

problem 1:

a) Explain the concept of XML Namespaces. How are namespaces declared and used in XML? How is namespace information represented in the XPath data model? What are namespaces used for? (3 credits)

b) A travel agency offers the following flights:

```
1 <?xml version="1.1"?>
2 <flights>
3   <flight from="Frankfurt" to="Rom"
4     start="2004-09-07 09:30" arrival="2004-09-07 10:30" price="70"/>
5   <flight from="Frankfurt" to="Rom"
6     start="2004-09-07 09:00" arrival="2004-09-07 10:05" price="70"/>
7   <flight from="Frankfurt" to="Helsinki"
8     start="2004-09-07 09:50" arrival="2004-09-07 11:45" price="90"/>
9   <flight from="Basel" to="Prag"
10    start="2004-09-07 10:15" arrival="2004-09-07 11:30" price="60"/>
11  <flight from="Baden-Baden" to="Frankfurt"
12    start="2004-09-07 08:30" arrival="2004-09-07 09:05" price="55"/>
13 </flights>
```

You want to go to Rom. Write an XQuery that lists all flights to Rom. Write a second XQuery that lists all flights to Rom in order of departure. Can you express these XQueries as XPath queries ? (3 credits)

c) You would like to start in Baden-Baden. As there unfortunately is no direct flight from Baden-Baden to Rom, maybe you could go there by changing somewhere else? Write an XQuery that lists all possibilities to go from Baden-Baden to Rom with one transit stop in-between. (4 credits)

*d) Write an XQuery that lists all possibilities to go from Baden-Baden to Rom by changing as often as necessary (i.e., without a fixed upper bound for the number of transit stops). (+2 credits)

problem 2:

a) What is an ontology? Name two different representations for ontologies. How do they differ?

(3 credits)

b) A mediastore offers the following products:

```
1 <?xml version="1.1"?>
2 <products xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance'
3     xsi:noNamespaceSchemaLocation='products.xsd'>
4   <book>
5     <title>Learning XML</title>
6     <author>EricRay</author>
7     <price>30.00</price>
8   </book>
9   <cd>
10    <title>for you</title>
11    <interpret>Frank Chastenier</interpret>
12    <price>15.00</price>
13  </cd>
14  <dvd>
15    <title>Goldrush</title>
16    <director>Charly Chaplin</director>
17    <price>19.00</price>
18  </dvd>
19 </products>
```

Write XML Schema declarations for the element `book`. Is it possible to factor out the common information for books, CDs and DVDs (`title` and `price`)? If so, make use of that in your XML Schema declaration for `book` and indicate where and how the declarations for `cd` and `dvd` are different. If not, explain why. (4 credits)

c) Represent the contents of the product table in RDF/RDFS. Specify an RDF schema that tries to describe your vocabulary as precise as possible (for the `book`-related vocabulary is sufficient; sketch differences for other vocabulary). (3 credits)