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# XML Technologies

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XML Schema

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# XSD vs. XML Document

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```
<?xml version="1.0" encoding="windows-1250"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
  ... <!-- XML schema definition --> ...
</xs:schema>
```

```
<?xml version="1.0" encoding="windows-1250"?>
<root_element_of_XML_document
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:noNamespaceSchemaLocation="schema2.xsd">
  ... <!-- XML document --> ...
</root_element_of_XML_document>
```

- XML Schema namespace
  - Namespace of XML Schema instances = XML documents valid against an XSD
  - URL of XSD file
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# Basic Principles

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- Data types
    - Simple (**simpleType**)
    - Complex (**complexType**)
  - Elements (**element**)
    - Groups of elements (**group**)
  - Attribute (**attribute**)
    - Groups of attributes (**attributeGroup**)
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# Example

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```
<xs:complexType name="TypeAddress">
  <!-- specification of content -->
  <xs:sequence>
    <xs:element name="Street" type="xs:string"/>
    <xs:element name="Number" type="xs:integer"/>
    <xs:element name="City" type="xs:string"/>
  </xs:sequence>

  <!-- specification of attributes -->
  <xs:attribute name="Country" type="xs:NMTOKEN"
                default="CZ"/>
</xs:complexType>

<xs:element name="Address" type="TypeAddress"/>
```

# Data Types

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- Simple data types

- Built-in

- Numbers, dates, ...

- User defined

- **restriction**

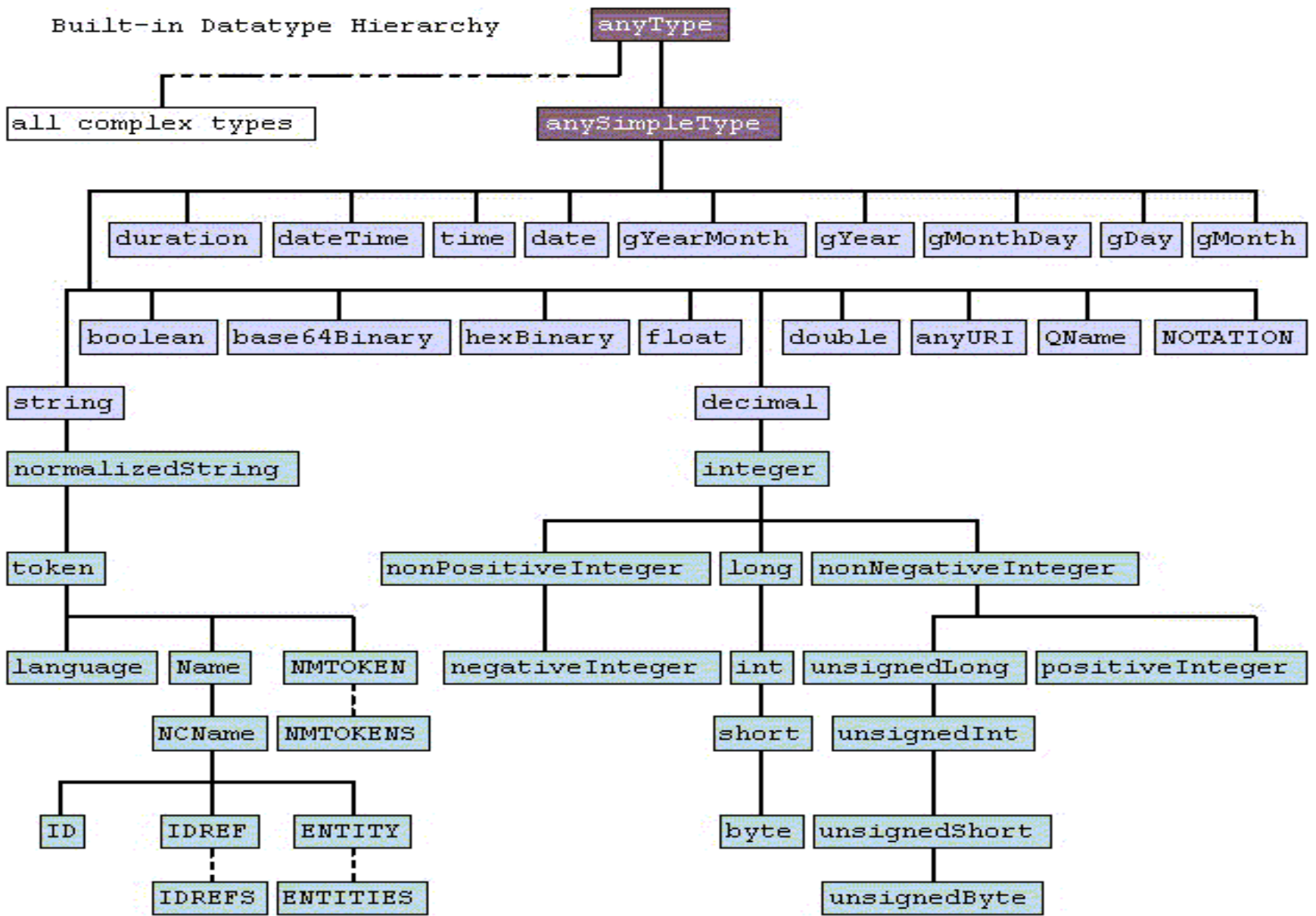
- enumeration, length, pattern, ...

- **list**

- **union**

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Built-in Datatype Hierarchy

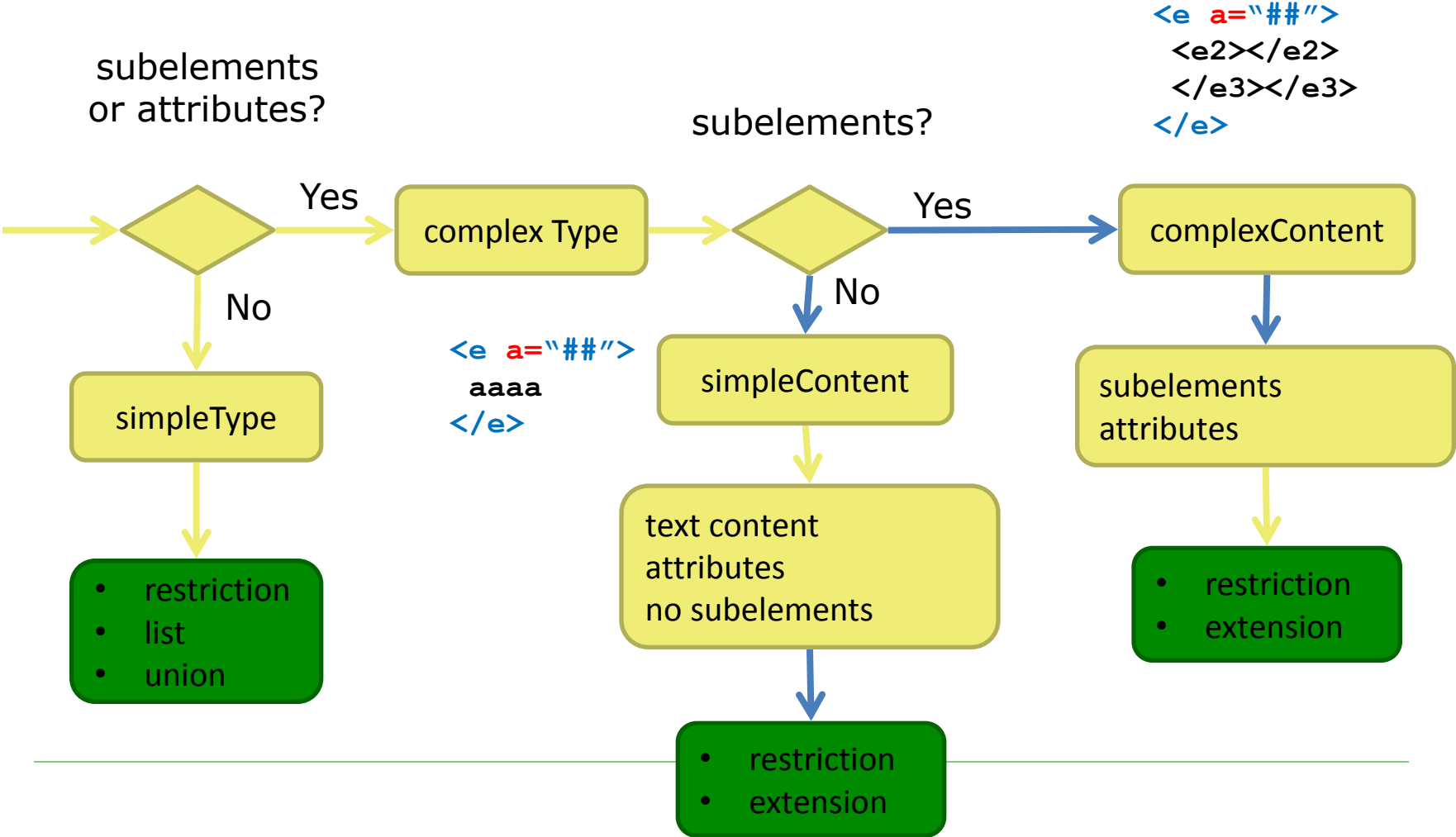


# Data Types

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- Complex data types
    - Simple content (**simpleContent**)
      - extension, restriction
    - **sequence, choice, all**
      - minOccurs, maxOccurs
    - Complex content (**complexContent**)
      - extension, restriction
    - **mixed**
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# Data Types





# References

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- Globally and locally defined
    - Elements, attributes
    - Groups of elements / attributes
    - Simple / complex types
  - References
    - Elements / attributes
    - Groups of elements / attributes
-

```
<xs:group name="CommonElements">
  <xs:sequence>
    <xs:element name="Name" type="xs:string"/>
    <xs:element name="Author" type="xs:string"/>
    <xs:element name="Date" type="xs:date"/>
  </xs:sequence>
</xs:group>

<xs:complexType name="TypeBook">
  <xs:sequence>
    <xs:group ref="CommonElements" minOccurs="0"/>
    <xs:element name="ISBN" type="xs:string"/>
    <xs:element name="Publisher" type="xs:string"/>
  </xs:sequence>
</xs:complexType>
```

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# Advanced Constructs

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- Wildcards
    - **any, anyAttribute**
  - Identity restrictions
    - **key, unique**
    - **keyref**
      - **selector, field**
  - Substitutability
    - Implicit (data types of elements)
    - Explicit (whole elements)
      - attribute **substitutionGroup** of elements
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# Note

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## □ Common abbreviation...

```
<complexType name="...">  
  <sequence>...</sequence>  
  <attribute.../>  
</complexType>
```

## □ ... and its meaning

```
<complexType name="...">  
  <complexContent>  
    <restriction base="anyType">  
      <sequence>...</sequence>  
      <attribute.../>  
    </restriction>  
  </complexContent>  
</complexType>
```

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