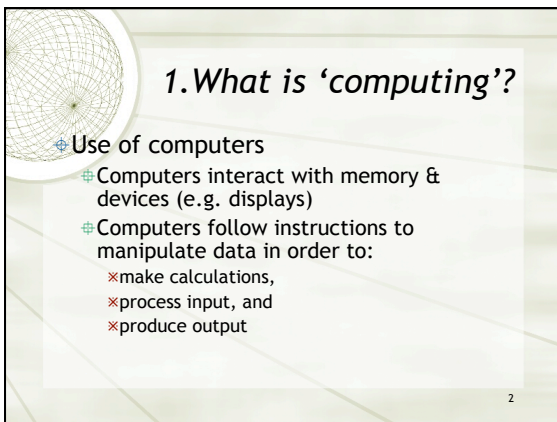




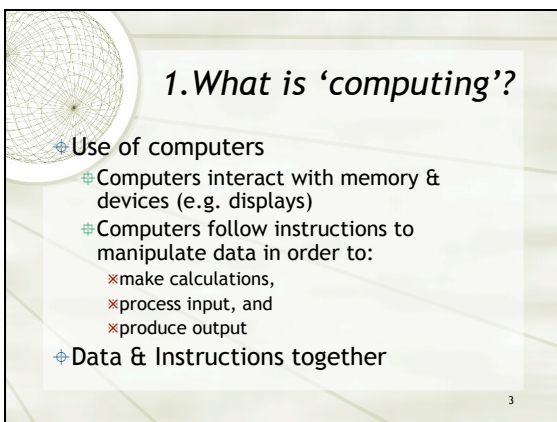
Web-centric Computing 2008:
Computing, Hypertext,
& the WWW



1. What is 'computing'?

- ⊕ Use of computers
 - # Computers interact with memory & devices (e.g. displays)
 - # Computers follow instructions to manipulate data in order to:
 - ✗ make calculations,
 - ✗ process input, and
 - ✗ produce output

2



1. What is 'computing'?

- ⊕ Use of computers
 - # Computers interact with memory & devices (e.g. displays)
 - # Computers follow instructions to manipulate data in order to:
 - ✗ make calculations,
 - ✗ process input, and
 - ✗ produce output
- ⊕ Data & Instructions together

3

2. One definition of Hypertext

Text which does not form a single sequence and which may be read in various orders; specially text and graphics ... which are interconnected in such a way that a reader of the material ... can discontinue reading one document at certain points in order to consult other related matter.

Dictionary (version 1.0.1) ©2005 Apple Computer Inc.

“written or printed words”

Simpson & Weiner (eds.) Oxford English Dictionary Additional Series (vol. 2, 1993)

“a book or other written or printed work, regarded in terms of its content rather than its physical form”

Dictionary (version 1.0.1) ©2005 Apple Computer Inc.

4

2.1 Another definition of Hypertext


“Both an author’s tool and a reader’s medium, a hypertext document system allows authors or groups of authors to link information together, create paths through a corpus of related material, annotate existing texts, and create notes that point readers to either bibliographic data or the body of the referenced text... Readers can browse through linked, cross-referenced, annotated texts in an orderly but non-linear manner.”

Designers of Intermedia hypertext system quoted by George F. Landow in *Hypertext 2.0* (2006), p.4

3. What is the WWW?

- A distributed document delivery service implemented using the client-server model running on the Internet
- Interoperability in a heterogeneous networked environment achieved by implementing shared protocols


7



3. What is the WWW?

- ◆ A distributed document delivery service implemented using application-level protocols on the Internet
- ◆ A network of co-operating computers interoperating using HTTP and related protocols to form a sub-net of the Internet
 - ◆ Like network news (Usenet) or UUCP or ...


8



3. What is the WWW?

- ◆ A distributed document delivery service implemented using application-level protocols on the Internet
- ◆ A network of co-operating computers interoperating using HTTP and related protocols to form a sub-net of the Internet
- ◆ A tool for collaborative writing and community building
 - ◆ Blogs, wikis, podcasts
 - ◆ Interactive games and chats


9



3. What is the WWW?

- ◆ A distributed document delivery service implemented using application-level protocols on the Internet
- ◆ A network of co-operating computers interoperating using HTTP and related protocols to form a sub-net of the Internet
- ◆ A tool for collaborative writing and community building
- ◆ A framework that supports e-commerce
 - ◆ On-line shopping and Business-to-Business
 - ◆ Secure credit-card transactions
 - ◆ Shopping carts


10



3. What is the WWW?

- ❖ A distributed document delivery service implemented using application-level protocols on the Internet
- ❖ A network of co-operating computers interoperating using HTTP and related protocols to form a sub-net of the Internet
- ❖ A tool for collaborative writing and community building
- ❖ A framework of protocols that support e-commerce
- ❖ A large graph made up of webpages and links
 - ▣ Webpages are nodes; Links are edges
 - ▣ Cyclical and directed


11



3. What is the WWW?

- ❖ A distributed document delivery service implemented using application-level protocols on the Internet
- ❖ A tool for collaborative writing and community building
- ❖ A framework of protocols that support e-commerce
- ❖ A network of co-operating computers interoperating using HTTP and related protocols to form a sub-net of the Internet
- ❖ A large cyclical directed graph made up of webpages and links

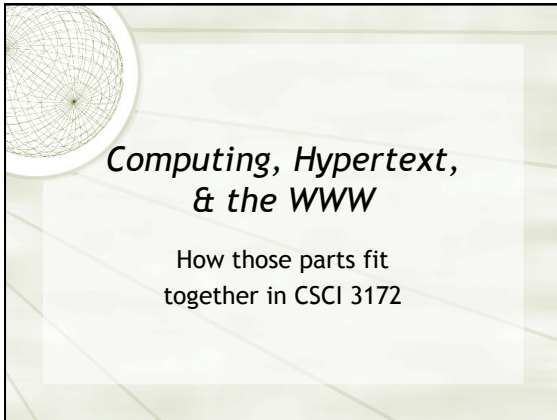
12



3. What is the WWW?

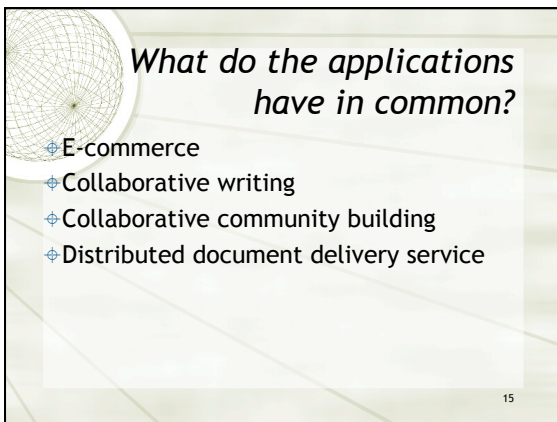
It is *all* that
and a hypertext system, too!

13



**Computing, Hypertext,
& the WWW**

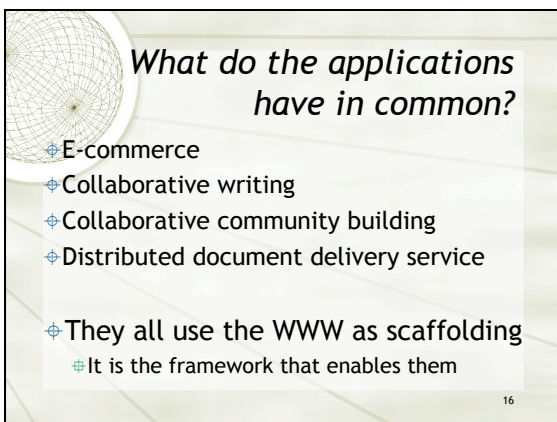
How those parts fit
together in CSCI 3172



**What do the applications
have in common?**

- ⊕ E-commerce
- ⊕ Collaborative writing
- ⊕ Collaborative community building
- ⊕ Distributed document delivery service

15




**What do the applications
have in common?**

- ⊕ E-commerce
- ⊕ Collaborative writing
- ⊕ Collaborative community building
- ⊕ Distributed document delivery service

- ⊕ They all use the WWW as scaffolding
 - ⊕ It is the framework that enables them

16



In Web-Centric Computing...

We do computing *on* the WWW


- ⊕ Putting the WWW under a microscope
- ⊕ Using it as a programming platform

Not programming *of* the WWW

- ⊕ Writing protocols, and applications

⊕ However it is important to understand how everything works at a deep level

17




Perspectives on the WWW

⊕ How we will examine the WWW

- ⊕ High-level overviews:
 - ⊕ Document delivery system
 - ⊕ Distributed hypertext system
 - ⊕ Mathematical models of the WWW
- ⊕ Details of some elements:
 - ⊕ Web services
 - ⊕ Web browsers as software platforms
 - ⊕ Hypertext-in-general and perhaps Web 2.0

18




The WWW as a Document Delivery System

- ⊕ Concepts of:
 - ⊕ access, availability, and accessibility
- ⊕ Basic technologies:
 - ⊕ client/server architectures, search engines, session and state
- ⊕ Issues:
 - ⊕ Ownership, control, authority, and power

19

High Level Overview




The WWW as a Hypertext System

- ◆ Distributed over the Internet
 - Status codes (404, etc.)
- ◆ Document formatting
 - Mark-up languages
- ◆ Dynamic documents
 - CGI protocol
- ◆ Interactivity and agency
 - Web 2.0
- ◆ Beyond the basics
 - Linkbases, Open Hypermedia, multi-links

High Level Overview

20




The WWW as a Mathematical Abstraction

- ◆ The 'web graph'
 - Structure of the links on the WWW
- ◆ Power laws
 - Link distribution
 - User habits
- ◆ Practical and theoretical applications

High Level Overview

21




What are Web Services?

- ◆ Distributed computing
- ◆ Services are used by programs for remote execution of programs
- ◆ A significant evolution from old style middleware
- ◆ Of particular interest:
 - Asynchronous message-based protocols
 - N-tier architectures

An Element of the WWW

22



Web Browsers as Software Platforms

An Element of the WWW

- Scripting languages
- Cascading Style Sheet language
- The DOM as a standard API (not just data)


Of particular interest:

- Gain programming experience
- Comparing cascading and inheritance

Errors and Opportunities:

- Graceful degradation
- Progressive enhancement

23



Some upcoming assignments

- Install personal Apache WWW server
- Create an interactive Javascript-based application using more than basic HTML
- Use `script.aculo.us` (or other code depository) to make a small website enhanced with Ajax
- Create a database-driven website
- Perhaps build a WWW-crawler/search engine
- Rework a complex webpage or small site to make it meet level AAA of WAI guidelines
- Perhaps assess quality of websites using `usability.gov` guidelines

25



Questions? Comments?



jamie@cs.dal.ca

Jamie Blustein, Dalhousie CompSci

26
