University of Glasgow Dip / MSc Information Technology Information Systems and Databases

Tutorial Week 2 Multimedia and Internet Facilities

Answers

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Multimedia

1. Describe the two kinds of representation used by computers for multimedia objects.

Images, QuickTime VR and WAV sound files all attempt to store the perceptual features of objects.

Drawings, VRML and MIDI sound files all attempt to model the object being perceived.

2. Why is compression important for multimedia data and distinguish lossy and lossless compression techniques?

Multimedia files in their full form quickly become **very large**. Compression techniques are required in order to reduce the size for transmission and storage. Thus we would expect to hold an important image in a number of forms – uncompressed for desk top publishing, compressed somewhat for internet delivery, more for mobiles and more again for thumbnails.

- **Lossless compression** uses techniques which maintain the full content of the data e.g. run-length encoding. **Lossy compression** reduces the precision of the presentation in order to reduce the size of the object. This uses techniques which take account of the limitations in our perceptual abilities.
- 3. Why are there different character sets used by computers? Describe any that you have used.

Partly this is **historical** – 7 bit ASCII was used first. **Internationalisation** has meant that a much larger set of characters had to be represented, so that at first a variety of language specific sets were designed and ultimately one set (UNICODE) was used. However UNICODE uses more bits than the specific sets and so makes for larger files.

ASCII is an example of a **legacy system** – i.e. it was designed for a previous generation of computers but still needs to be used – e.g. for e-mail.

- 4. You are designing a magazine to cater for the growing interest in baseball in this country. You plan a two mode delivery for the magazine – over the web and as a printed magazine. (You might consult mlb.com for help here.)
 - a) What will you put the magazine in terms of content?
 - Articles, photos, player biographies, statistics, film of play, interviews, merchandizing.
 - b) Which multimedia formats will you use?
 - Marked up text, images, tables, video, sound, forms. the on-line version will hold all media in the magazine web site. The printed version will be a mix of paper and CD or DVD.
 - c) What are the main problems in trying to deliver the same material in these two ways?
 - 1. Colour works differently when displayed than when printed. The on-line version will use RGB, while the printed version will use CMYK aligning the colours between the two versions is non-trivial.
 - 2. A displayed object must be compressed as it will be transmitted over the internet. A printed object requires the full information. Two versions of each file may need to be produced.
 - 3. Some multimedia objects can't be embedded in a magazine unless you add a CD.
 - 4. Although the same information may be available it will need to be placed into different structures and to be provided in different versions with different characteristics.
 - Note Although there should be a **single source** for each object, there may be more versions for different devices.
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d) How would you vary the representation of the magazine components for the two delivery mechanisms?

- 1. The on-line version will use RGB, while the printed version will use CMYK aligning the colours between the two versions is non-trivial.
- Two versions of each file may need to be produced. For instance, each image will have a full uncompressed version probably using TIFF for the printed magazine, while the on-line magazine will use compressed files.

Internet Facilities

- 5. What is meant by a Client Server Architecture?
 - A server is a computer which manages a set of resources. Thus there might be one or more data servers, printer servers or process servers in a network.
 - A client is a computer to which the user connects. Through interaction with a client process, the user issues requests for resources which the client process responds to by sending requests to the server processes.
 - There are several ways of organising these:
 - a stand-alone node, in which both client and server processes run on the same machine;
 - a one server, many client system is very common situation in which a single server supports multiple clients;
 - a many server, many client system; and
 - a three tier system, in which there is an intermediate set of processes, perhaps doing computation, and which can move to whichever node they will run fastest on.
- 6. What are the problems associated with sending Word documents, images and sound clips by e-mail and how are the problems solved?
 - Word documents, images and sound clips are all encoded in some kind of binary format, while e-mail is designed to send text (often 7-bit text). Also, the binary files can be very long, which might confuse some early mailers.
 - The binary needs to be re-encoded into a textual form. RTF, BinHex and Uuencode are product or platform specific ways of doing this. MIME is a more general system which is becoming a standard.

Most mail systems now manage all this automatically.

7. What is meant by FTP and how is it usually used?

File Transfer Protocol (FTP) allows you to go to another site and download files. Usually this is achieved by remotely logging in as an anonymous user and fetching the files.

- 8. Clearly distinguish the World Wide Web and the Internet.
 - The Internet is a massive and global Internetwork of computers. It consists of the networked computers and the low level software which permits binary data to be transferred over the network.
 - The World Wide Web is a distributed application which runs over the Internet to allow people to navigate about a massive set of hyperlinked documents held on the computers of the network. It is a client-server program in which browsers (such as Internet Explorer and Netscape) act as the client program and server programs which maintain access to that part of a file store which is the web site (such as Internet Server and Jigsaw).
- 9. What is meant by a mark-up language and what is the relationship between HTML, SGML, XML and XHTML?
 - SGML is the mark-up meta-language produced by the text processing community in the 1980's. It was used to specify HTML as a mark-up language.
 - XML is refinement of SGML which is much better structured. XHTML is a reformulation of HTML in XML. It has more precise and dogmatic structure than HTML, hopefully leading a more consistent appearance between different browsers.

10. How is XML being used in the Internet?

XML is understood by browsers which have a technique for transforming XML into HTML.

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More importantly all new internet standards have their data structures defined in XML. You have seen SVG and SMIL. XHTML is the XML way of writing HTML. There are many other examples – Web Services – see slide 139 for a diagram.
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Even programming systems for XML are defined in XML itself - e.g. XML-Schema and X-query.

11 Produce an XML representation of the baseball magazine.

Lots of possibilities here:

<magazine>

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<front page>
```

```
<title>Baseball Tonight</title>cedition>1.1</edition><date>November 2003</date>
<frontpageimage>Arod.jpg</frontpageimage>
</front page>
```

<toc>

```
<tocitem ref="A1" page="3">The World Series 2003</locitem>
```

```
<locitem ref="A2" page="6">The Baseball Season in Britain<locitem> etc.
```

</toc>

```
<article ID="A1" Author="Jack Black" file="WS2003.doc"/>
```

</article>

```
... other odds and ends
```

</magazine>

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Note how the precise hierarchical structure and the fact that everything is clearly named means that it is relatively straightforward to get a program to use the data - e.g. to create a table of contents.
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