

# Computer Science E-259

XML with Java, Java Servlet, and JSP

## Lecture 1: Introduction

17 September 2007

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# The Hype

## In the Press

*"XML, as a context-rich, data-neutral file format, is probably the most important new technology development of the last two years."*

Michael Vizard, InfoWorld

*"An idea almost as good as peanut butter and chocolate!"*

XML/EDI Group

*"'[A] spreading ooze of data' will expand as people exchange data more easily with XML."*

Rita Knox, Gartner Group

# The Hype

## In the Classroom

*"XML's strength is its wide adoption and excellent tools.  
XML itself is not that exciting."*

*"XML is very zen. If you 'get' XML, it's rarely about the XML, it's about the data and the tools. If you don't get it, it's all about angle brackets and buzzword-compliance."*

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## Goals of the Course

- Cut through the hype and get to the value
- Focus on
  - practicality: what you need to know to do real work
  - applications: what are the tools and technologies necessary to put XML to use
  - possibilities: what are some of the most common ways XML is being used in applications
- Emphasize understanding from the bottom up

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## Rewards of the Course

- A solid understanding of XML, the syntax, data structures, and algorithms that surround it
- Xperience
  - DTD, SVG, XForms, XInclude, XLink, XML Base, XML Encryption, XML Key Management, XML Namespaces, XML Schema, XML Signature, XPath, XPointer, XQuery, XSL-FO, and XSLT
  - SAX and DOM
  - JAXP and TrAX
  - JavaServer Pages and Java Servlet
  - HTTP, SOAP, web services, WSDL
  - FOP, Stylus Studio, Tomcat, Xalan, Xerces, XMLSpy...

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## Agenda

- Computer Science E-259
- J2EE
- XML
  - What
  - Who
  - When
  - How
  - Why
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# J2EE

## API

<http://java.sun.com/javaee/5/docs/api/>

# J2EE

## J2SE

<http://java.sun.com/j2se/1.5.0/docs/api/>

# XML

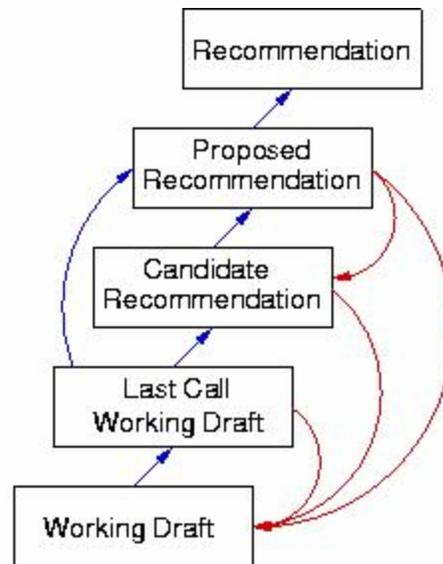
## What

- XML is a language for creating other languages!
- XML lets you define schemas for tag-based languages (ergo, “markup language”)
- XML allows you to extend any existing language (schema) with your own tags (ergo, “eXtensible”)
- Examples of XML schemas
  - financial transactions (stock transactions)
  - business documents (purchase order, invoice)
  - remote procedure calls (SOAP)
  - configuration files (security, server properties)

# XML

## Who

World Wide Web Consortium (W3C)  
<http://www.w3c.org/>



# XML

## When

- The World Wide Web Consortium (W3C) formed an XML Working Group in 1996 with these design goals
  1. XML shall be straightforwardly usable over the Internet
  2. XML shall support a wide variety of applications
  3. XML shall be compatible with SGML
  4. It shall be easy to write programs which process XML documents
  5. The number of optional features in XML is to be kept to the absolute minimum, ideally zero
  6. XML documents should be human-legible and reasonably clear
  7. The XML design should be prepared quickly
  8. The design of XML shall be formal and concise
  9. XML documents shall be easy to create
  10. Terseness in XML markup is of minimal importance

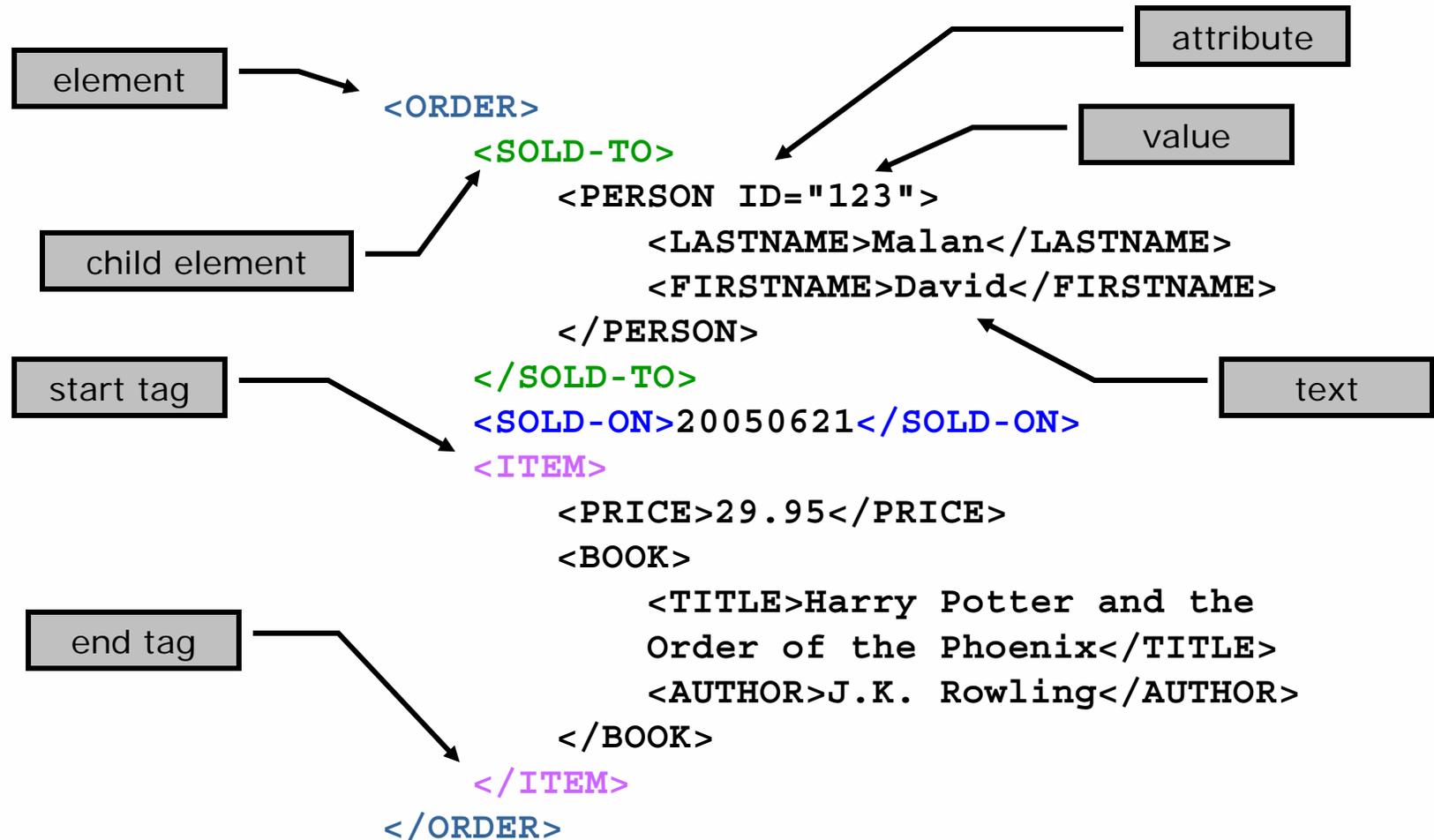
# XML

## When

- XML 1.0 became a standard (W3C recommendation) on 10 February 1998
  - effort grew out of experience with SGML
  - cooperation between various W3C member organizations (including Microsoft, Sun, IBM, HP, Adobe)
- XML 1.1 became a standard (W3C recommendation) on 4 February 2004
  - less rigid constraints on names
  - addresses issues involving character sets

# XML

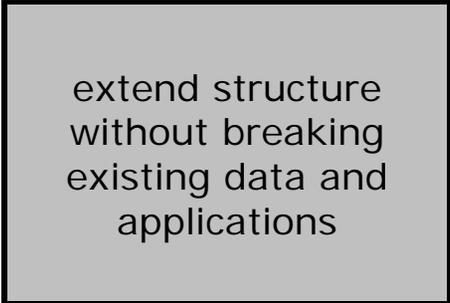
## How



# XML

## How

```
<ORDER>
  <SOLD-TO>
    <PERSON ID="123">
      <LASTNAME>Malan</LASTNAME>
      <FIRSTNAME>David</FIRSTNAME>
      <INITIAL>J</INITIAL>
      <ADDRESS>
        <STREET>Oxford Street</STREET>
        <NUMBER>33</NUMBER>
        <CITY>Cambridge</CITY>
        <STATE>MA</STATE>
      </ADDRESS>
    </PERSON>
  </SOLD-TO>
  <SOLD-ON>20050621</SOLD-ON>
  <ITEM>
    ...
  </ITEM>
</ORDER>
```



extend structure  
without breaking  
existing data and  
applications

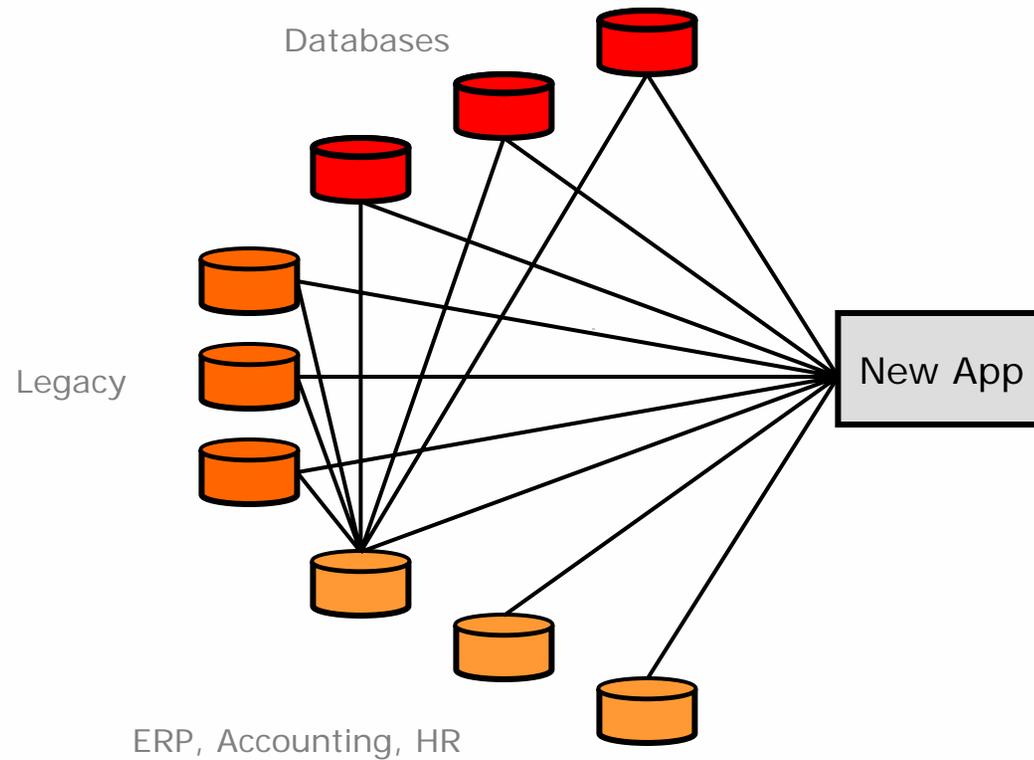
# XML

## Why: Content v. Presentation

<http://www.blockbuster.com/>

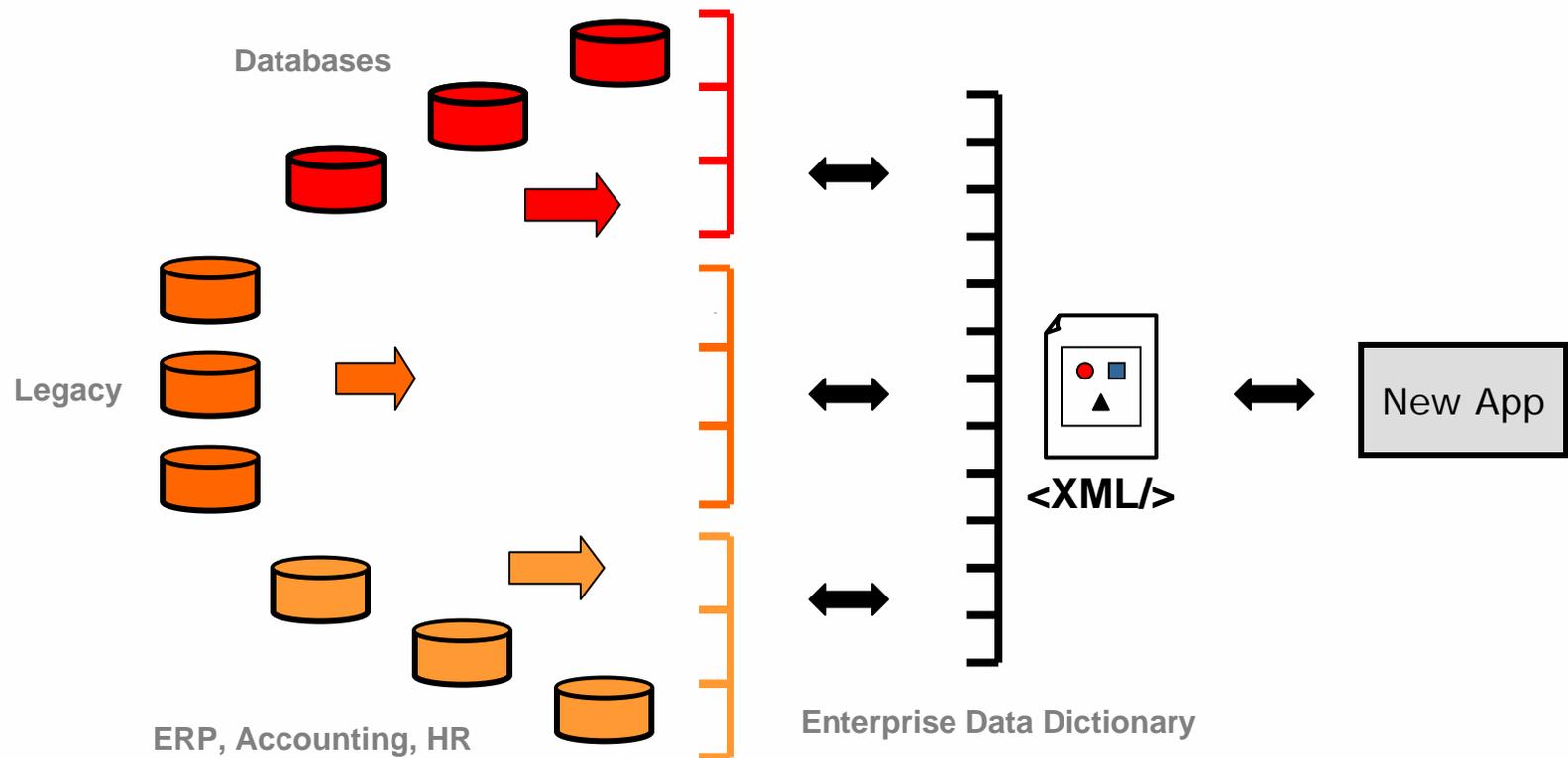
# XML

## Why: Application Integration



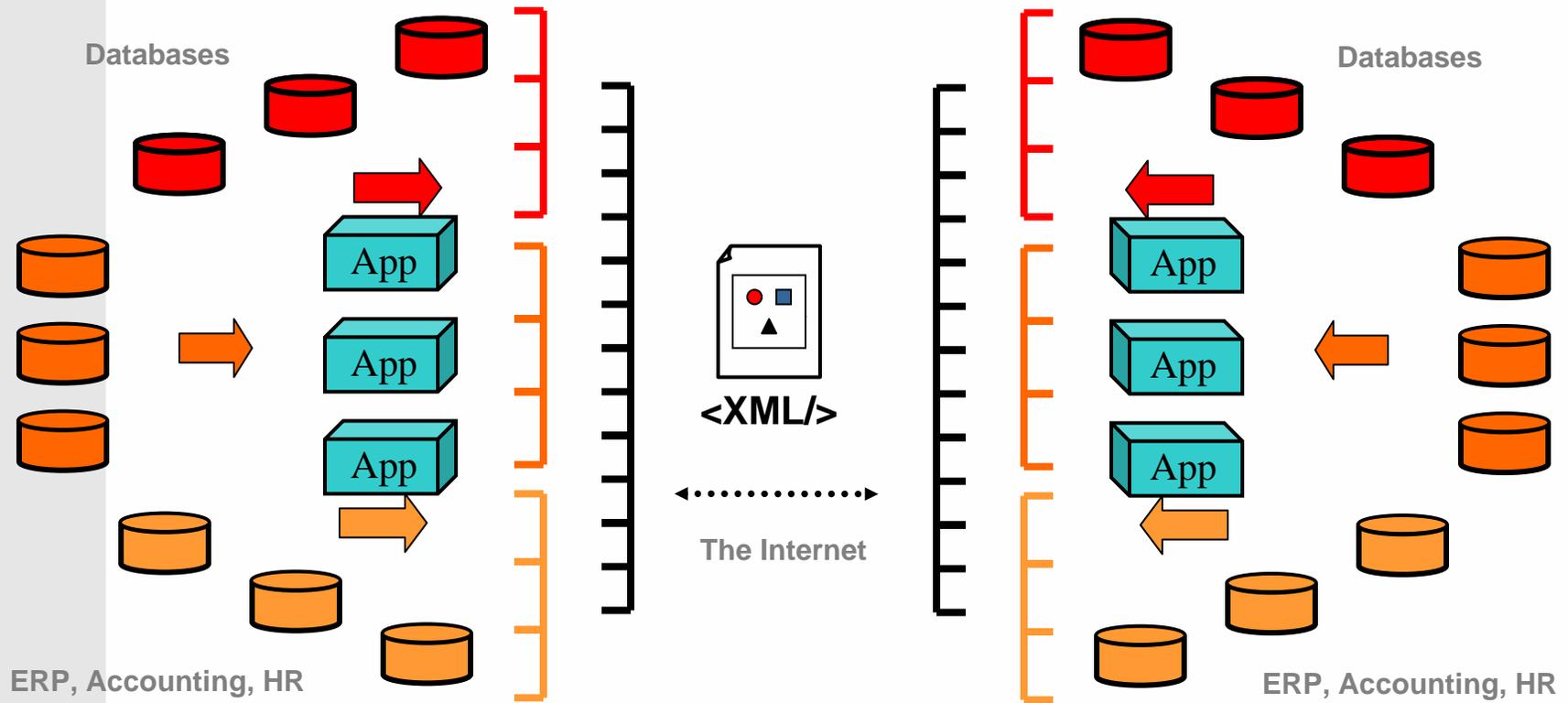
# XML

## Why: Application Integration



# XML

## Why: Application Integration



# XML

## Why: Platform-Independent Services

- In the past, functionality was exposed to remote clients via various remote object standards
  - COM/DCOM
  - CORBA
  - Java RMI
- Using these remote objects required a significant investment in a platform
- Web Services provide a new way to expose functionality
  - use XML and XML data types for transport
  - work with any platform
  - provide a bridge to existing business services

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## Prerequisites

- Comfort with Java and HTML or XHTML is assumed.

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## Expectations

- Attend or watch all lectures
- Complete four assigned projects
- Design and implement a final project

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## Grades

- Project 1
- Project 2
- Project 3
- Project 4
- Final Project

# Computer Science E-259

## Lectures

- Lecture 1: Introduction
- Lecture 2: XML 1.1 and SAX 2.0.2
- Lecture 3: DOM Level 3
- Lecture 4: XPath 1.0 (and 2.0) and XSLT 1.0 (and 2.0)
- Lecture 5: XPath 1.0 (and 2.0) and XSLT 1.0 (and 2.0), Continued
- Lecture 6: Namespaces in XML 1.1 (Second Edition), SVG 1.1, and XSL (XSL-FO) 1.0
- Lecture 7: HTTP 1.1, JavaServer Pages 2.1, and Java Servlet 2.5
- Lecture 8: XQuery 1.0 and DTD
- Lecture 9: XML Schema (Second Edition)
- Lecture 10: XML Schema (Second Edition), Continued
- Lecture 11: Web Services, SOAP 1.2, and WSDL 1.1
- Lecture 12: Web Services, SOAP 1.2, and WSDL 1.1, Continued
- Lecture 13: Ajax
- Lecture 14: Conclusion

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## Projects

- Project 1: My First XML Parser
- Project 2: XTube
- Project 3: Wahoo!
- Project 4: Scamazon.com

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## Final Project

- Pre-Proposal
- Proposal
- Status Report
- Implementation and Documentation

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## Exams

- No Midterm
- No Final Exam

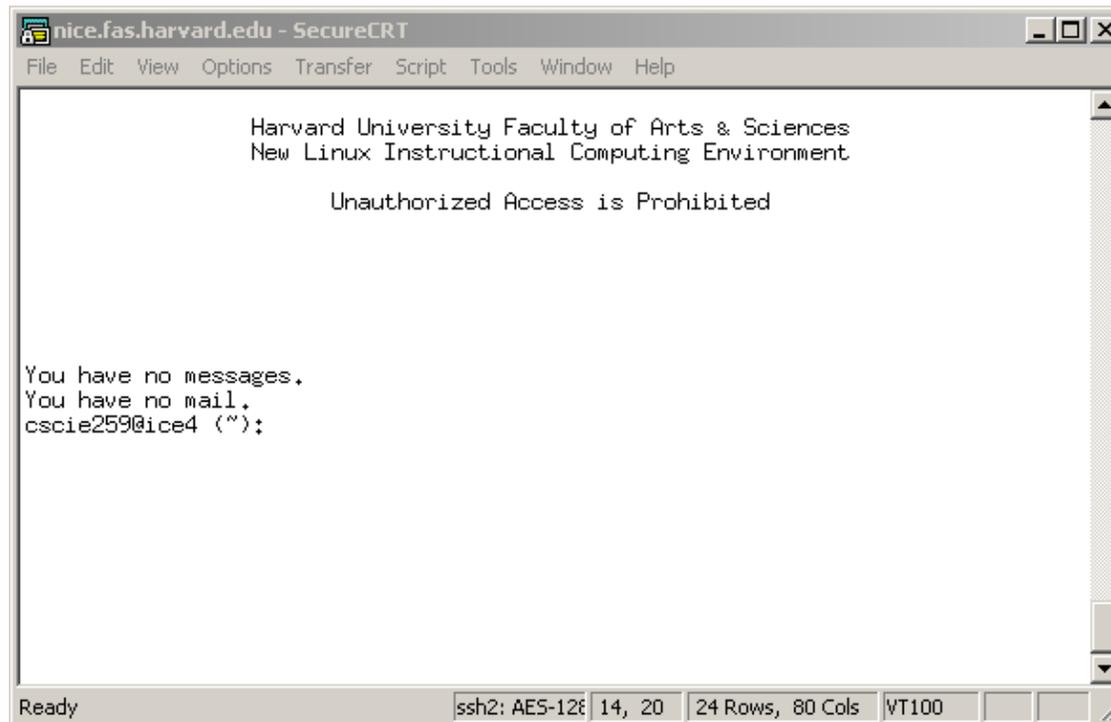
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## Books

- *Core Servlets and JavaServer Pages, Vol. 1: Core Technologies, Second Edition*
- *Essential XML Quick Reference*
- *XML Pocket Consultant*
- *XSLT Programmer's Reference, Second Edition*

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[nice.fas.harvard.edu](http://nice.fas.harvard.edu)



```
nice.fas.harvard.edu - SecureCRT
File Edit View Options Transfer Script Tools Window Help

Harvard University Faculty of Arts & Sciences
New Linux Instructional Computing Environment

Unauthorized Access is Prohibited

You have no messages.
You have no mail.
cscie259@ice4 (~):
```

Ready ssh2: AES-128 14, 20 24 Rows, 80 Cols VT100

# Computer Science E-259

Website

<http://www.fas.harvard.edu/~cscie259/>

# Computer Science E-259

Staff

[cscie259@fas.harvard.edu](mailto:cscie259@fas.harvard.edu)

# Computer Science E-259

Listserv

[cscie259@lists.dce.harvard.edu](mailto:cscie259@lists.dce.harvard.edu)

# Computer Science E-259

## Academic Honesty

With the exception of the final project, on which some collaboration is allowed, all work that you do toward fulfillment of this course's expectations must be your own. Viewing or copying another individual's work (even if published in a world-accessible directory) or lifting material from a book, magazine, website, or other source—even in part—and presenting said matter as your own constitutes academic dishonesty, as does showing or giving your work, even in part, to another student.

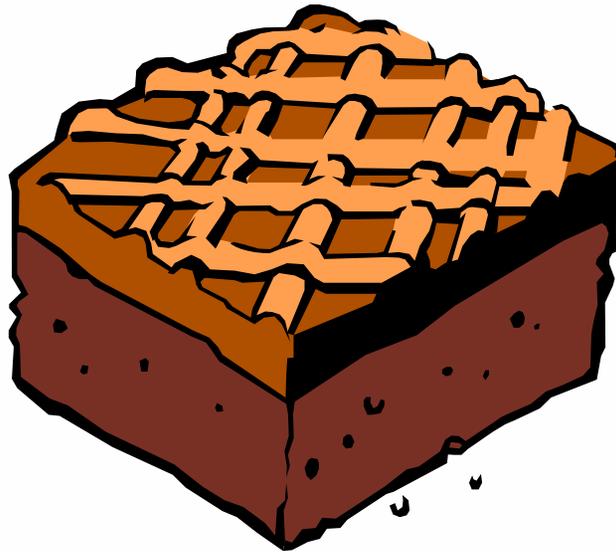
Similarly is dual submission academic dishonesty: you may not submit the same or similar work both to this class and to another. Moreover, submission of any work that you intend to use outside of the course (*e.g.*, at work) must be approved by the staff.

All forms of cheating will be dealt with harshly.

You are welcome to discuss the course's material with others in order to better understand it. You are also welcome to discuss projects' setups with others in order to resolve technical difficulties. But you may not discuss projects' content with other students beyond superficial details. If in doubt as to the appropriateness of some discussion, contact the staff.

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## Brownie Points



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