Exercise 4 - RDF(S)

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. both `worksInDivision` and `leadsDivision` have 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 every employee that works in a division located in Naples, and, optionally, the manager of such an employee; (b2) return every division that is located in the city where the manager that leads the division lives in; (b3) return every top manager that leads a division for which Ann works, and, optionally, the city where the manager lives.

(a)

```
@ prefix   rdf :
 <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@ prefix   rdfs:
 <http://www.w3.org/2000/01/rdf-schema#>.
@ prefix   myns :  <http://example.org/myVocabulary/>.
```

1.
```
myns : Employee      rdf : type      rdfs : Class .
myns : Manager       rdf : type      rdfs : Class .
myns : TopManager    rdf : type      rdfs : Class .
myns : Division      rdf : type      rdfs : Class .
myns : Man           rdf : type      rdfs : Class ,
myns : Woman         rdf : type      rdfs : Class .
myns : City          rdf : type      rdfs : Class .
```

2.
```
myns : TopManager    rdfs : subClassOf    myns : Manager .
myns : Manager       rdfs : subClassOf    myns : Employee .
```

3.
```
myns : worksWith     rdf : type      rdf : Property .
myns : livesIn       rdf : type      rdf : property ,
myns : isManagerOf   rdf : type      rdf : Property .
myns : headDivision  rdf : type      rdf : Property .
```

	myns: LocatedIn	rdf: type	rdf: Property .
4.	myns: isManagerOf	rdfs: subPropertyOf	myns: WorksWith .
5.	myns: isManagerOf	rdfs: domain	myns: Manager .
	myns: isManagerOf	rdfs: range	myns: Employee .
6.	myns: WorkInDivision	rdfs: domain	myns: Employee .
	myns: WorkInDivision	rdfs: range	myns: Division .
	myns: LeadsDivision	rdfs: domain	myns: Employee .
	myns: LeadsDivision	rdfs: range	myns: Division .
7.	myns: WorksWith	rdfs: domain	myns: Employee .
	myns: WorksWith	rdfs: range	myns: Employee .
8.	myns: LivesIn	rdfs: domain	myns: Person .
	myns: LivesIn	rdfs: range	myns: City .
9.	myns: LocatedIn	rdfs: domain	myns: Division .
	myns: LocatedIn	rdfs: range	myns: City .
10.	myns: John	rdf: type	myns: Manager .
11.	myns: Bob	rdf: type	myns: Employee .
	myns: Ann	rdf: type	myns: Employee .
12.	myns: Joe	myns: isManagerOf	myns: Bob .
13.	myns: John	myns: LivesIn	myns: Rome .
14.	myns: Mary	myns: LeadsDivision	myns: XYZ .
15.	myns: ABC	myns: LocatedIn	myns: Milan .

(b)

b1)

```
PREFIX  myns:  <http://exampee.org/myVocabulary>
SELECT  ?x  ?m
WHERE { ?x   rdf:type   myns:Employee .
        ?d   rdf:type   myns:Division .
        ?d   myns:locatedIn   myns:Naples .
        ?x   myns:worksInDivision   ?d
        OPTIONAL { ?m   myns:isManagerOf   ?x } }
```

b2)

```
PREFIX  myns:  <http://exampee.org/myVocabulary>
SELECT  ?d
WHERE { ?d   rdf:type   myns:Division .
        ?m   myns:leadsDivision   ?d .
        ?d   myns:located in   ?c .
        ?m   myns:lives In   ?c . }
```

b3)

```
PREFIX  myns:  <http://exampee.org/myVocabulary>
SELECT  ?m  ?c
```

```
WHERE { ?m      rdf:type     myns:TopManager
        ?m      myns:LeadsDivision   ?d
        myns:Ann   myns:WorkInDivision   ?d
        OPTIONAL { ?m   myns:livesIn   ?c } }
```