**ADVANCED DATABASE SYSTEMS**

**EXERCISES**

**XQuery**

**EXERCISE 1.** *(From the book of Silberschatz, Korth and Sudarshan)*

Write the following queries in XQuery, assuming the following DTD

```xml
<!DOCTYPE db[
  <!ELEMENT db (emp*)>
  <!ELEMENT emp (ename, children*, skills*)>
  <!ELEMENT children (name, birthday)>
  <!ELEMENT birthday (day, month, year)>
  <!ELEMENT skills (type, exams+)>
  <!ELEMENT exams (year, city)>
  <!ELEMENT ename (#PCDATA)>
  <!ELEMENT name (#PCDATA)>
  <!ELEMENT day (#PCDATA)>
  <!ELEMENT month (#PCDATA)>
  <!ELEMENT year (#PCDATA)>
  <!ELEMENT type (#PCDATA)>
  <!ELEMENT city (#PCDATA)>
]
```

a. Find the names of all employees who have a child who has a birthday in March.
b. Find the names of those employees who took an examination for the skill type “typing” in the city “Dayton”.
c. List all skill types in Emp.

**EXERCISE 2.** *(From the book of Silberschatz, Korth and Sudarshan)*

Write a query in XQuery on the XML document bank (of the slides on XML) to find the total balance, across all accounts, at each branch. (Hint: Use a nested query to get the effect of an SQL group by.)

**EXERCISE 3.** *(From the book of Silberschatz, Korth and Sudarshan)*

Give a query in XQuery to flip the nesting of data from the following DTD:

```xml
<!DOCTYPE books[
  <!ELEMENT books (book*)>
  <!ELEMENT book (title, author+, publisher, keyword)>
  <!ELEMENT publisher (pub-name, pub-branch)>
  <!ELEMENT title (#PCDATA)>
  <!ELEMENT author (#PCDATA)>
  <!ELEMENT keyword (#PCDATA)>
  <!ELEMENT pub-name (#PCDATA)>
  <!ELEMENT pub-branch (#PCDATA)>
]
```

That is, at the outermost level of nesting the output must have elements corresponding to authors, and each such element must have nested within it items corresponding to all the books written by the author.
**EXERCISE 4.** *(From the book of Silberschatz, Korth and Sudarshan)*

Consider the following DTD:

```xml
<!DOCTYPE bibliography[
<!ELEMENT bibliography (book*, article*)>
<!ELEMENT book (title, author+, year, publisher, place?)>
<!ELEMENT article (title, author+, journal, year, number, volume, pages?)>
<!ELEMENT author (last-name, first-name)>
<!ELEMENT title (#PCDATA)>
…similar PCDATA declarations for year, publisher, place, journal, number, volume, last-name and first-name ]>
```

Write queries in XQuery on the above bibliography DTD to do the following.

a. Find all authors who have authored a book and an article in the same year.

b. Display books and articles sorted by year.

c. Display books with more than one author.

**EXERCISE 5.** *(From the book of Silberschatz, Korth and Sudarshan)*

Write a query in XQuery to output customer elements with associated account elements nested within the customer elements, given the bank-2 XML document (of the slides on XML) that uses ID and IDREFS.