Internet Technologies II

Prof. Dr. Thomas Schmidt
HAW Hamburg, Dept. Informatik
Raum 780, Tel.: 42875 - 8452
Email:
  schmidt@informatik.haw-hamburg.de

Test Examination

1. **Multimedia Networking & QoS:**
   a) Suppose a 200 Mbit/s data stream hits a heterogeneous network transition (switch or router) downsizing to 100 Mbit/s. Please describe the difference in transport behavior, when UDP or TCP is used? What are the different results for the streams/the transition point?
   b) Please select and justify an optimal queuing & dropping strategy for routing audio data.
   c) Why does DiffServ scale much better than IntServ?
   d) How can DiffServ-Routers be enabled to dynamically adapt to network and resource conditions?

2. **Hypermedia & XML:**
   a) What for the Amsterdam Hypermedia Model are the essential points of criticism in the Dexter Reference Model? Please explain its additional capabilities.
   b) You need to transform two XML documents taken from either one of the two schemas (Appendix) into each other. Please describe the individual steps when using XML technologies only and give code fragments.
   c) Please explain the additional expressiveness of the XML/XLINK concept as compared to HTML/href. Sketch two architectural scheme for XLINK processing in applications.
   d) How can hyperlinks be used in evaluating resources? What is missing in HTML/href?

3. **Web Services**
   a) Please name and explain different standard options for transferring a complex data structure within a SOAP envelope.
   b) Please describe options to encrypt the data of your credit card no., when used in a Web Service. Discuss advantages and disadvantages of the different methods.
   c) How do Web Services undermine Firewalls? Please discuss possible layers on Web Service detection and filtering.
   d) How can Web Services preserve states? Please describe state scenarios and corresponding duties of the application programmer.

4. **Semantic Web**
   a) Please draw the RDF graph of the statement "Someone, mathematician with name Lewis, was last seen with Alice, said Paul".
   b) What are the semantic relations between taxonomic entities?
   c) True or false: "Ontologies represent knowledge concepts within semantic hierarchies."? Please give reasons or counter examples.
   d) Please give three examples of statements, which cannot be expressed within RDF/RDFS, but within OWL.

Appendix:

Schema I:

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
….
<xs:element name="Order">
       <xs:complexType>
              <xs:sequence>
                     <xs:element name="productNumber" type="xs:string"/>
                     <xs:element name="productName" type="xs:string"/>
                     <xs:element ref="productDescription"/>
                     <xs:element name="productPrice" type="xs:float"/>
              </xs:sequence>
       </xs:complexType>
</xs:element>
<xs:element name="longText" type="xs:string"/>
<xs:element name="productDescription">
       <xs:complexType>
              <xs:sequence>
                     <xs:element name="shortText" type="xs:string"/>
                     <xs:element ref="longText"/>
              </xs:sequence>
       </xs:complexType>
</xs:element>
</xs:schema>
```

Schema II:

```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
….
<xs:element name="request">
       <xs:complexType>
              <xs:element name="ID" type="xs:string"/>
              <xs:element name="labelTag" type="xs:string"/>
              <xs:element name="Specification" type="xs:string"/>
              <xs:element name="Value" type="xs:float"/>
       </xs:complexType>
</xs:element>
</xs:schema>
```