Due on: Tuesday 27.06.2006 (in lecture (only definition type questions) & via email (coding type questions)

Exercise 4.1

A travel agency offers the following flights:

```xml
<?xml version="1.1"?>
<flights>
      <flight from="Frankfurt" to="Rom" start="2004-09-07 09:30"
arrival="2004-09-07 10:30" price="70"/>
      <flight from="Frankfurt" to="Rom" start="2004-09-07 09:00"
arrival="2004-09-07 10:05" price="70"/>
      <flight from="Frankfurt" to="Helsinki" start="2004-09-07 09:50"
arrival="2004-09-07 11:45" price="90"/>
      <flight from="Basel" to="Prag" start="2004-09-07 10:15"
arrival="2004-09-07 11:30" price="60"/>
      <flight from="Baden-Baden" to="Frankfurt" start="2004-09-07 08:30"
arrival="2004-09-07 09:05" price="55"/>
</flights>
```

a) [3 points] 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?

b) [4 points] 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.

c) [3 points] 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 for a more general case).

Exercises on XML and Semantic Web Technologies   Summer term 2006
Prof. Dr. Lars Schmidt-Thieme , Karen Tso   Sheet IV / 22.6.2006
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Exercise 4.2

a) [2 points] What is understood by "validating" and "static typechecking" in XML processing? Give an example for each technique. How can they be used in XQuery?

b) [5 points] Write a XQuery query that transposes the following table:

```
<?xml version="1.0" encoding="UTF-8"?>
<table>
<row><col>A</col><col>B</col><col>C</col></row>
<row><col>1</col><col>2</col><col>3</col></row>
<row><col>x</col><col>y</col><col>z</col></row>
</table>
```

I.e., it interchanges rows and columns so that the result looks as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<table>
<row><col>A</col><col>1</col><col>x</col></row>
<row><col>B</col><col>2</col><col>y</col></row>
<row><col>C</col><col>3</col><col>z</col></row>
</table>
```

Will this query be performed efficiently?
Sketch a XSLT query for this task.

c) [3 points] Given the following DTD:

```
<?xml version="1.0" encoding="UTF-8"?>
<!ELEMENT uni (student+)>
<!ELEMENT student (name, take+)>
<!ELEMENT take (grade)>
<!ATTLIST take
sessionNo IDREF #REQUIRED >
<!ELEMENT session (courseno,semester,instructor) >
<!ATTLIST session
sessionNo ID #REQUIRED >
```

Note: All undeclared elements are considered to be #PCDATA.
Write an XQuery query to and all students who have taken at least two courses with the same instructor.