Exercises 9

The purpose of these exercises is to get initial experience with XQuery and XML Schema. To work with XQuery you need an XQuery interpreter. One such interpreter is Saxon, which may be used via the Java runtime machine. Download the jar files for processing XML files (see course home page), and place them in the Java classpath (on OSX place them in /Library/Java/Extensions/). Then you should be able to run the XQuery file `my.sq` by typing on the command line:

```
java net.sf.saxon.Query my.xq
```

To do XML Schema validation, use one of the many on-line validation services, e.g. the one at http://tools.decisionsoft.com/schemaValidate/ or the Java program `ValidateXMLSchema.java` (see course home page).

XQuery

A. The following exercise is taken from *An Introduction to XML and Web Technologies* by Møller and Schwartzbach. Write XQuery queries computing the following results for the recipe collection:

1. For each recipe, the total number of simple ingredients (that do not have any constituent ingredients).
2. The titles of recipes with ingredients nested to a depth of at least 2.
3. The recipes that use more butter than olive oil.

B. Finally, write an XQuery that for each ingredient lists the names of recipes of which it is part.

XML Schema

Extend the schema in `students.xsd`, as follows (there is considerable freedom of choosing the specifics):

- Each student should have a sex, male or female.
- Each student may, optionally, have a birth year, which should be a 4-digit number
- Each student may have at most one mentor (who is also a student), and each mentor may have one or more mentees. Extend the language with a tree structure describing the mentor/mentee tree(s).

Finally, put more data in the file `students.xml` to test your schema using a validator.