

## Document Type Definition (DTD)

A Document Type Definition (DTD) is used in XML to define the structure, elements, and attributes of an XML document. DTDs ensure that XML data follows specific rules and constraints, making it easier to validate and process.

Here's a simple example of a DTD that defines a structure for a "bookstore" XML document, with elements like book, title, author, price, and year:

### Example DTD

This example shows an external DTD file (bookstore.dtd):

```
<!ELEMENT bookstore (book+)>
<!ELEMENT book (title, author, price, year)>
<!ELEMENT title (#PCDATA)>
<!ELEMENT author (#PCDATA)>
<!ELEMENT price (#PCDATA)>
<!ELEMENT year (#PCDATA)>
<!ATTLIST book category CDATA #IMPLIED>
<!ATTLIST book id ID #REQUIRED>
```

### Explanation

1. **<!ELEMENT bookstore (book+)>**  
Defines a bookstore element that contains one or more (+) book elements.
2. **<!ELEMENT book (title, author, price, year)>**  
Defines a book element that contains the elements title, author, price, and year in that order.
3. **<!ELEMENT title (#PCDATA)>**  
Defines title as an element containing parsed character data (#PCDATA), which means it can have text.
4. **<!ELEMENT author (#PCDATA)>**  
Similar to title, author is a text-only element.
5. **<!ELEMENT price (#PCDATA)>**  
Similar to title and author, price is also a text-only element.

6. **<!ELEMENT year (#PCDATA)>**  
Similar to title, author, and price, year is a text-only element.
7. **<!ATTLIST book category CDATA #IMPLIED>**  
Adds an optional attribute category to the book element. CDATA means it can have any text value.
8. **<!ATTLIST book id ID #REQUIRED>**  
Adds a required id attribute to the book element, with the type ID, which must be unique across the document.

## XML Document Using bookstore.dtd

Here's an XML document that references bookstore.dtd and follows its structure:

```
<!DOCTYPE bookstore SYSTEM "bookstore.dtd">
<bookstore>
  <book id="b1" category="Fiction">
    <title>The Great Gatsby</title>
    <author>F. Scott Fitzgerald</author>
    <price>10.99</price>
    <year>1925</year>
  </book>

  <book id="b2" category="Non-Fiction">
    <title>Thinking, Fast and Slow</title>
    <author>Daniel Kahneman</author>
    <price>15.99</price>
    <year>2011</year>
  </book>
</bookstore>
```

In this example, the XML document adheres to the structure specified in **bookstore.dtd**.