

**[I] ( Exercise 2 ) XML Database [2]**

- BaseX Software for → XML databases
- 1 File (with xml data) → db Document in "DATA" in basex
- Many XML Documents (can go into) → Data
- Multiple tables in a database → single tree/graph in xml
- 1 File (XML data) → Document in basex/data directory

**[I] Simple Start [4]**

- Developed by - University of Konstanz, Germany
- Latest version - BaseX 8.5 → www.basex.org
- XML Database Engine for → Xpath, XQuery 3.1 processor
- Full support for W3C updates
- Interactive and User friendly Graphical user interface (GUI)
- Open Source Software

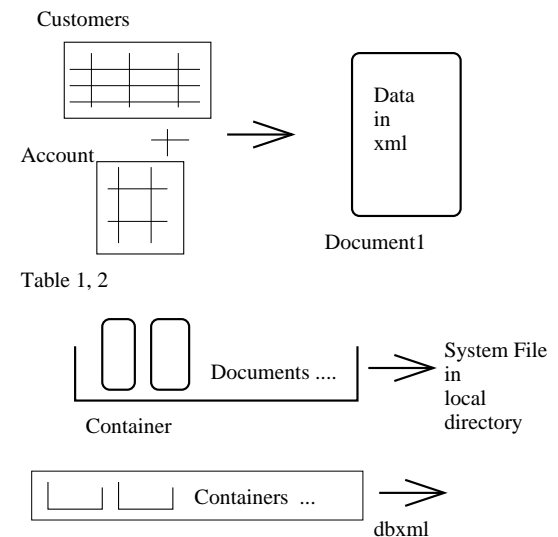


CSE IIT Delhi

Class Exercises

Query Languages for XML Databases

**[I] ( Ex. 2 ) XML Database [3]**



## [I] ( Ex. 2 ) Hello ! XML [6]

- [Download BaseX](#) OR on Linux  
cd; cp /misc/buffer/Courses/COV888/BaseX81.zip .
- unzip BaseX81.zip to get DIRECTORY 'baseX' ; chmod a+rx baseX
- **Delete** → BaseX81.zip
- [Ckeck baseX directory](#) → ls baseX/\* ; ls baseX/\*/\* ;
- [Read Contents](#) of → baseX/readme

## [I] ( Ex. 2 ) Create DB [8]

- 2. create student database from student.xml
- a) To start baseGUI  
cd baseX/bin ; ./baseXgui (baseX GUI)
- b) confirm database path  
Options → Preferences → General → Database Path  
Homedir/baseX/data
- c) create student database  
click menu Database → New → Input file:  
homedir/baseX/etc/student.xml  
Name of database: student > ls baseX/data/student

## [I] Simple Start [5]

- [Read](#) Wikipedia → [en.wikipedia.org/wiki/baseX](http://en.wikipedia.org/wiki/baseX)
- XML data is stored in Container files ~/baseX/etc/<file.xml> .
- [Container](#) → XML document
- [last OHP: Tables](#) → [XML Document](#) → [DB](#) → DATA in "baseX"
- Help: BaseX Graphical User Interface  
[http://docs.baseX.org/wiki/Graphical\\_User\\_Interface](http://docs.baseX.org/wiki/Graphical_User_Interface)
- Help: XQUERY 3.0  
[http://docs.baseX.org/wiki/XQuery\\_3.0](http://docs.baseX.org/wiki/XQuery_3.0)
- Help: XSLT  
[https://users.dimi.uniud.it/~massimo.franceschet/caffe-](https://users.dimi.uniud.it/~massimo.franceschet/caffe-xml/xslt/xslt-processors.html)  
xml/xslt/xslt-processors.html

## [I] ( Ex. 2 ) Create DB ! XML [7]

- 1. create file student.xml in *./baseX/etc/*
- ```
<students>
  <student>
    <name>Sastry</name>
    <sex>M</sex>
    <age>23</age>
  </student>
  <student>
    <name>RaghuRam</name>
    <sex>M</sex>
    <age>18</age>
  </student>
</students>
```

**[I] Test XPath Queries****[10]**

a) List full contents in students ( db in xml )

`/students` ( in Editor area in top line at 1.) PRESS [>] in editor

b) Find details of all students

`/students/student` ; ( use short form `'//student'` for student db )

c) Find names of all students

`/students/student/name` (or `//student/name` )

d) Find student names (with no tags)

`/students/student/name/text()` ( or `//student/name/text()` )

**[I] XQUERY****[12]**

TASK 6: Execute XQUERY query statements

a) Find age of all students

```
for $s in doc('student')//student
```

```
let $sage := $s/age
```

```
return <result>{$sage}</result>
```

b) Find age of all students ( order by age )

```
for $s in doc('student')//student
```

```
let $sage := $s/age/text()
```

```
order by $s/age
```

```
return <result>{$sage}</result>
```

**[I] ( Ex. 2 ) Create DB in GUI****[9]**

-----		
Query	Links to	
( Editor )	Tags in XML db	
-----		
Results of	DB	
Query	Details	
-----		

- Click on Links to tags after loading DB

**[I] XPath Queries****[11]**

e) Find age of all students

`/students/student/age` ( or `//student/age` )

f) Find age of all students (with no tags )

`/students/student/age/text()` ( or `//student/age/text()` )

g) Find student all details of student RaghuRam

`/students/student[name="RaghuRam"]` ( or `//student[name="RaghuRam"]` )

h) Find age of watanabe (without tags)

`/students/student[name="RaghuRam"]/age/text()`

(or `//student[name="RaghuRam"]/age/text()` )

**[I] Hello ! XML (Contd.)****[14]**

...Conitued from previous page/slide

```

<student>
  <name>RaghuRam</name>
  <sex>M</sex>
  <age>18</age>
</student>
<student>
  <name>Sastry</name>
  <sex>M</sex>
  <age>22</age>
/student>
</students>

```

**[I] ( Ex. 2 ) Create BOOK database****[16]**

Exercise :

1. create 'book' database

```
cp /misc/buffer/Courses/COV888/Grid.xml ~/basex/etc/Grid.xml
```

```
Database -> New -> Input file : homedir/basex/etc/Grid.xml
```

```
Name of database: book
```

```
OK ; Check its tag names for query purposes
```

2. create 'bookexer2' database

```
cp /misc/buffer/Courses/COV888/Php.xml ~/basex/etc/Php.xml
```

```
Database -> New -> Input file : homedir/basex/etc/Php.xml
```

```
Name of database: bookexer2
```

```
OK ; Check its tag names for query purposes
```

**[I] Hello ! XML (Contd.)****[13]**

Add new data in student.xml (step at b) as follows )

- a) drop student database

```
Database -> open & manage -> selectt student -> drop
```

- b) Use Editor for file ~/basex/etc/student.xml to add details of student "Ajay Singh"

```

<students>
  <student>
    <name>Sastry</name>
    <sex>M</sex>
    <age>23</age>
  </student>

```

.... Continued on next Slide/page ...

**[I] Hello ! XML (Contd.)****[15]**

- c) create student database

```
Click Database -> New -> Input file : homedir/basex/etc/student.xml
```

```
Name of database: student
```

```
Check if < OK > (Editor box,
```

```
Click on tags in Box on right )
```

Getting information about more Commands:

References :

1. Basex Graphical User Interface

```
http://docs.basex.org/wiki/Graphical_User_Interface
```

2. XQUERY 3.0 [http://docs.basex.org/wiki/XQuery\\_3.0](http://docs.basex.org/wiki/XQuery_3.0)

**[I] ( Ex. 2 ) Create BOOK database [18]**

- b) Find book titles without tags ( //Title/text() )
- c) Find names of Manufacturers without tags
- d) Find details of DetailPageURL with no tags
- e) Find ASIN numbers without tags

**[I] (Ex. B) [20]**

- The two files (Grid.xml and Php.xml ) were downloaded from Amazon.com (web services)
  - Draw a graph
1. Draw a rooted, acyclic graph with unique path for data in the file Grid.xml (use paper and pencil)
  2. Draw a rooted, acyclic graph with unique path for data in the file Php.xml (use paper and pencil)
  3. Are these graphs same or different ?

**[I] ( Ex. 2 ) Create BOOK database [17]**

2. Run xpath for Queries on database ' book ' (study its tags)

- a) Find names of Authors without tags ( //Author/text() )

ANSWER>

William H. Kemp  
Timothy Samara  
Rex A. Ewing; Doug Pratt  
Kimberly Elam  
Josef Muller-Brockmann  
Mary Engelbreit  
Phillip F. Schewe  
Andy Riley  
Jonathan Gennick

**[I] ( Ex. A ) XML Exercises [19]**

- Study the database (bookexer2) for the data file : Php.xml
  - 2. Do all XPath query steps a) to e) above on ' bookexer2 '
  - 3. Book topic is PHP
  - 4. Prepare your SAMPLE file - sIDxxxx.txt
- create a file sIDxxxx.txt with XPath commands and results
- Submit sIDxxxxx.txt with XPath queries on Php.xml

**[I] (EX-D) Simple Start****[22]**

10.3 Write the DTD and a XML representation for the following nested-relational schema-

```
Emp = (ename,ChildrenSet SETOF(Children),SkillSet SETOF(Skills))
Children = (name,Birthday)
Birthday = (day,month,year)
Skills = (type,ExamSet SETOF(Exams))
Exams = (year,city)
```

(see, files 10.03 dtd and xml)

**[I] (EX-E) XML exercise sample XSLT****[24]**

10.5 List all skill types in Emp (write query in XSLT).

(Read XSLT notes in slides and See sample answer )

**[I] (EX-C) Simple Start****[21]**

1. copy file: /public/public/database/xml-exercises.tar (unpack)

The file contains answers for problems-

10.1, 10.3, 10.5,10.14,10.15, and data (figure10.1).

10.1 Consider the Bank database in XML in Figure 10.1.  
Change the XML data to a different form (xml--> xml).  
Prepare another XML file, using attributes instead of subelements. Also, write DTD file for the new XML data.

( see Answer (DTD and xml) in the unpacked tar files ).

**[I] (EX-D) XML demo exercises****[23]**

2. load the xml data into ' basex '

Run the following queries, using templates from  
xml-exercises.tar

10.3a Find the names of all employees who have a child, who has a birthday in March (write in XQuery).

10.3b Find those employees who took an examination for the skill type 'typing' in the city 'Dayton' (write in XQuery).

10.3c List all skill types in Emp (write in XQuery).

**[I] (EX-E) XML Exercises****[26]**

1. Do the following questions. Compare your answers with solutions in the 'xml-exercises.tar'

10.14 Show the tree representation of the XML data in Figure 10.1. Please use nodes and child relationship.

10.15 Consider the following recursive DTD

```
<!DOCTYPE parts[
    <!ELEMENT part (name,subpartinfo*)>
    <!ELEMENT subpartinfo (part,quantity)>
    <!ELEMENT name ( #PCDATA )>
    <!ELEMENT quantity ( #PCDATA )>
]>
```

- ( a ) Give a small example of data for the above DTD.  
( b ) Show how to map this DTD to a relational schema.  
(Assume part names are unique.  
Whenever a part appears, its subpart structure will be same).

**[I] (EX-E) XML Exercises****[25]**

Load the database in Figure 10.1 into a container.  
execute XQuery statements for following queries,

- A) Find the names of all customer who have an account (A101).  
B) Find those accounts which belong to Johnson  
C) List all depositors  
D) List all account numbers in Bank (write in Xquery).

Submit a file 'ex3.txt' which includes xquery for the above questions A)-D).