One Document Does it all

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TEI

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Literate programming ODD-style

The TEI Guidelines, its DTD, and its schema fragments, are all produced from a single XML resource containing:

1. Descriptive prose (lots of it)
2. Examples of usage (plenty)
3. Formal declarations for components of the TEI Abstract Model:
    - elements and attributes
    - modules
    - classes and macros
4. We call this resource an ODD (One Document Does it all).

So what?

The TEI scheme can only be used by customizing it and customizations are also expressed in the ODD language. For example:

```
<schemaSpec ident="myTEIlite">
 <desc>This is TEI Lite with simplified heads</desc>
 <moduleRef key="tei"/>
 <moduleRef key="core"/>
 <moduleRef key="textstructure"/>
 <moduleRef key="header"/>
 <moduleRef key="linking"/>
 <elementSpec ident="head" mode="change">
  <content>
   <rng:text/>
  </content>
 </elementSpec>

</schemaSpec>
```

produces something like TEI Lite, with a slight change

ODD processors

- We maintain a library of XSLT scripts that can generate
  - The TEI Guidelines in canonical TEI XML format
  - The Guidelines in HTML or PDF
  - RelaxNG, DTD, or W3C schema fragments
- The same library is used by the customization layer to generate
  - project-specific documentation
  - project-specific schemas
  - translations into other (human) languages
- We use eXist as a database for extracting material from the P5 sources

The TEI abstract model

- The TEI abstract model sees a markup scheme (a **schema**) as consisting of a number of discrete **modules**, which can be combined more or less as required.
- A schema is made by combining references to modules and optional element over-rides or additions
- Each **element** declares the module it belongs to: elements cannot appear in more than one module.
- Each module extends the range of elements and attributes available by adding new members to existing **classes of elements**, or by defining new classes.

The TEI class system

- Class membership can do two distinct things for an element:
  1. give it some attributes
  2. allow it to join a ‘club’
- Content models reference ‘clubs’ rather than specific elements (wherever possible)
- Content models are named patterns, distinct from element names
- (There are also special named patterns for common content models such as `macro.phraseSeq`)

Expression of TEI content models

Within the class system, TEI elements have to be defined using some language notation; choices include:

1. using ‘raw’ XML DTD language
2. using W3C Schema language
3. using the Relax NG schema language
4. inventing an entirely new abstract language for later transformation to specific schema language

We chose a combination of 3 and 4 — using our abstract language, but switching to Relax NG for content modelling.

Why that combination?

- Expressing constraints in XML language is too attractive to forego
- There is a clamour for better datatyping than DTDs have
- The schema languages are so good, it is silly to reinvent them
- But we like our class system and literate programming

DTD vs Relax NG vs W3C Schema

- DTDs are not XML, and need specialist software
- W3C schema is not consistently implemented, is poorly documented, and looks over-complex
- Relax NG on the other hand...
  - uncluttered design
  - good documentation
  - multiple open source 100%-complete implementations
  - ISO standard
  - useful features for multipurpose structural validation
  - Compelling leadership (can James Clark do wrong?)

No contest. . .

What does an ODD look like?

```
<elementSpec module="spoken" ident="pause">
 <classes>
  <memberOf key="model.divPart.spoken"/>
  <memberOf key="att.timed"/>
  <memberOf key="att.typed"/>
 </classes>
 <content>
  <rng:empty/>
 </content>
 <attList>
  <attDef ident="who" usage="opt">
   <gloss>A unique identifier</gloss>
   <desc>supplies the identifier of the
     person or group pausing.
     Its value is the identifier of a <gi>person</gi>
     or <gi>persGrp</gi> element in the TEI header.
     </desc>
   <datatype>
    <rng:ref name="data.pointer"/>
   </datatype>
  </attDef>
 </attList>
 <desc>a pause either between or within utterances</desc>
```

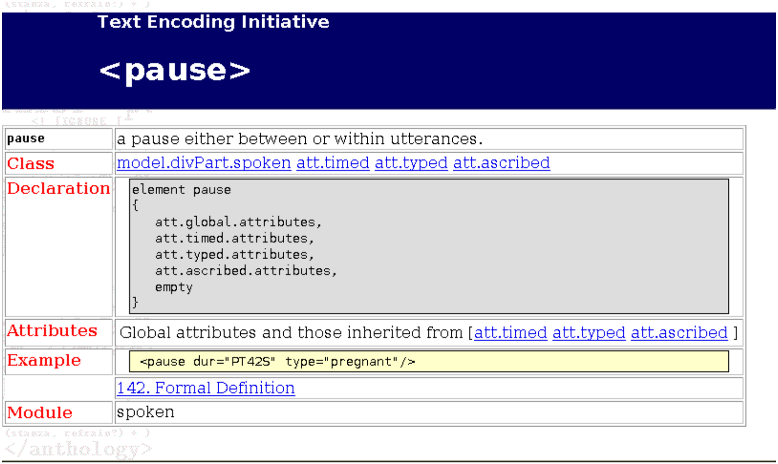
... from which we generate

```
element pause  pause.content, pause.attributes
pause.content = empty
pause.attributes =
 att.global.attributes,
 att.timed.attributes,
 att.typed.attributes,
 att.ascribed.attributes,
 [ a:defaultValue = "pause" ] attribute TEIform  text ?
model.divPart.spoken |= pause
att.timed |= pause
att.typed |= pause
att.ascribed |= pause
```

.. or

```
<!ELEMENT %n.pause; %om.RR; EMPTY>
<!ATTLIST %n.pause;
 %att.global.attributes;
 %att.timed.attributes;
 %att.typed.attributes;
 %att.ascribed.attributes;
 TEIform CDATA ’pause’  >
<!ENTITY % model.divPart.spoken
 "%x.model.divPart.spoken; %n.event; | %n.kinesic;
 | %n.pause; | %n.shift; | %n.u;
 | %n.vocal; | %n.writing;">
```

... and, indeed, to



Text Encoding Initiative

<pause>

pause	a pause either between or within utterances.
Class	model.divPart.spoken att.timed att.typed att.ascribed

Declaration	element pause
	{
	att.global.attributes,
	att.timed.attributes,
	att.typed.attributes,
	att.ascribed.attributes,
	empty
	}

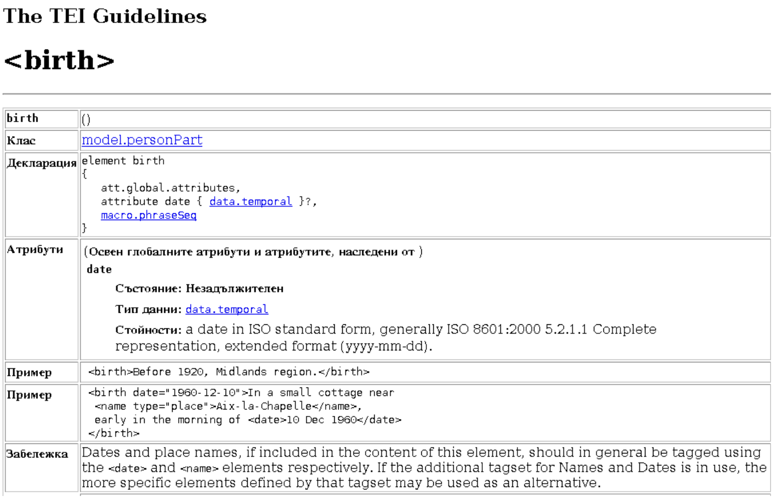
Attributes	Global attributes and those inherited from [att.timed att.typed att.ascribed]
Example	`<pause dur="PT42S" type="pregnant"/>`
	142. Formal Definition
Module	spoken

A more complex example

```
 <elementSpec module="corpus" ident="birth">
 <gloss>Birth details</gloss>
 <desc>contains information about a person's birth,
 such as its date and place.</desc>
 <classes>
 <memberOf key="model.personPart"/>
 </classes>
 <content>
 <rng:ref name="macro.phraseSeq"/>
 </content>
 <attList>
 <attDef ident="date" usage="opt">
 <desc>specifies the date of birth in an ISO standard form
(yyyy-mm-dd).</desc>
 <datatype>
 <rng:ref name="data.temporal"/>
 </datatype>
 </attDef>
 </attList>

 </elementSpec>
```

Which produces . . .



The TEI Guidelines

<birth>

birth	()
Клас	model.personPart

Декларация	element birth
	{
	att.global.attributes,
	attribute date { data.temporal }?,
	macro.phraseSeq
	}

Атрибути	(**Освен глобалните атрибути и атрибутите, наследени от**) **date** **Състояние: Незадължителен** **Тип данни:** data.temporal **Стойности:** a date in ISO standard form, generally ISO 8601:2000 5.2.1.1 Complete representation, extended format (yyyy-mm-dd).
Пример	<birth>Before 1920, Midlands region.</birth>
Пример	<birth date="1960-12-10">In a small cottage near <name type="place">Aix-la-Chapelle</name>, early in the morning of <date>10 Dec 1960</date> </birth>
Забележка	Dates and place names, if included in the content of this element, should in general be tagged using the <date> and <name> elements respectively. If the additional tagset for Names and Dates is in use, the more specific elements defined by that tagset may be used as an alternative.

And some XSD for a change . . .

```
  <xs:element name="birth">
    <xs:annotation>
      <xs:documentation>(Birth details) contains information
about a  person’s birth, such as its date
and place.</xs:documentation>
    </xs:annotation>
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="ns1:birth.content">
          <xs:attributeGroup ref="ns1:birth.attributes"/>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>
  <xs:complexType name="birth.content">
    <xs:complexContent>
      <xs:extension base="ns1:macro.phraseSeq"/>
    </xs:complexContent>
  </xs:complexType>
```

Customizing the TEI

The TEI has over 20 modules. A working project will:

- Choose the modules they need
- Probably narrow the set of elements within a module
- Probably add local datatype constraints
- Possibly add new elements
- Possibly localize the names of elements

We can do this in ODD

A simple selection of modules

```
<schema>
 <moduleRef key="tei"/>
 <moduleRef key="core"/>
 <moduleRef key="header"/>
 <moduleRef key="textstructure"/>
 <moduleRef key="linking"/>

</schema>
```

More interestingly..

```
<schema>
 <moduleRef key="header"/>
 <moduleRef key="verse"/>
 <elementSpec ident="soundClip">
  <classes>
   <memberOf key="tei.data"/>
  </classes>
  <attList>
   <attDef ident="location">
    <desc>supplies the location of the clip</desc>
    <datatype>
     <rng:ref name="data.pointer"/>
    </datatype>
   </attDef>
  </attList>
  <desc>includes an audio object in a document.</desc>
 </elementSpec>
 <elementSpec ident="head" mode="change">
  <content>
   <rng:text/>
  </content>
 </elementSpec>
```

Uniformity of description

- modules, elements, attributes, value-lists are treated uniformly
- each has an identifier, a gloss, a description, and one or more equivalents
- each can be added, changed, replaced, deleted within a given context
- for example, membership in the `att.type` class gives you a generic **type** attribute, which can be over-ridden for specific class members

Overriding a value-list

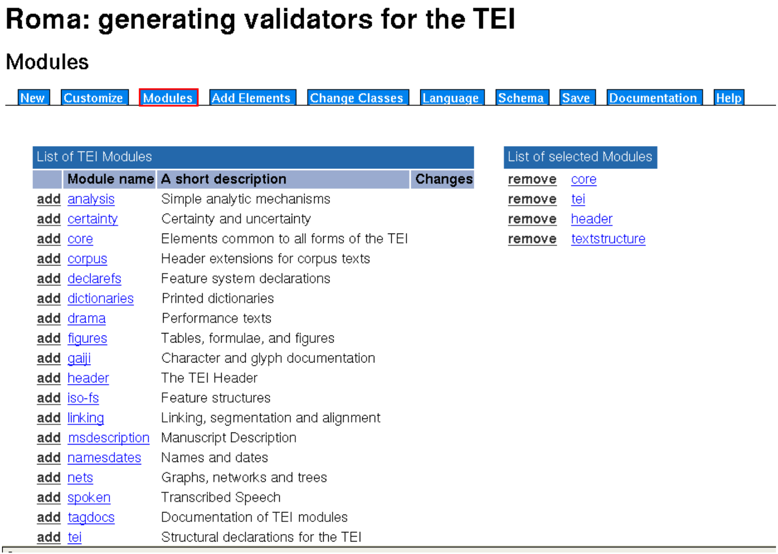
```
<elementSpec ident="list" module="core">
 <classes>
  <memberOf key="att.typed"/>
 </classes>
 <attDef ident="type" mode="replace">
  <valList type="closed">
   <valItem ident="ordered">
    <gloss>Items are ordered</gloss>
   </valItem>
   <valItem ident="bulleted">
    <gloss>Items are bulleted</gloss>
   </valItem>
   <valItem ident="frabjous">
    <gloss>Items are frabjous</gloss>
   </valItem>
  </valList>
 </attDef>
</elementSpec>
```

Ontological mapping

The `<equiv>` element supplies a URI which identifies an equivalent concept (*not* a name) in some externally-defined ontology, e.g.

- ISO data category registry
- CIDOC conceptual reference model
- Wordnet

You don’t have to write XML: Roma (1)



Roma: generating validators for the TEI

Modules

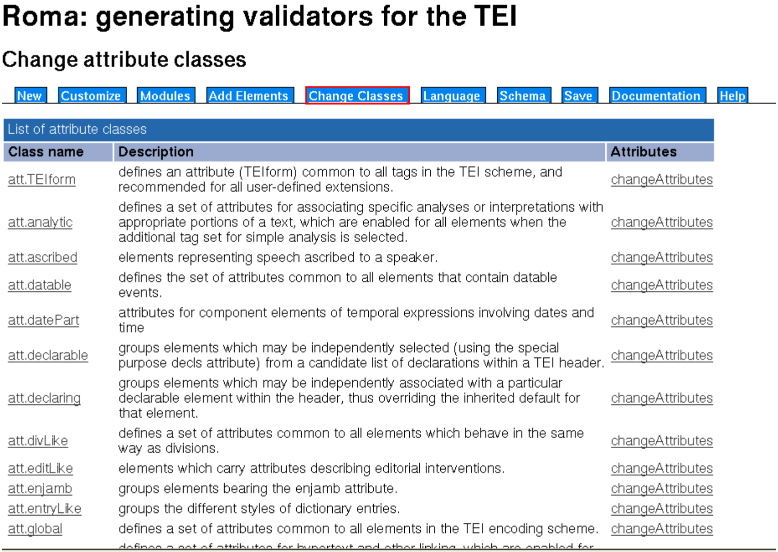
List of TEI Modules

	Module name	A short description	Changes
add	analysis	Simple analytic mechanisms	
add	certainty	Certainty and uncertainty	
add	core	Elements common to all forms of the TEI	
add	corpus	Header extensions for corpus texts	
add	declarefs	Feature system declarations	
add	dictionaries	Printed dictionaries	
add	drama	Performance texts	
add	figures	Tables, formulae, and figures	
add	gaiji	Character and glyph documentation	
add	header	The TEI Header	
add	iso-fs	Feature structures	
add	linking	Linking, segmentation and alignment	
add	msdescription	Manuscript Description	
add	namesdates	Names and dates	
add	nets	Graphs, networks and trees	
add	spoken	Transcribed Speech	
add	tagdocs	Documentation of TEI modules	
add	tei	Structural declarations for the TEI	

List of selected Modules

remove	core
remove	tei
remove	header
remove	textstructure

Roma (2)



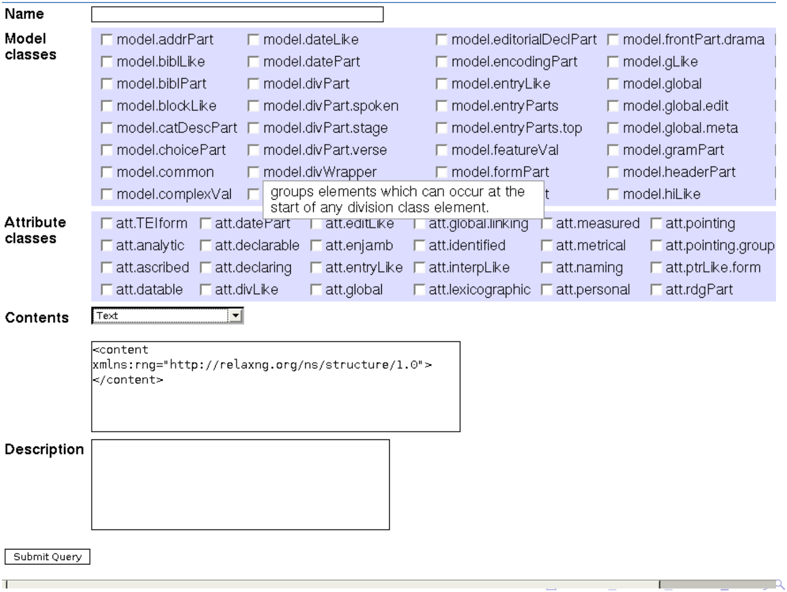
Roma: generating validators for the TEI

Change attribute classes

List of attribute classes

Class name	Description	Attributes
att.TEIform	defines an attribute (TEIform) common to all tags in the TEI scheme, and recommended for all user-defined extensions.	changeAttributes
att.analytic	defines a set of attributes for associating specific analyses or interpretations with appropriate portions of a text, which are enabled for all elements when the additional tag set for simple analysis is selected.	changeAttributes
att.ascribed	elements representing speech ascribed to a speaker.	changeAttributes
att.datable	defines the set of attributes common to all elements that contain datable events.	changeAttributes
att.datePart	attributes for component elements of temporal expressions involving dates and time	changeAttributes
att.declarable	groups elements which may be independently selected (using the special purpose decls attribute) from a candidate list of declarations within a TEI header.	changeAttributes
att.declaring	groups elements which may be independently associated with a particular declarable element within the header, thus overriding the inherited default for that element.	changeAttributes
att.divLike	defines a set of attributes common to all elements which behave in the same way as divisions.	changeAttributes
att.editLike	elements which carry attributes describing editorial interventions.	changeAttributes
att.enjamb	groups elements bearing the enjamb attribute.	changeAttributes
att.entryLike	groups the different styles of dictionary entries.	changeAttributes
att.global	defines a set of attributes common to all elements in the TEI encoding scheme.	changeAttributes
	defines a set of attributes for hypertext and other linking, which are enabled for	

Roma (3)



Name

Model classes

- ☐ model.addrPart
- ☐ model.biblLike
- ☐ model.biblPart
- ☐ model.blockLike
- ☐ model.catDescPart
- ☐ model.choicePart
- ☐ model.common
- ☐ model.complexVal
- ☐ model.dateLike
- ☐ model.datePart
- ☐ model.divPart
- ☐ model.divPart.spoken
- ☐ model.divPart.stage
- ☐ model.divPart.verse
- ☐ model.divWrapper
- ☐
- ☐ model.editorialDeclPart
- ☐ model.encodingPart
- ☐ model.entryLike
- ☐ model.entryParts
- ☐ model.entryParts.top
- ☐ model.featureVal
- ☐ model.formPart
- t
- ☐ model.frontPart.drama
- ☐ model.gLike
- ☐ model.global
- ☐ model.global.edit
- ☐ model.global.meta
- ☐ model.gramPart
- ☐ model.headerPart
- ☐ model.hiLike

groups elements which can occur at the start of any division class element.

Attribute classes

- ☐ att.TEIform
- ☐ att.analytic
- ☐ att.ascribed
- ☐ att.datable
- ☐ att.datePart
- ☐ att.declarable
- ☐ att.declaring
- ☐ att.divLike
- ☐ att.editLike
- ☐ att.enjamb
- ☐ att.entryLike
- ☐ att.global
- ☐ att.global.linking
- ☐ att.identified
- ☐ att.interpLike
- ☐ att.lexicographic
- ☐ att.measured
- ☐ att.metrical
- ☐ att.naming
- ☐ att.personal
- ☐ att.pointing
- ☐ att.pointing.group
- ☐ att.ptrLike.form
- ☐ att.rdgPart

Contents: Text

```
<content
xmlns:rng="http://relaxng.org/ns/structure/1.0">
</content>
```

Description