

XML Data

Introduction,
Well-formed XML

Extensible Markup Language (XML)

- Standard for data representation and exchange
- Document format similar to HTML
 - Tags describe content instead of formatting
- Also streaming format

```
<?xml version="1.0" ?>
<!-- Bookstore with no DTD -->
<Bookstore>
- <Book ISBN="ISBN-0-13-713526-2" Price="85" Edition="3rd">
   <Title>A First Course in Database Systems</Title>
 - <Authors>
   - <Author>
      <First_Name>Jeffrey</First_Name>
      <Last Name>Ullman</Last Name>
     </Author>
   - <Author>
      <First Name>Jennifer</First Name>
      <Last Name>Widom</Last Name>
     </Author>
   </Authors>
 </Book>
- <Book ISBN="ISBN-0-13-815504-6" Price="100">
   <Remark>Buy this book bundled with "A First Course" -- a great deal!
   <Title>Database Systems: The Complete Book</Title>
```

Basic constructs

- Tagged elements (nested)
- Attributes
- Text

```
<?xml version="1.0" ?>
<!-- Bookstore with no DTD -->
<Bookstore >//
 <Book ISBN="ISBN-0-13-713526-2" Price="85" Edition="3rd":</p>
                                                  No remark
   <Title>A First Course in Database Systems</Title>
 - <Authors>
    <Author>
      <First_Name>Jeffrey</First_Name>
       <Last_Name><Ullman</pre>
     /Author>
     <Author>
                                                No edition
      <First_Name>Jennifer</First_Name>
       Last_Name>Widom</Last_Name>
     </Author>
   </Authors>
  </Book>
 <Book ISBN="ISBN-0-13-815504-6" Price="100">
   <Remark>Buy this book bundled with "A First Course" -- a great deal!</Remark>
   <Title>Database Systems: The Complete Book</Title>
 - <Authors>
   - <Author>
      <First Name>Hector</First Name>
      <Last_Name>Garcia-Molina</Last_Name>
     </Author>
   - <Author>
      <First_Name>Jeffrey</First_Name>
      <Last_Name>Ullman</Last_Name>
     </Author>
   - <Author>
```

<First Name>Jennifer</First Name>

Jennifer Widom

Relational Model versus XML

	Relational	XML
Structure	Tables	Hierarchical Tree, graph
Schema	Fixed in advance	Flexible "Self-describing"
Queries	Simple, nice largs.	Less 50. (:
Ordering	None.	Implied.
Implementation	Native.	Add-on.

"Well-Formed" XML

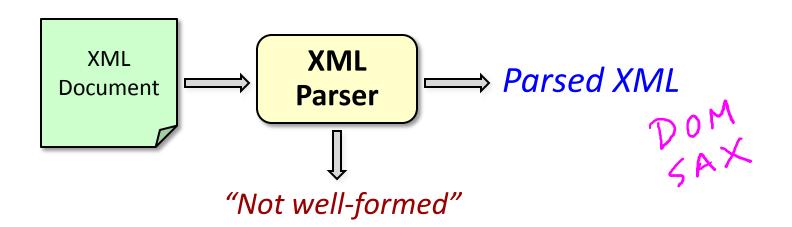
Adheres to basic structural requirements

- Single root element
- Matched tags, proper nesting
- Unique attributes within elements

```
<?xml version="1.0" ?>
<!-- Bookstots with no DTD -->
<Bookstore>
- <Book ISBN="ISBN-0-13-713526-2" Price="85" Edition="3rd">
   <Title>A First Course in Database Systems</Title>
 - <Authors>
   - <Author>
       <First Name>Jeffrey</First Name>
       <Last_Name>Ullman</Last_Name>
     </Author>
   - <Author>
       <First_Name>Jennifer</First_Name>
       <Last Name>Widom</Last Name>
     </Author>
   </Authors>
  </Book>
- <Book ISBN="ISBN-0-13-815504-6" Price="100">
   <Remark>Buy this book bundled with "A First Course" -- a great deal!
   <Title>Database Systems: The Complete Book</Title>
  - < Authors >
```

Adheres to basic structural requirements

- Single root element
- Matched tags, proper nesting
- Unique attributes within elements



Displaying XML

Use rule-based language to translate to HTML

- Cascading stylesheets (CSS)
- Extensible stylesheet language (XSL)

```
<?xml version="1.0" ?>
 <!-- Bookstore with no DTD -->

    <Bookstore>

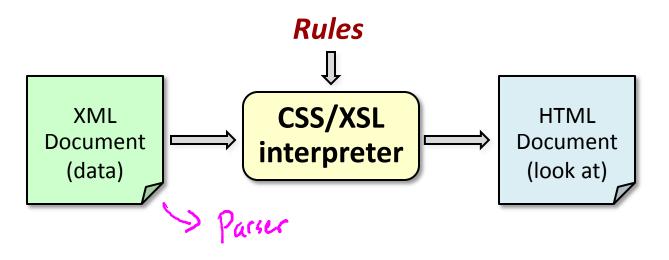
 - <Book ISBN="ISBN-0-13-713526-2" Price="85" Edition="3rd">
    <Title>A First Course in Database Systems</Title>
  - <Authors>
    - <Author>
        <First Name>Jeffrey</First Name>
        <Last_Name>Ullman</Last_Name>
      </Author>
    - <Author>
        <First_Name>Jennifer</First_Name>
        <Last Name>Widom</Last Name>
      </Author>
     </Authors>
   </Book>
 - <Book ISBN="ISBN-0-13-815504-6" Price="100">
    <Remark>Buy this book bundled with "A First Course" -- a great deal!</pr
    <Title>Database Systems: The Complete Book</Title>
   - < Authors >
```

Jennifer Widom

Displaying XML

Use rule-based language to translate to HTML

- Cascading stylesheets (CSS)
- Extensible stylesheet language (XSL)



Extensible Markup Language (XML)

- Standard for data representation and exchange
- Formal specification is enormous; we cover most important components

```
<?xml version="1.0" ?>
 <!-- Bookstore with no DTD -->
- <Bookstore>
 - <Book ISBN="ISBN-0-13-713526-2" Price="85" Edition="3rd">
    <Title>A First Course in Database Systems</Title>
  - <Authors>
    - <Author>
        <First Name>Jeffrey</First Name>
        <Last_Name>Ullman</Last_Name>
      </Author>
    - <Author>
        <First_Name>Jennifer</First_Name>
        <Last Name>Widom</Last Name>
      </Author>
     </Authors>
   </Book>
 - <Book ISBN="ISBN-0-13-815504-6" Price="100">
    <Remark>Buy this book bundled with "A First Course" -- a great deal!</pr
    <Title>Database Systems: The Complete Book</Title>
   - < Authors >
```