

### TUTORS:

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**QUESTIONS:** Please don't hesitate to ask any questions. Questions help you and your peers.

**PRINT:** Please consider the environment before printing the exercise.

## 1 Review questions

1. Identify the correct representation in Turtle RDF serialization of the date **12th of May 2020**

- (a) "2020-05-12"^^xsd:date ✗ **Missing ^**
- (b) "May-12-2020"^^xsd:date ✗ **No String allowed for date datatype**
- (c) "2020-05-12"^^xsd:date ✓ **Correct format and order**
- (d) "12-05-2020"xsd:date ✗ **Wrong order and missing ^^**
- (e) "12-05-2020"^^xsd:date ✗ **Wrong order**

For the following tasks assume the provided prefix definitions:

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix foaf: <http://xmlns.com/foaf/0.1/#>.
@prefix dbp: <http://dbpedia.org/property/#>.
@prefix dbr: <http://dbpedia.org/resource/#>.
@prefix dbo: <http://dbpedia.org/ontology/#>.
@prefix ex: <http://example.org/#>.
```

2. According to the following Turtle triples, which abbreviation is correct?

```
dbr:Aachen      dbp:locatedIn  dbr:Germany.
dbr:Aachen      dbp:locatedIn  dbr:North_Rhine-Westphalia.
dbr:Aachen      rdf:type      dbo:City.
dbr:Bonn        dbp:locatedIn  dbr:Germany.
dbr:Bonn        dbp:locatedIn  dbr:North_Rhine-Westphalia.
dbr:Bonn        rdf:type      dbo:City.
dbr:Uni_Bonn   dbo:City      dbr:Bonn.
```

- (a) dbr:Aachen, dbr:Bonn dbp:locatedIn dbr:Germany,  
dbr:North\_Rhine-Westphalia.  
✗ **Aggregation of Aachen and Bonn as subject is not allowed**
- (b) dbr:Aachen dbp:locatedIn dbr:Germany;  
dbr:North\_Rhine-Westphalia.  
✗ **Expected ',' instead of ';' for separating objects with same subjects and predicates.**
- (c) dbr:Aachen dbp:locatedIn dbr:Germany,  
dbr:North\_Rhine-Westphalia;  
a dbr:Uni\_Bonn dbo:City.  
✓ **Correct: dbr:Germany and dbr:North\_Rhine-Westphalia have the same subjects and predicates, so they are separated with ',' and this triple separated with next one with ';', because just the subjects of them are the same.**
- (d) dbr:Uni\_Bonn dbo:City dbr:Bonn [rdf:type dbo:City].  
✗ **Wrong syntax**

3. Identify the syntactically correct Turtle serialization.

- (a) `dbr:Karl_Marx dbo:deathDate "1883-01-01"xsd:date.`    **✗ Missing ^^**
- (b) `dbr:Karl_Marx foaf:surname Marx@en.`    **✗ Marx is not in quotes**
- (c) `dbr:The_Communist_Manifesto dbp:releasedDate "Late February 1844".`  
**✓ Correct, releaseDate is a string and not date to be mentioned as date datatype, so syntactically it's correct.**
- (d) `"dbr:Karl_Marx" foaf:gender "male"@en.`    **✗ dbr:Karl\_Marx is in quotes**

4. Which statement is correct about RDF lists?

- (a) The difference between containers and collection is in the ordering of elements in them.  
**✗ The difference between containers and collection is in the permission to add element in them, which in first is allowed to add element and in the later is not.**
- (b) In collection list, each item is addressed by one blank node.  
**✓ Clear by the definition and the graph of collection.**
- (c) In sequence container, each element is followed by `rdf:first`.  
**✗ This holds for collections**
- (d) The `rdf:Bag` is used to show the ordered list of resources in the RDF.  
**✗ The `rdf:Bag` is used to show the unordered list of resources in the RDF. To show the ordered list, we use `rdf:Seq`.**
- (e) The last element of containers followed by the predicate `rdf:nil`.  
**✗ This holds for collections**

## 2 Task

Consider the following sentences:

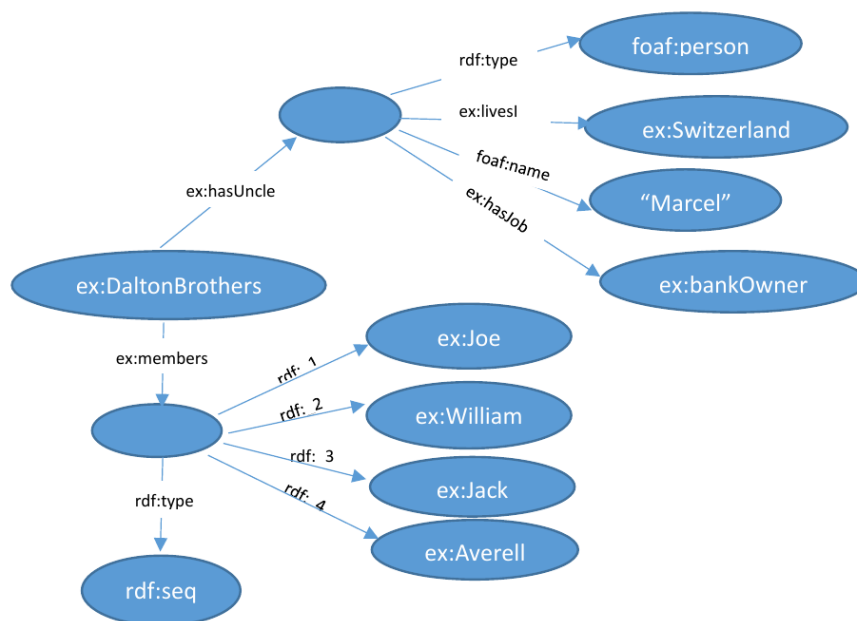
The Dalton Brothers band consists of four persons, Joe, William, Jack, and Averell.  
 The uncle of the Dalton Brother is Marcel Dalton, who is a person and he lives in Switzerland.  
 Marcel Dalton has bank, thus his job is bank owner.

1. Draw the corresponding RDF graph.

(you can use blank nodes and one type of containers in your model)

*Hint: Draw resources as ellipses or circles and literals with rectangles.*

**Solution:** Graph



2. Represent this graph in RDF Turtle serialization.

**Solution:** Turtle format

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix foaf: <http://xmlns.com/foaf/0.1/>.
@prefix ex: <http://example.org/>.
ex:DaltonBrothers ex:members [ a rdf:Seq;
                               rdf:_1 ex:Joe;
                               rdf:_2 ex:William;
                               rdf:_3 ex:Jack;
                               rdf:_4 ex:Averell ];

                               ex:hasUncle [ a foaf:person;
                                             ex:livesIn ex:Switzerland;
                                             foaf:name "Marcel";
                                             ex:hasJob ex:bankOwner ].
```

### 3 Find the errors of the following RDF snippet which is represented in turtle serialization.

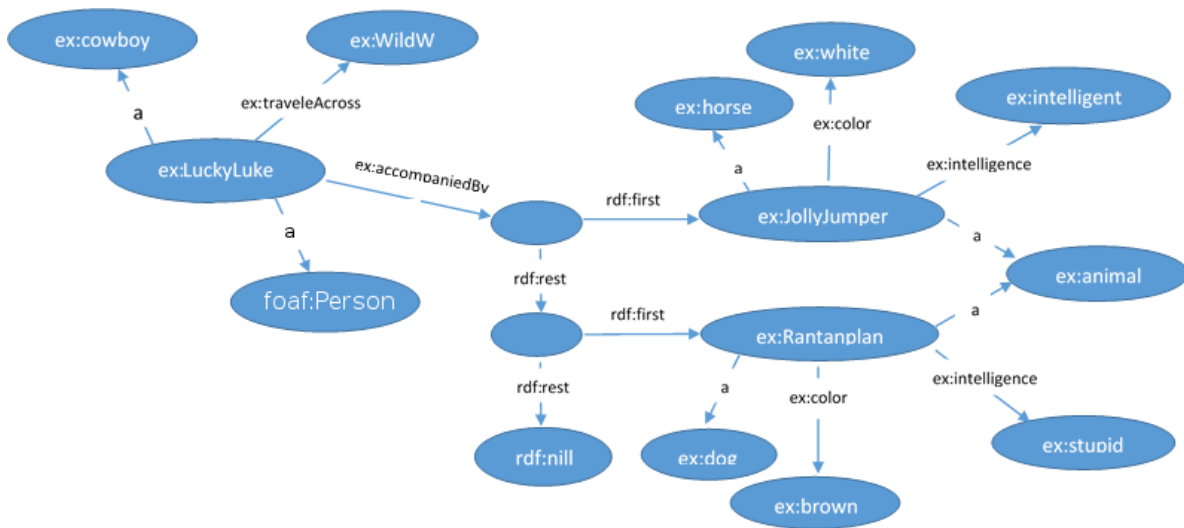
```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix ex: <http://example.org#>,
@prefix dbp: <http://dbpedia.org/property/>;
@prefix dbr: <http://dbpedia.org/resource/>
dbr:Christopher_Hitchens dbp:influences dbr:Albert_Camus.
@prefix foaf: <http://xmlns.com/foaf/0.1/>.
"The_stranger" foaf:primaryTopic <http://live.dbpedia.org/resource/The_Stranger_(novel)>,
               ex:author [ ex:fullname "Albert Camus";
                           ex:nationality ex:French
                           ];
               ex:format [a rdf:Alt,
                          rdf:_1 ex:Book,
                          rdf:_2 ex:eBook];
dbr:genre ex:novel.
```

**Solution:**

1. Line 2, 3, 4: prefix statement should be ended with .
2. Line 6: prefix should be stated in the header
3. Line 7: Literals cannot state at subject position
4. Line 7, 11 ,12: triples with the same subjects and different predicates should be separated with ; not ,

### 4 The following text is represented by an RDF graph.

"Lucky Luke is a cowboy person who travels across Wild West. Jolly Jumper and Rantanplan accompany Lucky Luke in his travels. Jolly Jumper is an intelligent white animal. It's a horse. But, Rantanplan is a stupid brown animal. It is a dog."



4a) Write its corresponding Turtle serialization.

**Solution:**

```

@prefix ex: <http://example.org#>.
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>.
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>.
@prefix xml: <http://www.w3.org/XML/1998/namespace>.
@prefix xsd: <http://www.w3.org/2001/XMLSchema#>.
@prefix foaf: <http://xmlns.com/foaf/0.1/#>.

ex:LuckyLuke a ex:Cowboy, foaf:Person;
  ex:accompaniedBy (ex:JollyJumper ex:Rantanplan);
  ex:traveleAcross ex:WildWest.

ex:JollyJumper a ex:Animal, ex:Horse;
  ex:color ex:white;
  ex:intelligence ex:intelligent.

ex:Rantanplan a ex:Animal, ex:Dog;
  ex:color ex:brown;
  ex:intelligence ex:stupid.

```

4b) Create a JSON-LD representation of Turtle serialization.

**Solution:**

```

{
  "@context": {
    "ex": "http://example.org#",
    "foaf": "http://xmlns.com/foaf/0.1/#",
    "rdf": "http://www.w3.org/1999/02/22-rdf-syntax-ns#",
    "rdfs": "http://www.w3.org/2000/01/rdf-schema#",
    "xsd": "http://www.w3.org/2001/XMLSchema#"
  },
  "@graph": [
    {
      "@id": "ex:LuckyLuke",
      "@type": [
        "foaf:Person",
        "ex:Cowboy"
      ],
      "ex:accompaniedBy": {
        "@list": [

```

```

    {
      "@id": "ex:JollyJumper"
    },
    {
      "@id": "ex:Rantanplan"
    }
  ]
},
"ex:traveleAcross": {
  "@id": "ex:WildWest"
}
},
{
  "@id": "ex:JollyJumper",
  "@type": [
    "ex:Horse",
    "ex:Animal"
  ],
  "ex:color": {
    "@id": "ex:white"
  },
  "ex:intelligence": {
    "@id": "ex:intelligent"
  }
},
{
  "@id": "ex:Rantanplan",
  "@type": [
    "ex:Dog",
    "ex:Animal"
  ],
  "ex:color": {
    "@id": "ex:brown"
  },
  "ex:intelligence": {
    "@id": "ex:stupid"
  }
}
]
}

```

## 5 Serializations

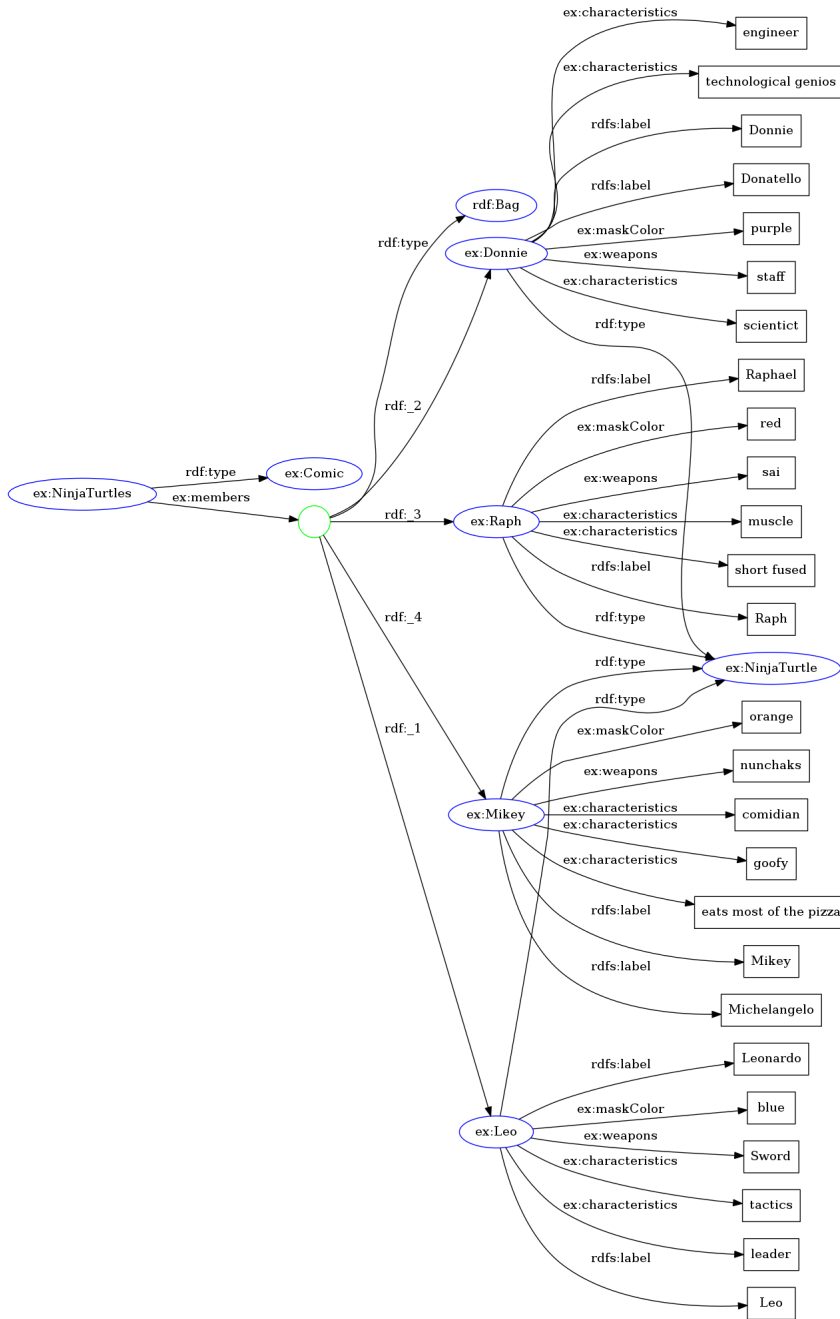
```
<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:ex="http://example.org/"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">

  <rdf:Description rdf:about="http://example.org/NinjaTurtles">
    <rdf:type rdf:resource="http://example.org/Comic"/>
    <ex:members>
      <rdf:Bag>
        <rdf:li>
          <rdf:Description rdf:about="http://example.org/Leo">
            <rdf:type rdf:resource="http://example.org/NinjaTurtle"/>
            <rdfs:label>Leo</rdfs:label>
            <rdfs:label>Leonardo</rdfs:label>
            <ex:maskColor>blue</ex:maskColor>
            <ex:weapons>Sword</ex:weapons>
            <ex:characteristics>tactics</ex:characteristics>
            <ex:characteristics>leader</ex:characteristics>
          </rdf:Description>
        </rdf:li>
        <rdf:li>
          <rdf:Description rdf:about="http://example.org/Donnie">
            <rdf:type rdf:resource="http://example.org/NinjaTurtle"/>
            <rdfs:label>Donnie</rdfs:label>
            <rdfs:label>Donatello</rdfs:label>
            <ex:maskColor>purple</ex:maskColor>
            <ex:weapons>staff</ex:weapons>
            <ex:characteristics>scientist</ex:characteristics>
            <ex:characteristics>engineer</ex:characteristics>
            <ex:characteristics>technological genius</ex:characteristics>
          </rdf:Description>
        </rdf:li>
        <rdf:li>
          <rdf:Description rdf:about="http://example.org/Raph">
            <rdf:type rdf:resource="http://example.org/NinjaTurtle"/>
            <rdfs:label>Raph</rdfs:label>
            <rdfs:label>Raphael</rdfs:label>
            <ex:maskColor>red</ex:maskColor>
            <ex:weapons>sai</ex:weapons>
            <ex:characteristics>muscle</ex:characteristics>
            <ex:characteristics>short fused</ex:characteristics>
          </rdf:Description>
        </rdf:li>
        <rdf:li>
          <rdf:Description rdf:about="http://example.org/Mikey">
            <rdf:type rdf:resource="http://example.org/NinjaTurtle"/>
            <rdfs:label>Mikey</rdfs:label>
            <rdfs:label>Michelangelo</rdfs:label>
            <ex:maskColor>orange</ex:maskColor>
            <ex:weapons>nunchaks</ex:weapons>
            <ex:characteristics>comedian</ex:characteristics>
            <ex:characteristics>goofy</ex:characteristics>
            <ex:characteristics>eats most of the pizza</ex:characteristics>
          </rdf:Description>
        </rdf:li>
      </rdf:Bag>
    </ex:members>
  </rdf:Description>
</rdf:RDF>
```

Tasks:

- Draw corresponding graph for the data

Solution:



Namespaces:  
rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>  
ex: <http://example.org/>  
rdfs: <http://www.w3.org/2000/01/rdf-schema#>

- Provide turtle (TTL) representation

**Solution:**

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

ex:NinjaTurtles a    ex:Comic;
                  ex:members [ rdf:type rdf:Bag;
                                rdf:_1 ex:Leo;
                                rdf:_2 ex:Donnie;
                                rdf:_3 ex:Raph;
                                rdf:_4 ex:Mikey
                              ].

ex:Leo a ex:NinjaTurtle;
      rdfs:label "Leo";
      rdfs:label "Leonardo";
      ex:maskColor "blue";
      ex:weapons "Sword";
      ex:characteristics "tactics", "leader".

ex:Donnie a ex:NinjaTurtle;
          rdfs:label "Donnie";
          rdfs:label "Donatello";
          ex:maskColor "purple";
          ex:weapons "staff";
          ex:characteristics "scientist", "engineer", "technological genius".

ex:Raph a ex:NinjaTurtle;
        rdfs:label "Raph";
        rdfs:label "Raphael";
        ex:maskColor "red";
        ex:weapons "sai";
        ex:characteristics "muscle", "short fused".

ex:Mikey a ex:NinjaTurtle;
         rdfs:label "Mikey";
         rdfs:label "Michelangelo";
         ex:maskColor "orange";
         ex:weapons "nunchaks";
         ex:characteristics "comedian", "goofy", "eats most of the pizza".
```



- Provide RDFa representation for **one** of the ninja turtles.

**Solution:**

```

<div vocab="http://example.org/" >
  <div style='display:flex'>
    <div>
      
      <span property="rdfs:label">Raphael</span>
      (<span property="rdfs:label">Raph</span>) </br>
      Mask Color: <span property="maskColor">red</span>
      <div>
        Weapons: <span property="weapons">Sai</span>
      </div>
      <div>
        Characteristics: <span property="characteristics">muscle</span>,
          <span property="characteristics">short fused</span>
      </div>
    </div>
  </div>
</div>

```