

UNIT IV XML DATABASES 9

Structured, Semi structured, and Unstructured Data – XML Hierarchical Data Model – XML Documents – Document Type Definition – XML Schema – XML Documents and Databases – XML Querying – XPath – XQuery

XML Schema:

XML schema is a language which is used for expressing constraints about XML documents. There are so many schema languages which are used now a days for example Relax- NG and XSD (XML schema definition). An XML schema is used to define the structure of an XML document. It is like DTD but provides more control on XML structure.

Example:

```
<?xml version="1.0"?>
  <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
    targetNamespace="http://www.javatpoint.com"
    xmlns="http://www.javatpoint.com"
    elementFormDefault="qualified">
    <xs:element name="employee">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="firstname" type="xs:string"/>
          <xs:element name="lastname" type="xs:string"/>
          <xs:element name="email" type="xs:string"/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:schema>
```

Description of XML Schema:

<xs:element name="employee"> : It defines the element name employee.
<xs:complexType> : It defines that the element 'employee' is complex type.
<xs:sequence> : It defines that the complex type is a sequence of elements.
<xs:element name="firstname" type="xs:string"/> : It defines that the element 'firstname' is of string/text type.
<xs:element name="lastname" type="xs:string"/> : It defines that the element 'lastname' is of string/text type.
<xs:element name="email" type="xs:string"/> : It defines that the element 'email' is of string/text type.

XML Schema Data types:

There are two types of data types in XML schema.

1. SimpleType
2. ComplexType

SimpleType

The simpleType allows you to have text-based elements. It contains less attributes, child elements, and cannot be left empty.

ComplexType

The complexType allows you to hold multiple attributes and elements. It can contain additional sub elements and can be left empty.

DTD vs XSD

There are many differences between DTD (Document Type Definition) and XSD (XML Schema Definition). In short, DTD provides less control on XML structure whereas XSD (XML schema) provides more control.

Sl.No	DTD	XSD
1.	DTD stands for Document Type Definition.	XSD stands for XML Schema Definition.
2.	DTDs are derived from SGML syntax.	XSDs are written in XML.
3.	DTD doesn't support datatypes.	XSD supports datatypes for elements and attributes.
4.	DTD doesn't support namespace.	XSD supports namespace.
5.	DTD doesn't define order for child elements.	XSD defines order for child elements.
6.	DTD is not extensible.	XSD is extensible.
7.	DTD is not simple to learn.	XSD is simple to learn because you don't need to learn a new language.
8.	DTD provides less control on XML structure.	XSD provides more control on XML structure.

XML Database:

XML database is a data persistence software system used for storing the huge amount of information in XML format. It provides a secure place to store XML documents. You can query your stored data by using XQuery, export and serialize into desired format. XML databases are usually associated with document-oriented databases.

Types of XML databases:

There are two types of XML databases.

1. XML-enabled database
2. Native XML database (NXD)

1. XML-enable Database:

XML-enable database works just like a relational database. It is like an extension provided for the conversion of XML documents. In this database, data is stored in table, in the form of rows and columns.

2. Native XML Database:

Native XML database is used to store large amount of data. Instead of table format, Native XML database is based on container format. You can query data by XPath expressions. Native XML database is preferred over XML-enable database because it is highly capable to store, maintain and query XML documents.

Example:

```
<?xml version="1.0"?>
  <contact-info>
    <contact1>
      <name>Vimal Jaiswal</name>
      <company>SSSIT.org</company>
      <phone>(0120) 4256464</phone>
    </contact1>
    <contact2>
      <name>Mahesh Sharma </name>
      <company>SSSIT.org</company>
      <phone>09990449935</phone>
    </contact2>
  </contact-info>
```
