Document Type Definition (DTD)

- A DTD is a Document Type Definition.
- A DTD defines the structure and the legal elements and attributes of an XML document.

Why Use a DTD?

- With a DTD, independent groups of people can agree on a standard DTD for interchanging data.
- An application can use a DTD to verify that XML data is valid.

An Internal DTD Declaration

If the DTD is declared inside the XML file, it must be wrapped inside the <!DOCTYPE> definition:

XML document with an internal DTD

```xml
<?xml version="1.0"?>
<!DOCTYPE note [
<!ELEMENT note (to,from,heading,body)>
<!ELEMENT to (#PCDATA)>
<!ELEMENT from (#PCDATA)>
<!ELEMENT heading (#PCDATA)>
<!ELEMENT body (#PCDATA)>
]>
<note>
<to>Tove</to>
<from>Jani</from>
<heading>Reminder</heading>
<body>Don't forget me this weekend</body>
</note>
```

The DTD above is interpreted like this:

- **!DOCTYPE note** defines that the root element of this document is note
- **!ELEMENT note** defines that the note element must contain four elements: "to,from,heading,body"
- **!ELEMENT to** defines the to element to be of type "#PCDATA"
- **!ELEMENT from** defines the from element to be of type "#PCDATA"
- **!ELEMENT heading** defines the heading element to be of type "#PCDATA"
- **!ELEMENT body** defines the body element to be of type "#PCDATA"

An External DTD Declaration

If the DTD is declared in an external file, the <!DOCTYPE> definition must contain a reference to the DTD file:

XML document with a reference to an external DTD

```xml
<?xml version="1.0"?>
<!DOCTYPE note SYSTEM "note.dtd">
<note>
  <to>Anupam</to>
  <from>Arindam</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend!</body>
</note>
```

And here is the file "note.dtd", which contains the DTD:

```
<!ELEMENT note (to,from,heading,body)>
<!ELEMENT to (#PCDATA)>
<!ELEMENT from (#PCDATA)>
<!ELEMENT heading (#PCDATA)>
<!ELEMENT body (#PCDATA)>
```