Enhancements to MAT 2170

Peter Andrews  Duane Broline
William Slough  Nancy Van Cleave

Eastern Illinois University
Department of Mathematics
and Computer Science

Pluralitas non est ponenda sine neccesitate.

—William of Ockham
What we do in MAT 2170

- Teach a detail-oriented subject to a wide spectrum of students
- Emphasize laboratory work
- Provide source code for labs: no “blank slate!”
- Use computer graphics
- Provide a detailed lab manual
- Provide other support materials
What we want for MAT 2170

- Increase retention and success rate
- Coordination of multiple sections
- Flexibility
- Teach modern programming paradigms
- Use technology in appropriate ways
- Communication with students outside of class
MAT 2170 — WebCT

What we wanted

- Interactive computer-based environment
- Self-tests to supplement lab previews
- Quizzes to reinforce understanding
MAT 2170 — WebCT

What we discovered

- Labor-intensive
- Web-based data entry is slow
- Primitive typesetting—HTML
- Multiple sections?
- Campus personnel helpful
- Documentation limited
MAT 2170 — Web site

→ Late-breaking news, errata
→ Syllabi
→ Lecture notes
→ Lab materials
→ Programming assignments
→ Overhead presentations
→ Useful links
Web site: behind the scenes

- Platform independent
  - HTML
  - PDF
  - No reliance on proprietary document formats
- Convert 200+ existing pages of \LaTeX\ documents
- Create new documents with hyperlinks
- Create documents for overhead presentations
- Package C++ source code
Creating web-enabled documents

We wanted a \texttt{TEX}-based approach

- Fine control of typesetting
- Utilize existing \texttt{TEX} documents
- Use in other courses

We wanted to spend little or no money

Utilize public domain resources

\texttt{xfig} \quad \texttt{Gimp} \quad \texttt{FoilTEX} \quad \texttt{PPower4} \quad \texttt{hyperref} \quad \texttt{pdfLATEX} \quad \texttt{TEX4ht}
Desired Computing Environment

- Portable
- Economical
- Consistent
- Highly available
- Up-to-date
Computing Environment

- Linux server—OM 3041 closet
- Linux workstations—OM 3041 lab
- Student accounts/files on server
- Remote access via Lumpkin, SSB, dorms (via Xvnc)
- Total software costs: < $1/workstation
Chaos Game – Drawn with xfig
Chaos Game – Screenshot with gimp
Chaos Game – Another screenshot
Technology: the good...

- Provides highly structured course organization
- Allows for consistency among various sections
- Provides ready access to course handouts and references
- Effort can be amortized over several semesters of use
- We and our colleagues can use similar techniques for other courses
Technology: the bad...

Network infrastructure is crucial—but outside our control

Classroom presentation equipment needs improvement

Substantial effort is required

It is challenging to identify and learn software tools
Technology: and the ugly
Technology: and the ugly

The P.I. takes a sabbatical just as the project goes online