

## Development of Internet Applications

1.
  - (a) SGML stands for Standardised Generalised Markup Language. It is a system standardised by the ISO for organising elements in a document using a DTD. HTML and XML are both subsets of SGML. HTML is defined by a standard SGML DTD. XML defines a method based on SGML, but more narrow than SGML, for organising elements using a DTD.
  - (b) A JDBC driver is a set of classes that implement the JDBC interfaces. They provide an actual connection to the database. All communication is done through the driver interfaces. Typically, all a program needs to know about the JDBC driver is how to load it and what values to use to connect to a database.
  - (c) A Universal Resource Identifier (URI) is a unique identifier for identifying a resource on the web. A uniform resource name overcomes the disadvantages of a URL by less dependence on host names, less dependence on file structure on host and more ease with which URL can be invalidated. It names a resource as opposed to giving its address. There is no syntactic difference, however. A URI is either URN or a URL.
  - (d) Valid and well-formed. A document is well-formed if it follows the general rules of XML, but a DTD need not be specified. A document is valid if is well-formed and also conforms to a DTD.
  - (e) Advantages of attributes: Gives some type control, for example you can enumerate allowed values or specify a default value. Advantages with element: Can be repeated with multiple values; can have an internal substructure.
2.
  - (a) CSS is a language for the specification of the layout (position, size, font, etc.) of a document, in a specific style sheet language. It is used to assign style to parts or elements of documents in HTML, XML and other formats. CSS can either be included in a document or referenced indirectly by the URI for a separate CSS file. It is also possible to specify that different style sheets are to be used when presenting a document on different media, such as screen, paper, etc. By “cascading” is meant that there can be more than one style sheet for a document, and there are then rules for deciding which of them to apply to each element in the document. An advantage with CSS is that you can specify style information in a single file, and use it in many documents, and can then change the style of all the documents by changing in only a single place. A problem is that web browsers do not always support CSS correctly and consistently.

- (b) Advantages of a single long session: Only one login/authentication is needed, information about the status of a user is easy to keep from one interaction to another. Setting up and closing down sessions costs time and resources. Interactivity is possible, for example confirmations than required actions have been performed. Advantages of small sessions with immediate closing: Keeping a session alive costs resources, especially on large servers with many users. Bookkeeping for simple sessions is simpler, server need not use timeouts to stop inactive sessions, and timeouts are resource requiring. Different information is easy to download in parallel, which may give faster "progressive rendering" of, for example, web pages.
3. (a) Web site becomes easier to manage. Minimises the number of static HTML pages required. e.g. One data-driven web page could store information on 100 products, versus 100 static HTML pages. Helps separate content from presentation. Can support ad-hoc type queries on content.
- (b) Extensibility: Can define new elements and attributes. Structure: Elements contain other elements, with arbitrary nesting. Validation: Can validate structure against a DTD.
- (c) Types of JDBC Drivers: The type of a driver refers to how it communicates with the database and has no bearing on how you use it in your programs.
- Type 1:JDBC-ODBC bridge driver - allows you to use any existing ODBC driver from within Java. It translates JDBC operations into ODBC operations. The bridge implements JDBC for any database for which an ODBC driver is available. The ODBC driver and ODBC driver manager must be installed on the machine where the Java program is running.
  - Type 2: Native-API partly Java driver: This driver is only partly written in Java. At various points the driver makes native calls into dynamic shared libraries written in another language. The binaries for these libraries are thus required to be installed on the client.
  - Type 3: Net-Protocol pure Java: Written in 100% pure Java and uses its own network protocol to talk to a proprietary server, which then talks to the database. The server itself doesn't have to be written in Java and may use whatever software is appropriate to talk to the database. Doesn't have to be installed on the client and can be downloaded by a web browser as required. Can possibly communicate with databases from different vendors.
  - Type 4: Native protocol pure Java: Talks directly to the database using the database's own native protocol. Fast. Possible problems with firewalls. Written in 100% pure Java. Limited to a single database type.

4. (a) Simplifies document development process. DTD says what tags are valid, what elements are mandatory or optional, order of elements, etc. Without a DTD, developer would need to keep all the information in their head. Industry-wide standardised DTDs simplify data transfer between organisations. Use of a DTD simplifies work of parser.
- (b) The main principle of Usenet News is to replicate each document to each server, and the user gets his articles from the local server. In the WWW, documents are primarily stored on one master server, even if caching can be used. Advantage with WWW: Less storage cost, controlled master copy, long time availability, less censorship. Advantage with Usenet News: Fast response times, better availability, less network load.
- (c) <TITLE> to specify a title for the window head is mandatory and very common. Other common fields are:  
 <META NAME="GENERATOR" ...> web editor.  
 <META NAME="keywords" ...> for search engines.  
 <META NAME="description" ...> for search engines.  
 <META NAME="author" ...> for search engines.  
 <META HTTP-EQUIV="Refresh" ...> to specify automatic refresh.  
 <LINK REL="stylesheet" ,,,> or <STYLE ...> to reference or include style sheets.
5. (a) <!ELEMENT exam (code, title, date, questions) >  
 <!ELEMENT date (month, year) >  
 <!ELEMENT questions (question, question, question, question, question, question?) >  
 <!ELEMENT question (part+) >  
 <!ELEMENT part ((part|#PCDATA)+) >  
 <!ELEMENT code (#PCDATA) >  
 <!ELEMENT title (#PCDATA) >  
 <!ELEMENT month (#PCDATA) >  
 <!ELEMENT year (#PCDATA) >
- (b) i. The freshness of D1 is 2400 and that of D2 is 800  
 ii. The staleness of D3 is 1200  
 iii. C would get a fresh copy of D1 from S and send it to B  
 iv. C would send cached copy of D1 to B  
 v. C would send cached copy of D2 to B  
 vi. C would get a fresh copy of D2 from S and send it to B  
 vii. C would get a fresh copy of D3 from S and send it to B  
 viii. C would send cached copy of D3 to B

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6. <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 Final//EN">
<HTML>
<HEAD><TITLE>Example HTML Code for Forms</TITLE></HEAD>
<BODY>
<h1 align=center>An Example HTML Form</h1>
<hr>

<form method="POST" action="http://www.dcs.bbk.ac.uk/cgi-bin/form-handler.cgi">

<P>Input Your Name <INPUT TYPE="text" NAME="name" ></P>

Your Gender:
<DL>
  <DD><INPUT TYPE="radio" NAME="Gender" VALUE="Female"> Female<BR>
  <DD><INPUT TYPE="radio" NAME="Gender" VALUE="Male"> Male<BR>
  <DD><INPUT TYPE="radio" NAME="Gender" VALUE="Other" CHECKED> Other<BR>
</DL>

Your hobbies:
<DL>
  <DD><INPUT TYPE="checkbox" NAME="Hobbies" VALUE="Drinking"> Drinking<BR>
  <DD><INPUT TYPE="checkbox" NAME="Hobbies" VALUE="E-commerce"> E-commerce<BR>
  <DD><INPUT TYPE="checkbox" NAME="Hobbies" VALUE="Other" CHECKED> Other<BR>
</DL>

<P>Select your Favourite Food:
<SELECT NAME="food">
<OPTION>Cabbage
<OPTION>Eggplant
<OPTION>Pasta
<OPTION>Fish
</SELECT>
</P>

Your Address:
<TEXTAREA NAME="Address" ROWS=4 COLS=40>
</TEXTAREA>

<!-- A submit button, so the user can send off the form. -->
<INPUT TYPE="submit" VALUE="Submit Form">

<!-- A reset button, to clear the form. (Optional) -->
<INPUT TYPE="reset" VALUE="Clear This Form">

</form>
<hr>
</BODY>
</HTML>

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