, Rome, Naples, Milan, ABC, XYZ.

1. Employee, Manager, TopManager, Division, Man, Woman and City are classes;
2. TopManager is a subclass of Manager which is a subclass of Employee;

3. worksWith, livesIn, isManagerOf, leadsDivision and locatedIn are properties;
4. isManagerOf is a subproperty of worksWith;
5. isManagerOf has domain Manager and range Employee;
6. worksInDivision has domain Employee and range Division;
7. worksWith has domain Employee and range Employee;
8. livesIn has domain Person and range City;
9. locatedIn has domain Division and range City;
10. Jane is a manager;
11. Bob and Ann are employees;
12. Joe is manager of Bob;
13. Jane lives in Rome;
14. Mary leads division XYZ of the company;
15. division ABC is located in Milan.

- (b) Write SPARQL queries corresponding to the following requests: (b1) return all the managers of the male employees that live in Milan; (b2) return the cities of the divisions for which at least a female employee works; (b3) return every manager that works in a division located in Naples, and, optionally, the city where the manager lives.

a)

@ prefix rdfs: <<http://www.w3.org/2009/02/22-rdf-syntax-ns#>>  
 @ prefix rdfs : <<http://www.w3.org/2009/rdf-vocab>>  
 @ prefix myns: <<http://www.example.org/myVocabulary>>

1) myns:Employee rdfs:type rdfs:Class.

myns:Manager rdfs:type rdfs:Class.

myns:TopManager rdfs:type rdfs:Class.

myns:Division rdfs:type rdfs:Class.

myns:Man rdfs:type rdfs:Class.

myns:Woman rdfs:type rdfs:Class.

myns:City rdfs:type rdfs:Class.

2) myns:TopManager rdfs:subClassOf myns:Manager.

myns:Manager rdfs:subClassOf myns:Employee.

- 2) myns: Empolyee rdfs: domain myns: Manager .  
myns: Manager rdfs: subClassOf myns: Employee .
- 3) myns: WorksWith rdfs: type rdfs: Property .  
myns: LivesIn rdfs: type rdfs: Property .  
myns: IsManagerOf rdfs: type rdfs: Property .  
myns: LeadsDivision rdfs: type rdfs: Property .  
myns: LocatedIn rdfs: type rdfs: Property .
- 4) myns: IsManagerOf rdfs: subPropertyOf myns: WorksWith .
- 5) myns: IsManagerOf rdfs: domain myns: Manager .  
myns: IsManagerOf rdfs: range myns: Employee .
- 6) myns: worksWith rdfs: domain myns: Employee .  
myns: WorksWith rdfs: range myns: Employee .
- 7) myns: LivesIn rdfs: domain myns: Person .  
myns: LivesIn rdfs: range myns: City .
- 8) myns: LocatedIn rdfs: domain myns: DIVISION .  
myns: LocatedIn rdfs: range myns: CITY .
- 9) myns: Jane rdfs: type myns: Manager .
- 10) myns: Bob rdfs: type myns: Employee .  
myns: Ann rdfs: type myns: Employee .
- 11) myns: Joe myns: Manager myns: Bob .
- 12) myns: Jane myns: LivesIn myns: Rome .
- 13) myns: Mary myns: LeadsDIVISION myns: XYZ .
- 14) myns: ABC myns: LocatedIn myns: Naples .

14) myns:ABC      myns:locatedIn      myns:Naples.

b)

(b1)

PREFIX

  rdf

  Myns

SELECT ?m

WHERE{

  ?m myns:isManagerOf ?e.  
  ?e rdf:type myns:Male.  
  ?m myns:livesIn myns:Milan.

}

(b2)

PREFIX

  rdf

  Myns

SELECT ?c

WHERE{

  ?e myns:worksInDivision ?d.  
  ?e rdf:type myns:Woman.  
  ?d myns:locatedIn ?c.

}

(b3)

PREFIX

  rdf

  Myns

SELECT ?m ?c

WHERE{

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?m rdf:type myns:Manager.  
?m myns:worksInDivision ?d.  
?d myns:locatedIn myns:Naples.  
OPTIONAL {  
    ?m myns:livesIn ?c.  
}.  
}
```