

WEEK-6

Objective: To learn about the transformation of data from one format to another form and storing of data using XML.

Aim:

Write an XML to store student details which includes student id, student name, phone number, address and cgpa.

DTD rules:

- i) While storing student name last name has to be attribute and first name has to be child.
- ii) While storing phone number a student can have more than one phonenumber.

XML Schema rules:

- i) Student name should not contain any kind of digits and first name, last name must be strings.
- ii) Phone number must not contain letters and must be length of 10.
- iii) cgpa must be float and should store in range ($0 < \text{cgpa} \leq 10$).

Program:

#XML

```
<?xml version="1.0" ?>
<StudentInfo>
  <student>
    <sid>1201</sid>
    <sname lname="Doe">John</sname>
    <phnum>9988664422</phnum>
    <addr>
      <area>Dolphin Heights</area>
      <city>Vizianagaram </city>
    </addr>
    <res cgpa="9.0">
      <sgpa>8.9</sgpa>
    </res>
  </student>

  <student>
    <sid>1202</sid>
    <sname lname="jill">jack</sname>
    <phnum>9658743521</phnum>
    <addr>
      <area>Vasanth Vihar</area>
      <city>Vizianagaram </city>
    </addr>
    <res cgpa="9.22">
      <sgpa>9.01</sgpa>
    </res>
  </student>
</StudentInfo>
```

```

</student>

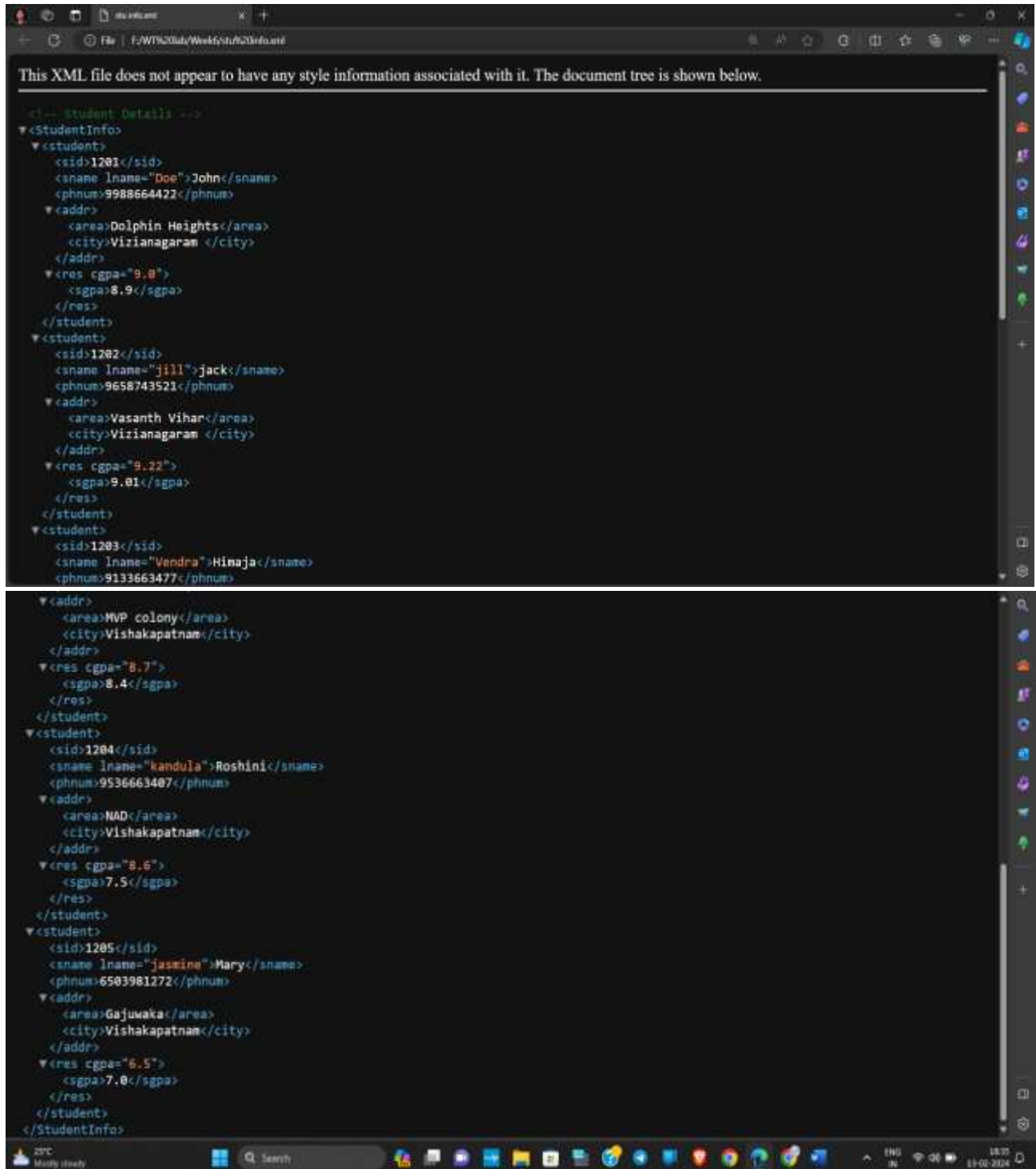
<student>
  <sid>1203</sid>
    <sname lname="Vendra">Himaja</sname>
  <phnum>9133663477</phnum>
  <addr>
    <area>MVP colony</area>
    <city>Vishakapatnam</city>
  </addr>
  <res cgpa="8.7">
    <sgpa>8.4</sgpa>
  </res>
</student>

<student>
  <sid>1204</sid>
    <sname lname="kandula">Roshini</sname>
  <phnum>9536663407</phnum>
  <addr>
    <area>NAD</area>
    <city>Vishakapatnam</city>
  </addr>
  <res cgpa="8.6">
    <sgpa>7.5</sgpa>
  </res>
</student>

<student>
  <sid>1205</sid>
    <sname lname="jasmine">Mary</sname>
  <phnum>6503981272</phnum>
  <addr>
    <area>Gajuwaka</area>
    <city>Vishakapatnam</city>
  </addr>
  <res cgpa="6.5">
    <sgpa>7.0</sgpa>
  </res>
</student>
</StudentInfo>

```

Output:



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<!-- Student Details -->
<StudentInfo>
  <student>
    <sid>1201</sid>
    <sname lname="Doe">John</sname>
    <phnum>9988664422</phnum>
    <addr>
      <area>Dolphin Heights</area>
      <city>Vizianagaram</city>
    </addr>
    <res cgpa="9.8">
      <sgpa>8.9</sgpa>
    </res>
  </student>
  <student>
    <sid>1202</sid>
    <sname lname="jill">jack</sname>
    <phnum>9658743521</phnum>
    <addr>
      <area>Vasanth Vihar</area>
      <city>Vizianagaram</city>
    </addr>
    <res cgpa="9.22">
      <sgpa>9.01</sgpa>
    </res>
  </student>
  <student>
    <sid>1203</sid>
    <sname lname="Vendru">Hinaja</sname>
    <phnum>9133663477</phnum>
    <addr>
      <area>WVP colony</area>
      <city>Vishakapatnam</city>
    </addr>
    <res cgpa="8.7">
      <sgpa>8.4</sgpa>
    </res>
  </student>
  <student>
    <sid>1204</sid>
    <sname lname="kandula">Roshini</sname>
    <phnum>9536663407</phnum>
    <addr>
      <area>NAD</area>
      <city>Vishakapatnam</city>
    </addr>
    <res cgpa="8.6">
      <sgpa>7.5</sgpa>
    </res>
  </student>
  <student>
    <sid>1205</sid>
    <sname lname="jasmine">Mary</sname>
    <phnum>6503981272</phnum>
    <addr>
      <area>Gajuwaka</area>
      <city>Vishakapatnam</city>
    </addr>
    <res cgpa="6.5">
      <sgpa>7.0</sgpa>
    </res>
  </student>
</StudentInfo>
```

#DTD

```
<!DOCTYPE StudentInfo
[
  <!ELEMENT StudentInfo (student)+>
  <!ELEMENT student (sid,sname,phnum,addr,res)>
  <!ELEMENT sid (#PCDATA)>
  <!ELEMENT sname (#PCDATA)>
  <!ELEMENT phnum (#PCDATA)>
  <!ELEMENT addr (area,city)>
  <!ELEMENT area (#PCDATA) >
  <!ELEMENT city (#PCDATA) >
  <!ELEMENT res (sgpa)>
  <!ELEMENT sgpa (#PCDATA)>
  <!ATTLIST sname lname CDATA #REQUIRED >
  <!ATTLIST res cgpa CDATA #REQUIRED >
]>
```

Output:

When more than one student is not specified.

The screenshot displays an XML validation tool interface. On the left, a text area contains the following XML DTD definition:

```
1 <?xml version="1.0" ?>
2
3 <!DOCTYPE StudentInfo
4 [
5   <!ELEMENT StudentInfo (student)>
6   <!ELEMENT student (sid,sname,phnum,addr,res)>
7   <!ELEMENT sid (#PCDATA)>
8   <!ELEMENT sname (#PCDATA)>
9   <!ELEMENT phnum (#PCDATA)>
10  <!ELEMENT addr (area,city)>
11  <!ELEMENT area (#PCDATA) >
12  <!ELEMENT city (#PCDATA) >
13  <!ELEMENT res (sgpa)>
14  <!ELEMENT sgpa (#PCDATA)>
15  <!ATTLIST sname lname CDATA #REQUIRED >
16  <!ATTLIST res cgpa CDATA #REQUIRED >
17 ]>
18
```

At the bottom of the text area are two buttons: "Upload..." and "Load url".

On the right, a "Validation result" panel is open, showing the following results:

- Syntax wellformed**: PASSED
- DTD validation**: FAILED
- XSD validation**: OMITTED

The DTD validation failure message states: "Line 20: Element StudentInfo content does not follow the DTD, expecting (student), got (student student student student student)".

Below the validation results, there is a note: "No schema reference provided using either xsi:schemaLocation or xsi:noNamespaceSchemaLocation attribute." and a link to "Sign up now".

At the bottom right of the interface, there are two buttons: "Actions" and "Validate".

When *sid* is not declared in internal dtd.

The screenshot shows an XML editor with the following code:

```
1 <?xml version="1.0" ?>
2
3 <!DOCTYPE StudentInfo
4 [
5   <!ELEMENT StudentInfo (student)+>
6   <!ELEMENT student (sname,phnum,addr,res)>
7   <!ELEMENT sid (#PCDATA)>
8   <!ELEMENT sname (#PCDATA)>
9   <!ELEMENT phnum (#PCDATA)>
10  <!ELEMENT addr (area,city)>
11  <!ELEMENT area (#PCDATA) >
12  <!ELEMENT city (#PCDATA) >
13  <!ELEMENT res (sgpa)>
14  <!ELEMENT sgpa (#PCDATA)>
15  <!-->
16  <!-->
17 ]>
18
```

The validation result panel on the right shows:

- Syntax wellformed: PASSED
- DTD validation: FAILED

The DTD validation failure is detailed in the following messages:

- Line 21: Element student content does not follow the DTD, expecting (sname , phnum , addr , res), got (sid sname phnum addr res)
- Line 34: Element student content does not follow the DTD, expecting (sname , phnum , addr , res), got (sid sname phnum addr res)
- Line 47: Element student content does not follow the DTD, expecting (sname , phnum , addr , res), got (sid sname phnum addr res)
- Line 60: Element student content does not follow the DTD, expecting (sname , phnum , addr , res), got (sid sname phnum addr res)
- Line 73: Element student content does not follow the DTD, expecting (sname , phnum , addr , res), got (sid sname phnum addr res)

Buttons at the bottom: Upload..., Load url, Actions, Validate.

When the sequence of elements changed in xml

The screenshot shows an XML editor with the following code:

```
8 <!--Student Details-->
9 <!--StudentInfo-->
10 <!--student-->
11 <!--sname-->
12 <!--phnum-->
13 <!--addr-->
14 <!--area-->
15 <!--city-->
16 <!--res-->
17 <!--sgpa-->
18 <!--sgpa-->
19 <!--sgpa-->
20 <!--sgpa-->
21 <!--sgpa-->
22 <!--sgpa-->
23 <!--sgpa-->
24 <!--sgpa-->
25
```

The validation result panel on the right shows:

- Syntax wellformed: PASSED
- DTD validation: FAILED
- XSD validation: OMITTED

The DTD validation failure is detailed in the following message:

- Line 21: Element student content does not follow the DTD, expecting (sid , sname , phnum , addr , res), got (sid phnum sname addr res)

The XSD validation failure is detailed in the following message:

- No schema reference provided using either xsi:schemaLocation or xsi:noNamespaceSchemaLocation attribute.

Buttons at the bottom: Upload..., Load url, Actions, Validate.

```

1 <?xml version="1.0" ?>
2
3 <!DOCTYPE StudentInfo
4 [
5 <!ELEMENT StudentInfo (student)+>
6 <!ELEMENT student (sid,sname,phnum,addr,res)>
7 <!ELEMENT sid (#PCDATA)>
8 <!ELEMENT sname (#PCDATA)>
9 <!ELEMENT phnum (#PCDATA)>
10 <!ELEMENT addr (area,city)>
11 <!ELEMENT area (#PCDATA) >
12 <!ELEMENT city (#PCDATA) >
13 <!ELEMENT res (sgpa)>
14 <!ELEMENT sgpa (#PCDATA)>
15 <!--ATTLIST sname lname CDATA #REQUIRED -->
16 <!--ATTLIST res cgpa CDATA #REQUIRED -->
17 ]>
18

```

Upload...

Load url

▼ Validation result

Syntax wellformed

PASSED

DTD validation

PASSED

XSD validation

OMITTED

No schema reference provided using either xsi:schemaLocation or xsi:noNamespaceSchemaLocation attribute.

Want to cover various integrity and conditional requirements as well?
Check [video tutorials](#) to setup test profiles for professional use cases.
[Sign up now](#) »

Actions ▼

Validate

#XML Schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="StudentInfo">
<xs:complexType>
<xs:sequence>
  <xs:element name="student" minOccurs="1" maxOccurs="unbounded" >
    <xs:complexType>
      <xs:sequence>
        <xs:element name="sid" type="xs:integer"/>
        <xs:element name="sname">
          <xs:complexType>
            <xs:simpleContent>
              <xs:extension base="xs:string">
                <xs:attribute name="lname" type="xs:string"/>
              </xs:extension>
            </xs:simpleContent>
          </xs:complexType>
        </xs:element>
        <xs:element name="phnum" minOccurs="1" maxOccurs="unbounded">
          <xs:simpleType>
            <xs:restriction base="xs:integer">
              <xs:pattern value="[0-9]{10}"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element name="addr">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="area" type="xs:string"/>
              <xs:element name="city" type="xs:string"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
        <xs:element name="res">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="sgpa" type="xs:decimal"/>
            </xs:sequence>
            <xs:attribute name="cgpa">
              <xs:simpleType>
                <xs:restriction base="xs:decimal">
                  <xs:minInclusive value="1"/>
                  <xs:maxInclusive value="10"/>
                </xs:restriction>
              </xs:simpleType>
            </xs:attribute>
          </xs:complexType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

```

</xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>

```

Output:

XML schema (XSD) data

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
3   <xs:element name="StudentInfo">
4     <xs:complexType>
5       <xs:sequence>
6         <xs:element name="student" minOccurs="1">
7           <xs:complexType>
8             <xs:sequence>
9               <xs:element name="sid" type="xs:integer"/>
10              <xs:element name="sname">
11                <xs:complexType>
12                  <xs:simpleContent>
13                    <xs:extension base="xs:string">

```

Validate

Errors

Severity	Location	Filename	Message
	16:13	sample.xml	cvc-complex-type.2.4.d: Invalid content was found starting with element 'student'. No child element is expected at this point.

XML schema (XSD) data

```

13           <xs:extension base="xs:string">
14             <xs:attribute name="lname" type="xs:string"/>
15           </xs:extension>
16         </xs:simpleContent>
17       </xs:complexType>
18     </xs:element>
19   <xs:element name="phnum" minOccurs="1" maxOccurs="unbounded">
20     <xs:simpleType>
21       <xs:restriction base="xs:integer">
22         <xs:pattern value="[0-9]"/>
23       </xs:restriction>
24     </xs:simpleType>
25   </xs:element>

```

Validate

Errors

Severity	Location	Filename	Message
	6:32	sample.xml	cvc-pattern-valid: Value '9988664422' is not facet-valid with respect to pattern '[0-9]' for type 'AnonType_phnumstudentStudentInfo'.

XML schema (XSD) data

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
3 <xs:element name="StudentInfo">
4 <xs:complexType>
5 <xs:sequence>
6 <xs:element name="student" minOccurs="1" maxOccurs="unbounded" >
7 <xs:complexType>
8 <xs:sequence>
9 <xs:element name="sid" type="xs:integer"/>
10 <xs:element name="sname">
11 <xs:complexType>
12 <xs:simpleContent>
13 <xs:extension base="xs:string">
```

Validate

Document Valid

#XSLT

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="1.0"
xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
  <xsl:template match="/">
    <html>
      <head>
        <style>
          table {
            border-collapse: collapse;
            width: 100%;
          }
          th, td {
            border: 1px solid black;
            text-align: center;
            padding: 2px;
          }
        </style>
      </head>
      <body>
        <h2>Student Information</h2>
        <table>
          <tr>
            <th rowspan="2">Student Id</th>
            <th colspan="2">Student Name</th>
            <th rowspan="2">Phone Number</th>
            <th colspan="2">Address</th>
            <th colspan="2">Result</th>
          </tr>
          <tr>
            <th>First name</th>
            <th>Last name</th>
            <th>Area</th>
            <th>City</th>
            <th>CGPA</th>
            <th>SGPA</th>
          </tr>
          <xsl:apply-templates select="StudentInfo/student"/>
        </table>
      </body>
    </html>
  </xsl:template>
  <xsl:template match="student">
    <tr>
      <td><xsl:value-of select="sid"/></td>
      <td><xsl:value-of select="sname"/></td>
      <td><xsl:value-of select="sname/@lname"/></td>
      <td><xsl:value-of select="phnum"/></td>
      <td><xsl:value-of select="addr/area"/></td>
      <td><xsl:value-of select="addr/city"/></td>
      <td><xsl:value-of select="res/@cgpa"/></td>
      <td><xsl:value-of select="res/sgpa"/></td>
    </tr>
  </xsl:template>
</xsl:stylesheet>
```

```

    </tr>
  </xsl:template>
</xsl:stylesheet>

```

Output:

The screenshot shows an online XSLT editor interface. It has two main text areas for code, a button to edit the code, and a preview of the output table.

XML Code:

```

<student>
  <sid>1205</sid>
  <sname lname="Jasmine">Mary</sname>
  <phnum>6503981272</phnum>
  <addr>
    <area>Gajuwaka</area>
    <city>Vishakapatnam</city>
  </addr>
  <res cgpa="6.5">
    <sgpa>7.0</sgpa>
  </res>
</student>
</StudentInfo>

```

XSLT Code:

```

<xsl:template match="student">
  <tr>
    <td><xsl:value-of select="sid"/></td>
    <td><xsl:value-of select="sname"/></td>
    <td><xsl:value-of select="sname/@lname"/></td>
    <td><xsl:value-of select="phnum"/></td>
    <td><xsl:value-of select="addr/area"/></td>
    <td><xsl:value-of select="addr/city"/></td>
    <td><xsl:value-of select="res/cgpa"/></td>
    <td><xsl:value-of select="res/sgpa"/></td>
  </tr>
</xsl:template>
</xsl:stylesheet>

```

Student Information

Student Id	Student Name		Phone Number	Address		Result	
	First name	Last name		Area	City	CGPA	SGPA
1201	John	Doe	9983664422	Dolphin Heights	Vizianagaram	9.0	8.9
1202	Jack	Jill	9658743521	Venush Vihar	Vizianagaram	9.22	9.01
1203	Hanuja	Venka	9133663477	MVP colony	Vishakapatnam	8.7	8.4
1204	Roshini	knashila	9536663407	NAID	Vishakapatnam	8.6	7.5
1205	Mary	Jasmine	6503981272	Gajuwaka	Vishakapatnam	6.5	7.0