

Data Types

We have already recognized the very restricted selection of data types as a key weakness of DTDs. XML Schema provides powerful capabilities for defining data type.

First there is a variety of *built-in data types*. Here we list a few:

- Numerical data types, including integer, short, Byte, long, float, decimal
- String data types, including string, ID, IDREF, CDATA, language
- Date and time data types, including time, date, gMonth, gYear

There are also *user-defined data types*, comprising *simple data types*, which cannot use elements or attributes, and *complex data types*, which can use elements and attributes. We discuss complex types first, deferring discussion of simple data types until we talk about restriction. Complex types are defined from already existing data types by defining some attributes (if any) and using

- sequence, a sequence of existing data type elements, the appearance of which in a predefined order is important,
- all, a collection of elements that must appear but the order of which is not important,
- choice, a collection of elements, of which one will be chosen.

Here is an example:

```
<complexType name="lecturerType">
  <sequence>
    <element name="firstname" type="string"
      minOccurs="0" maxOccurs="unbounded"/>
    <element name="lastname" type="string"/>
  </sequence>
```