CHAPTER 30

XML

Solutions for the Practice Exercises of Chapter 30

Practice Exercises

30.1

Answer:
The query is shown in Figure 30.101

30.2

Answer:
The query is shown in Figure 30.102

30.3

Answer:
The query is shown in Figure 30.103

```
for $b in distinct (/university/department/dept_name)
return
<dept-total>
      <dept_name> $b/text() </dept_name>
      let $s := sum (/university/instructor[dept_name=$b]/salary)
      return <total-salary> $s </total-salary>
</dept-total>
```

Figure 30.101 XQuery

```
<lojoin>
for $d in /university/department,
      $c in /university/course
where $c/dept_name = $d/dept_name
return <dept-course> $d $c </dept-course>
|
for $d in /university/department,
where every $c in /university/course satisfies
(not ($c/dept_name =$d/dept_name))
return <dept-course > $c </dept-course >
</lojoin>
```

Figure 30.102 XQuery

30.4

Answer:
Relation schema:

book (bid, title, year, publisher, place)
article (artid, title, journal, year, number, volume, pages)
book_author (bid, first_name,last_name, order)
article_author (artid, first_name,last_name, order)

30.5

Answer:
The answer is shown in Figure 30.104.

The answer in XQuery is

```
<university-2>
     for $c in /university/course
     return
          <course>
               <course_id> $c/* </course_id>
               for $a in $c/id(@instructors)
               return $a
          </course>
</university-2>
```

Figure 30.103 XQuery

30.6

Answer:

a. Show how to map this DTD to a relational schema.

part(partid,name)
subpartinfo(partid, subpartid, qty)

Attributes partid and subpartid of subpartinfo are foreign keys to part.

b. The XML Schema for the DTD is shown in Figure 30.106.

nodes(1,element,university,–)
nodes(2,element,department,–)
nodes(3,element,department,–)
nodes(4,element,course,–)
nodes(5,element,course,–)
nodes(6,element,instructor,–)
nodes(7,element,instructor,–)
nodes(8,element,instructor,–)
nodes(9,element,teaches,–)
nodes(10,element,teaches,–)
nodes(11,element,teaches,–)
child(2,1) child(3,1) child(4,1)
child(5,1) child(6,1)
child(7,1) child(8,1) child(9,1)

Continued in Figure 30.105

Figure 30.104 Relational representation of XML data as trees.

child(10,1) child(11,1)
nodes(12,element,dept_name,Comp. Sci.)
nodes(13,element,building,Taylor)
nodes(14,element,budget,100000)
child(12,2) child(13,2) child(14,2)
nodes(15,element,dept_name,Biology)
nodes(16,element,building,Watson)
nodes(17,element,budget,90000)
child(15,3) child(16,3) child(17,3)
nodes(18,element,course_id,CS-101)
nodes(19,element,title,Intro. to Computer Science)
nodes(20,element,dept_name,Comp. Sci.)
nodes(21,element,credits,4)
child(18,4) child(19,4) child(20,4)child(21,4)
nodes(22,element,course_id,BIO-301)
nodes(23,element,title,Genetics)
nodes(24,element,dept_name,Biology)
nodes(25,element,credits,4)
child(22,5) child(23,5) child(24,5)child(25,5)
nodes(26,element,IID,10101)
nodes(27,element,name,Srinivasan)
nodes(28,element,dept_name,Comp. Sci.)
nodes(29,element,salary,65000)
child(26,6) child(27,6) child(28,6)child(29,6)
nodes(30,element,IID,83821)
nodes(31,element,name,Brandt)
nodes(32,element,dept_name,Comp. Sci.)
nodes(33,element,salary,92000)
child(30,7 child(31,7) child(32,7)child(33,7)
nodes(34,element,IID,76766)
nodes(35,element,dept_name,Biology)
nodes(36,element,salary,72000)
child(34,8) child(35,8) child(36,8)
nodes(37,element,IID,10101)
nodes(38,element,course_id,CS-101)
child(37,9) child(38,9)
nodes(39,element,IID,83821)
nodes(40,element,course_id,CS-101)
child(39,10) child(40,10)
nodes(41,element,IID,76766)
nodes(42,element,course_id,BIO-301)
child(41,11) child(42,11)

Figure 30.105 Continuation of Figure 30.104.

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="parts" type="partsType" />
<xs:complexType name="partType">
    <xs:sequence>
        <xs:element name="name" type="xs:string"/>
        <xs:element name="subpartinfo" type="subpartinfoType"
            minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
<xs:complexType name="subpartinfoType"/>
    <xs:sequence>
        <xs:element name="part" type="partType"/>
        <xs:element name="quantity" type="xs:string"/>
    </xs:sequence>
</xs:schema>
```

Figure 30.106 Figure for Exercise 30.6.