



Scoping the Oral Exam

Sample Questions



XML Documents (I)

- What is the underlying data model?
- Is XML byte or character oriented?
- Is XML capturing semantics?
- What are the main mechanisms für structuring content?
- What is mixed content and when do you use it?

What is the underlying data model?

Tree structure, hierarchy, structure information (tags) + content

Is XML byte or character oriented?

Character-oriented, UTF 8 / 16, UNICODE

Is XML capturing semantics?

No, but to some extent you can capture semantics by the tags

What are the main mechanisms für structuring content?

Element, Attributes

What is mixed content and when do you use it?

Text contains some other elements, HTML description, links,.....



XML Documents (II)

- What's the problem when accessing XML in a programming language? Solutions? Pro & Cons?
- What are namespaces, what is the purpose of it?
- What's the difference between well-formed and valid documents?

What's the problem when accessing XML in a programming language? Solutions? Pro & Cons?

structural mismatch between the tree structure and data structure in your programming language

1) *Access with a programming API (SAX, DOM)*

SAX:

SAX is an event-based API for accessing XML documents

SAX parsing requires little memory and can handle very large documents

SAX parsing does not allow random access or backward movement

DOM:

DOM as a tree-based API for accessing XML documents

very large documents may not fit into memory (risk of *thrashing*)

DOM is based on an in-memory representation of an XML document

DOM parsers have an additional layer for building the tree

2) *Mapping of the data structure*

Mapping between XML and the programming language can take two forms

- using hand-crafted code (based on XML functions) that performs the mapping

- generating code using an XML schema and/or target data structures in the language

3) *Access by XML Programming Language (XSLT, etc.)*

What are namespaces, what is the purpose of it?

Distinguishing tags from different schemas, multiple namespaces are possible

What's the difference between well-formed and valid documents?

Well-formed: tags are correct

Valid: DTD, XSD

1. use special functions to work on XML documents as external data objects
2. map XML documents to native data structures of the programming language
3. XML Programming Language

[information not available in the Infoset](#)

order of attributes

type of quotes around attribute values

notation of empty elements (<elem></elem> vs. <elem/>)

how lines are terminated

entities and character references



Schema Languages

- What is the purpose of a schema language?
- Why are there different schema languages?
- What is the main characteristic of?
 - DTD
 - XSD
 - Schematron
 - Relax NG
- What are the main features of XSD?
- What are the difference between DTD and XML Schema?
- What are important design issues in XSD?

What is the purpose of a schema language?

Define structure and content of a XML document, enabling validation

Why are there different schema languages?

For historical reasons, Emerged from different domains like document or database world

What is the main characteristic of?

- Schematron (no grammar but rules, relies on XPath, complementary to other schema language)

- Relax NG (no types, some affinity to DTD)

What are the main features of XSD?

Data Types

What are the difference between DTD and XML Schema?

Data Types, Extensions / Restrictions, namespaces, more powerful identity constraints (key, keyref, unique)

What are important design issues in XSD?

Local vs. global declaration of elements and types



XPath

- What is the purpose of XPath?
- Which XML technologies rely on XPath?
- Which are the elements of a XPath expression?
- What the main difference between XPath 1.0 and XPath 2.0?
- What does XPath 1.0 returns?
- What is the underlying data model of XPath 2.0?

What is the purpose of XPath?

Selecting parts of a XML document for further processing

Which XML technologies rely on XPath?

XSD, XSLT, Schematron, XQuery

Which are the elements of a XPath expression?

Axis, Node test, Predicates

What the main difference between XPath 1.0 and XPath 2.0?

More functions, typed date, conditional expressions

What does XPath 1.0 returns?

Node sets, snumber, integer, boolean

What is the underlying data model of XPath 2.0?

XDM provides the sequence model as a foundation, functions and operators allow advanced sequence handling



- What are the main features of XSLT?
- What are the main characteristic of XSLT?
- How does XPath contributes to XSLT?
- What's the purpose of conflict resolution?
- What's new in XSLT 2.0?

What are the main features of XSLT?

XSLT is an XML-oriented programming language

XSLT uses XML as its syntax

XSLT is a weakly typed language

XSLT is not designed for large programming tasks

XSLT is the standard language for XML-to-XML transformations

XSLT is very simple and often too simple

XSLT 2.0 is much more complex and powerful

XSLT is a functional programming language fundamentally different from the usual languages, not important for very simple mapping applications, but important for writing more complex transformations and hard to get used to for procedurally trained people

What are the main characteristic of XSLT?

- templates, functional, recursive

How does XPath contributes to XSLT?

- in all the places where something is evaluated, XPath's are being used

What's the purpose of conflict resolution?

Finding the appropriate template if there are some concurrent matches

What's new in XSLT 2.0?

XPath 2.0, Grouping, several output documents, user defined functions



XQuery

- Is a XQuery Statement XML?
- Why use XQuery instead of XPath 2.0?

Is a XQuery Statement XML?

No, it is a kind of database query syntax (FLOWER)

Why use XQuery instead of XPath 2.0?

XPath is too condensed for many users

XQuery provides a less compact and easier accessible syntax

XQuery provides features which are not part of Xpath

No sorting, no grouping, no user defined functions



XML and Databases

- Where can you store XML documents?
What's the difference?
- What's the main challenge in mapping
between the XML and database world?

Where can you store XML documents? What's the difference?

File vs - Database

What's the main challenge in mapping between the XML and database world?

Relational vs. hierarchy, i.e. tables vs. trees, mixed content