

1.

a)

```
<!DOCTYPE products[
  <!ELEMENT products(product*)>
  <!ELEMENT product(name,price,description, store*,sells*)>
  <!ATTLIST product
    pid ID #REQUIRED
  >
  <!ELEMENT name(#PCDATA)>
  <!ELEMENT phone(#PCDATA)>
  <!ELEMENT description(#PCDATA)>
  <!ELEMENT stores(name,phone,markup)>
  <!ATTLIST stores
    sid ID #REQUIRED
  >
  <!ELEMENT name(#PCDATA)>
  <!ELEMENT phone(#PCDATA)>
  <!ELEMENT markup(#PCDATA)>
  <!ATTLIST markup pid IDREF #REQUIRED>
  <!ATTLIST markup sid IDREF #REQUIRED>
]>
```

b)

```
for $x in doc("db.xml")/db/products/row
  $y in doc("db.xml")/db/stores/row
  $z in doc("db.xml")/db/sells/row
where $x/pid=$z/pid and $y/pid=$z/pid
return
  <row>
    <product>{$x/name,$x/price,$x/description}</product>
    <store>{$y/name,$y/phone,$y/markup}</store>
    <sell>{$z/markup}</sell>
  </row>
```

c)

```
for $x in doc("db.xml")/db/products/row
  $y in doc("db.xml")/db/sells/row
where $x/pid = $y/pid and $y/markup = 25%
return
```

```

<product>
  <name>{$x/name}</name>
  <price>{$x/price}</price>
</product>

```

d)

```

SELECT P.name, P.price
FROM Products P, Sells P
WHERE P.pid = S.pid AND S.markup = 25
GROUP BY P.pid P.pname

```

2.

a)

```

for $x in doc("broadway.xml")/broadway
let $a in $x/theater/title
let $b in $x/concert/title
let $c in $x/opera/title
return <theater> {$a/title} </theater>
      <concert> {$b/title} </concert>
      <opera> {$c/title} </opera>

```

b)

```

for $x in doc("broadway.xml")/broadway/theater[date = "11/9/2008"]
where $x/price < 35
return {$x/title,$x/address}

```

c)

```

for $x in doc("broadway.xml")/broadway/concert[type = "chamber
orchestra"]
where avg($x/price) >= 50
return $x/title

```

d)

```

for $x in doc("broadway.xml")/broadway/*
return
  <groupedByDate>
    <day>
      <date> {$x/date} </date>
      <show>

```

```

        <title>{$x/title}</title>
        <price>{$x/price}</price>
    </show>
</day>
</groupByDate>

```

3.

1)

For XML file, I add a sub-element: <firstname> and <lastname> .

XML:

```

<?xml version="1.0" encoding="ISO-8859-1" ?>
<?xml-stylesheet type="text/xsl" href="bib.xsl"?>
<!DOCTYPE bib SYSTEM "bib.dtd">
<bib>
    <book>
        <author>
            <firstname>Leslie</firstname>
            <lastname>Lamport</lastname>
        </author>
        <title>Latex: A Document Preparation System </title>
        <year>1986</year>
        <publisher>Addison-Wesley</publisher>
    </book>

    <article>
        <author>
            <firstname>David</firstname>
            <lastname>Marr</lastname>
        </author>
        <title>Visual information processing</title>
        <year>1980</year>
        <volume>290</volume>
        <page>
            <from>199</from>
            <to>218</to>
        </page>
        <journal>Phil. Trans. Roy. Soc. B</journal>
    </article>

```

```
<article>
  <author>
    <firstname>Clifton</firstname>
  <lastname>R. K.</lastname>
  </author>
  <title>Breakdown of echo suppression in the precedence
effect</title>
  <year>1987</year>
  <volume>82</volume>
  <page>
    <from>1834</from>
    <to>1835</to>
  </page>
  <journal>J. Acoust. Soc. Am. </journal>
</article>
```

```
<book>
  <author>
    <firstname>David</firstname>
  <lastname>Marr</lastname>
  </author>
  <title>Vision</title>
  <year>1982</year>
  <address> NY </address>
  <publisher>Freeman</publisher>
</book>
```

```
<article>
  <author>
    <firstname>David</firstname>
  <lastname>Marr</lastname>
  </author>
  <title>Visual information processing</title>
  <year>1980</year>
  <volume>290</volume>
  <page>
    <from>199</from>
    <to>218</to>
  </page>
```

```

        <journal> Phil. Trans. Roy. Soc. B</journal>
    </article>
</bib>

```

For DTD file, I add the <!ELEMENT author (firstname, lastname)> and the definition of the firstname and lastname. The code goes as follows:

DTD:

```

<?xml version="1.0" ?>
<!ELEMENT bib ( (book | article)+)>
<!ELEMENT book ( author, title, year, (address)?, publisher )>
<!ELEMENT article ( author, title, year, volume, page, journal) >
<!ELEMENT author ( firstname, lastname)>
<!ELEMENT page (from, to)>
<!ELEMENT title (#PCDATA)>
<!ELEMENT year (#PCDATA)>
<!ELEMENT address (#PCDATA)>
<!ELEMENT publisher (#PCDATA)>
<!ELEMENT firstname (#PCDATA)>
<!ELEMENT lastname (#PCDATA)>
<!ELEMENT from (#PCDATA)>
<!ELEMENT to (#PCDATA)>
<!ELEMENT journal (#PCDATA)>
<!ELEMENT volume (#PCDATA)>

```

For xsl, I add a () into the book part, and let the publisher and the date appear within the (). For article , let the publisher and the date appear in bold.

The code is as follows:

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
    <html>
    <head>
        <title>Bibliography</title>
    </head>
    <body background="antiquewhite">
        <center><h2>Bibliography</h2><hr width="90%"/></center>

```

```

        <ul>
          <xsl:for-each select="bib/book">
            <p/><li>
              <xsl:value-of select="author/lastname"/>,
              <xsl:value-of select="author/firstname"/>.
              <b><xsl:value-of select="title"/></b>
              (<xsl:value-of select="publisher"/>
              <xsl:value-of select="address"/>
              <xsl:text> </xsl:text>
              <xsl:value-of select="year"/>).
            </li>
          </xsl:for-each>

          <xsl:for-each select="bib/article">
            <p/><li>
              <xsl:value-of select="author/lastname"/>,
              <xsl:value-of select="author/firstname"/>.
              <xsl:value-of select="title"/>,
              <b><xsl:value-of select="journal"/>,
              <xsl:value-of select="volume"/></b>,
              pp.<xsl:apply-templates select="page"/>
              <xsl:value-of select="year"/>.
            </li>
          </xsl:for-each>
        </ul>
      </body>
    </html>
  </xsl:template>
  <xsl:template match="page">
    <xsl:value-of select="from"/>-<xsl:value-of select="to"/>,
  </xsl:template>
</xsl:stylesheet>

```

2)

The XML code is as follows:

```

<?xml version="1.0" encoding="ISO-8859-1" ?>
<?xml-stylesheet type="text/xsl" href="bib.xsl"?>
<!DOCTYPE bib SYSTEM "bib.dtd">
<bib>
  <book>

```

```
<author>
  <firstname>Leslie</firstname>
  <lastname>Lamport</lastname>
</author>
<title>Latex: A Document Preparation System </title>
<year>1986</year>
<publisher>Addison-Wesley</publisher>
</book>
```

```
<article>
  <author>
    <firstname>David</firstname>
    <lastname>Marr</lastname>
  </author>
  <title>Visual information processing</title>
  <year>1980</year>
  <volume>290</volume>
  <page>
    <from>199</from>
    <to>218</to>
  </page>
  <journal>Phil. Trans. Roy. Soc. B</journal>
</article>
```

```
<article>
  <author>
    <firstname>Clifton</firstname>
    <lastname>R. K.</lastname>
  </author>
  <title>Breakdown of echo suppression in the precedence
effect</title>
  <year>1987</year>
  <volume>82</volume>
  <page>
    <from>1834</from>
    <to>1835</to>
  </page>
  <journal>J. Acoust. Soc. Am. </journal>
</article>
```

```
<book>
  <author>
    <firstname>David</firstname>
    <lastname>Marr</lastname>
  </author>
  <title>Vision information processing</title>
  <year>1982</year>
  <address> NY </address>
  <publisher>Freeman</publisher>
</book>
```

```
<article>
  <author>
    <firstname>David</firstname>
    <lastname>Marr</lastname>
  </author>
  <title>Visual information processing</title>
  <year>1980</year>
  <volume>290</volume>
  <page>
    <from>199</from>
    <to>218</to>
  </page>
  <journal> Phil. Trans. Roy. Soc. B</journal>
</article>
```

```
<book>
  <author>
    <firstname>Sierra</firstname>
    <lastname>Bates</lastname>
  </author>
  <title>Head First Java</title>
  <year>2007</year>
  <address> NJ </address>
  <publisher>EdieFreeman</publisher>
</book>
```



```
<article>
  <author>
    <firstname>Tim</firstname>
    <lastname>Bray</lastname>
  </author>
  <title>Extensible Markup language(XML)</title>
  <year>2006</year>
  <volume>5307</volume>
  <page>
    <from>1</from>
    <to>50</to>
  </page>
  <journal> W3C Recommendation 16 August 2006</journal>
</article>
```

```
<book>
  <author>
    <firstname>Sierra</firstname>
    <lastname>Bates</lastname>
  </author>
  <title>Algorithm Fourth Edition</title>
  <year>2012</year>
</book>
```

```
<article>
  <author>
    <firstname>James</firstname>
    <lastname>Clark</lastname>
  </author>
  <title>XML Path Language(XPath)</title>
  <year>1999</year>
  <volume>2447</volume>
</article>
```

```
</bib>
```

3. XSL code

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<xsl:stylesheet version="1.0"
```

```

xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
<xsl:template match="/">
  <html>
  <head>
    <title>Bibliography</title>
  </head>
  <body background="antiquewhite">
    <center><h2>Bibliography</h2><hr width="90%"/></center>
    <ul>
      <xsl:for-each select="bib/book">
        <p/><li>
          <xsl:value-of select="author/lastname"/>,
          <xsl:value-of select="author/firstname"/>.
          <b><xsl:value-of select="title"/></b>
          (<xsl:value-of select="publisher"/>
          <xsl:value-of select="address"/>
          <xsl:text> </xsl:text>
          <xsl:value-of select="year"/>).
        </li>
      </xsl:for-each>

      <xsl:for-each select="bib/article">
        <p/><li>
          <xsl:value-of select="author/lastname"/>,
          <xsl:value-of select="author/firstname"/>.
          <xsl:value-of select="title"/>,
          <b><em><xsl:value-of
select="journal"/></em>,
          <xsl:value-of select="volume"/></b>,
          pp.<xsl:apply-templates select="page"/>
          <xsl:value-of select="year"/>.
        </li>
      </xsl:for-each>

      <xsl:for-each select="bib/PhD-theses">
        <p/><li>
          <xsl:value-of select="author/lastname"/>,
          <xsl:value-of select="author/firstname"/>.
          <xsl:value-of select="title"/>,
          <b><xsl:value-of select="subject"/>,

```

```

        <xsl:value-of select="ISSN"/></b>,
        <xsl:apply-templates select="Language"/>
        <xsl:value-of select="year"/>.
    </li>
</xsl:for-each>
</ul>
</body>
</html>
</xsl:template>
<xsl:template match="page">
<xsl:value-of select="from"/>-<xsl:value-of select="to"/>,
</xsl:template>
</xsl:stylesheet>
DTD code:
<?xml version="1.0" ?>
<!ELEMENT bib ( (book | article)+)>
<!ELEMENT book ( author, title, year, (address)?, publisher )>
<!ELEMENT article ( author, title, year, volume, page, journal) >
<!ELEMENT PhD-theses ( author, title, year, ISSN, language,subject) >
<!ELEMENT author ( firstname, lastname)>
<!ELEMENT page (from, to)>
<!ELEMENT title (#PCDATA)>
<!ELEMENT year (#PCDATA)>
<!ELEMENT address (#PCDATA)>
<!ELEMENT publisher (#PCDATA)>
<!ELEMENT firstname (#PCDATA)>
<!ELEMENT lastname (#PCDATA)>
<!ELEMENT from (#PCDATA)>
<!ELEMENT to (#PCDATA)>
<!ELEMENT journal (#PCDATA)>
<!ELEMENT volume (#PCDATA)>
<!ELEMENT ISSN (#PCDATA)>
<!ELEMENT subject (#PCDATA)>
<!ELEMENT language (#PCDATA)>

```

XML code:

```

<?xml version="1.0" encoding="ISO-8859-1" ?>
<?xml-stylesheet type="text/xsl" href="bib.xsl"?>
<!DOCTYPE bib SYSTEM "bib.dtd">

```

```
<bib>
  <book>
    <author>
      <firstname>Leslie</firstname>
    <lastname>Lamport</lastname>
    </author>
    <title>Latex: A Document Preparation System </title>
    <year>1986</year>
    <publisher>Addison-Wesley</publisher>
  </book>
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<article>
  <author>
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  <lastname>Marr</lastname>
  </author>
  <title>Visual information processing</title>
  <year>1980</year>
  <volume>290</volume>
  <page>
    <from>199</from>
    <to>218</to>
  </page>
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```
<article>
  <author>
    <firstname>Clifton</firstname>
  <lastname>R. K.</lastname>
  </author>
  <title>Breakdown of echo suppression in the precedence
effect</title>
  <year>1987</year>
  <volume>82</volume>
  <page>
    <from>1834</from>
    <to>1835</to>
```

```
    </page>
    <journal>J. Acoust. Soc. Am. </journal>
</article>
```

```
<book>
  <author>
    <firstname>David</firstname>
    <lastname>Marr</lastname>
  </author>
  <title>Vision information processing</title>
  <year>1982</year>
  <address> NY </address>
  <publisher>Freeman</publisher>
</book>
```

```
<article>
  <author>
    <firstname>David</firstname>
    <lastname>Marr</lastname>
  </author>
  <title>Visual information processing</title>
  <year>1980</year>
  <volume>290</volume>
  <page>
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  </page>
  <journal> Phil. Trans. Roy. Soc. B</journal>
</article>
```

```
<book>
  <author>
    <firstname>Sierra</firstname>
    <lastname>Bates</lastname>
  </author>
  <title>Head First Java</title>
  <year>2007</year>
```

```
    <address> NJ </address>
    <publisher>EdieFreeman</publisher>
</book>
```

```
<article>
    <author>
        <firstname>Tim</firstname>
    <lastname>Bray</lastname>
    </author>
    <title>Extensible Markup language(XML)</title>
    <year>2006</year>
    <volume>5307</volume>
    <page>
        <from>1</from>
        <to>50</to>
    </page>
    <journal> W3C Recommendation 16 August 2006</journal>
</article>
```

```
<book>
    <author>
        <firstname>Sierra</firstname>
    <lastname>Bates</lastname>
    </author>
    <title>Algorithm Fourth Edition</title>
    <year>2012</year>
</book>
```

```
<article>
    <author>
        <firstname>James</firstname>
    <lastname>Clark</lastname>
    </author>
    <title>XML Path Language(XPath)</title>
    <year>1999</year>
    <volume>2447</volume>
</article>
```

```
<PhD-theses>
  <author>
    <firstname>Andersson</firstname>
    <lastname>Mats</lastname>
  </author>
  <title>Object-Oriented Modeling and Simulation of Hybrid
Systems</title>
  <year>1994</year>
  <ISSN> 0280-5315</ISSN>
  <language> English</language>
  <subject> Control Engineering</subject>
</PhD-theses>
```

```
<PhD-theses>
  <author>
    <firstname>Olsson</firstname>
    <lastname>Henrik</lastname>
  </author>
  <title>Control Systems with Friction</title>
  <year>1996</year>
  <ISSN> 0280-5316</ISSN>
  <language> English</language>
  <subject> Control Engineering</subject>
</PhD-theses>
```

```
</bib>
```