DTD

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Document Type Definition

DTD defines the document description language

a formal description of the document's structure, containing information about elements (tags), their additional properties (attributes) and dependencies between elements that connect them to a tree structure

A DTD specifies a grammar for the document

- Constraints on structures and values of elements, attributes, etc.

Document Type Definition

DTD defines the document description language

Advantages:

- The possibility of validation
- The possibility of automatic conversion
- Documentation
- Creating multiple documents according to one recipe

An Internal DTD Declaration

An External DTD Declaration

Tree.XML:

```
<?xml version=1.0? encoding="UTF-8" >
<!DOCTYPE tree [
   <!ELEMENT tree (#PCDATA)>
]>
...
```

Tree.DTD:

```
<?xml version="1.0" encoding="UTF-8" ?>
<ELEMENT tree (#PCDATA)>
...
```

Tree.XML:

```
<?xml version=1.0 standalone= ” yes” ?>
<!DOCTYPE tree SYSTEM ” Tree.dtd”>
...
```

An External DTD Declaration

Private

<!DOCTYPE name_of_the_root_element **SYSTEM** "URL_DTD"**>**

<!DOCTYPE tree **SYSTEM** "Tree.dtd"**>**

Public

<!DOCTYPE name_of_the_root_element **PUBLIC** "DTD_name" "URL_DTD"**>**

<!DOCTYPE html **PUBLIC** "-//W3C//DTD HTML 4.01//EN"

"http://www.w3.org/TR/html4/strict.dtd"**>**

Document Type Definition

Elements

Atributes

Entities

Elements

<name_of_element>
content according to type
</ name_of_element >

Element declaration

<!ELEMENT **name_of_element** *type_of_the_content*>

<!ELEMENT **name** (#PCDATA)>

Element content

- Content type
  - chars (#PCDATA)
  - elements
  - mixed
- EMPTY
- ANY

<name>
Kowalski
</name>

<person>
Kowalski
</person>

Order indicators

- sequence
- choice
- sequence and choice connection

```
<computer>
        < out_dev > </ out_dev >
        < in_dev > </ in_dev >
</ computer>
```

```
<computer>
        < out_dev > </ out_dev >
</computer>
```

```
<!ELEMENT computer (out_dev, in_dev)>
<!ELEMENT computer (out_dev | in_dev)>
<!ELEMENT computer (model, (out_dev | in_dev), nr)>
```

```
<komputer>
        <model> </ model >
        <out_dev > </ out_dev >
        <nr> </nr>
</ komputer>
```

Number of occurences

No symbol	One and only one	Element
?	Zero or one	optional element
*	zero or any number of times	Optional element iteration
+	one or more times	iteration of the obligatory element

```
<computer>
        <disk> 1 </disk>
        <disk> 2 </disk>
        <disk> 3 </disk>
</computer>
```

<!ELEMENT computer (disk, disk, disk)>

<!ELEMENT computer (disk*)>

Content type

Char content

```
<!ELEMENT computer (#PCDATA)>
```

```
<computer> my computer </computer>
```

Mixed content

```
<!ELEMENT computer (#PCDATA | ram | disk | monitor)*>
```

```
<computer>
        computer with
        <ram> 2 </ram>
        <monitor></monitor>
</computer>
```

Content type

ANY content

- any element declared in the DTD

```
<!ELEMENT computer ANY>
```

EMPTY content

- must be empty

```
<!ELEMENT point EMPTY>
```

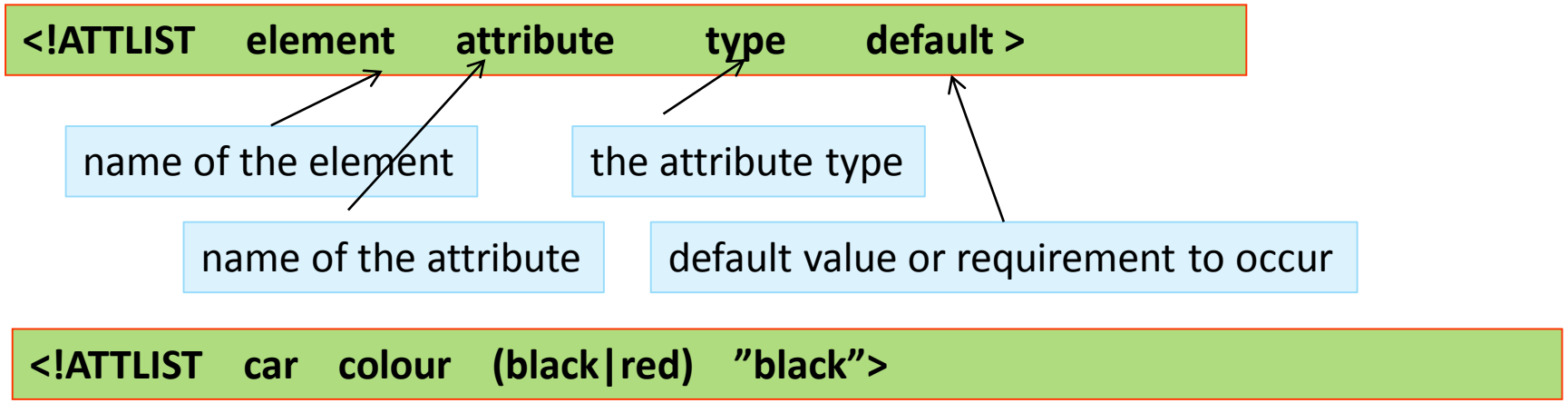
```
<point/>
```

```
<!ELEMENT computer (#PCDATA)>
```

```
<computer> </computer>
```

Attributes

attribute declaration



<!ATTLIST car colour (black|red) ”black”>

types for attribute

- CDATA
- ID
- IDREF
- …

<car colour= ”black” >...</car>

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Attribute types

string

```
<!ATTLIST document  no   CDATA >
```

```
<document no=”1.2.3”>   ...   </document >
```

enumeration

```
<!ATTLIST document status (project | edition | ready) >
```

```
<document status=”edition”>   ...   </document>
```

modular

```
<!ENTITY   % status  ” status (project | edition | ready)”>
<!ENTITY   % no   ”no CDATA”>

<!ATTLIST document  %no; % status;>
```

Default values

accepted if no value is given in the document

```
<!ATTLIST document status (project | edition | ready) ’edition’>
```

described by the keyword

- #REQUIRED
- #IMPLIED
- #FIXED the value cannot be changed

```
<!ATTLIST document status (project | edition | ready) #REQUIRED>
<!ATTLIST document status (project | edition | ready) #IMPLIED>
<!ATTLIST document status (project | edition | ready) #FIXED ’ 14.11’>
```

Global attributes

Each element can use them

```
<!ENTITY %  x.global
‘ status  (project | edition | ready) #REQUIRED
  no      CDATA                      #IMPLIED ‘>
...
<!ELEMENT document (#PCDATA | chapter)*>
<!ATTLIST   document   %x.global;>
...
<!ELEMENT chapter (#PCDATA)>
<!ATTLIST   chapter   %x.global;>
...
```


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DTD - limitations

No default values for elements

DTD does not support namespace

No possibility to limit the text content of documents

No data types other than textual

Inability to define own types of elements

Poor modularity

Non-compliance with XML specification