CS 5204
Operating Systems
Godmar Back

About This Class
• Graduate Level Operating Systems
  – Emphasis on research
  • Read and evaluate research papers
  – Projects
  • Unstructured problems
  – Presentations
  • Of others’ research and your own

About Me
• Undergraduate Work at Humboldt and Technical University Berlin
• PhD University of Utah
• Postdoctoral at Stanford University
• New Assistant Professor at Virginia Tech
• Research Interests:
  – Operating systems, runtime systems and compilers: focus on building reliable systems.

Course Facts
• Meet Tuesday and Thursday 9:30am-10:45am McBryde 224
• Listserv:
  – cs5204_91476@listserv.vt.edu
• Will use Blackboard Portal
  – http://learn.vt.edu
  – Check regularly for announcements there
  – Until this is set up, use http://courses.cs.vt.edu/~cs5204/fall04

Prerequisite/Force-Add Form
• All students please fill out form
  – Even if you’re already registered
• Helps me learn about your background and objectives
• Helps the “force-add” process
• Please return to me by Thursday after class (or sooner)

Reading Material
• Assigned research papers
• Recommended textbook
Format

- Lecture + discussions
- Paper evaluations
- Speaker evaluations
- Two student presentations
  - one for assigned research paper
  - one for term project
- Term project

Discussions

- Everybody reads assigned papers before class
- Submit brief evaluation form
  - Proves you’ve read the paper
  - Enables discussion
- Instructions will be on website

Late Policy

- No late submissions will be accepted.
- Instead, you have three wildcards:
  - Three dates on which you can skip evaluations without penalty.
- Contact instructor in severe circumstances only

Paper Evaluation Form

- What problem does the paper attack? How does it relate to and improve upon previous work in its domain?
- What are the key contributions of the paper?
- Briefly describe how the paper’s experimental methodology supports the paper’s conclusions.
- Write down one question you plan to bring up in the discussion.

Your presentation

- 2 parts
- First, present research as if it were your own
- Then, change roles:
  - Evaluate research from your perspective
- Help lead subsequent discussion

Preparing your presentation

- Guidelines for presentations will be posted on class website
- Every student must meet with instructor to discuss slides.
  - Tentative Time: Tuesday 11:00am (1st presenter) and 11:45am (2nd presenter) for Thursday’s presentations.
  - You must have your slides ready by that time.
Getting Feedback
- Speaker evaluation forms
- Compiled by TA, provide feedback on your performance

Speaker Evaluation Form
- Content
  - Did the speaker extract and emphasize the paper’s main contributions?
  - Did the speaker put the presented work in context?
- Form
  - Slides: Were the slides readable and concise?
  - Presentation: Was the presentation understandable and clear?
  - Other comments you wish to provide, if any

Class Participation
- Important
- Usually proportional to preparation

Midterm
- Only exam!
- Probably mid-to-end of October
- Covers material from lectures and discussion

Term Project
- Two Choices:
  - Survey Paper
  - Programming Project
- Milestones
  - Project proposal
  - Will post schedule
- Final Presentation
  - To teaching staff during final’s week

Survey Paper
- Done individually
- Explore research area or controversy
- Do not merely summarize n papers
- Rather
  - Identify problems, ideas and concepts in related (or contrasting) research and approaches
  - Learn and discuss trade-offs
  - Evaluate approaches
Survey Topics: Examples

• Threads vs. Events
• Soft Updates vs. Journaling File Systems
• Virtualization Techniques
• Multi-tasking/resource control in a JVM
• … pick your own topic of interest here

Programming Project

• Done in teams of 1-2 students (3 if project size warrants)
• Many options:
  – Build small distributed system
    • E.g., small P2P system; distributed webcache
  – Perform experiments
    • E.g., measure denial-of-service resistance of C#
  – Modify or improve existing system
    • E.g., add failure report facility to Linux
• … your own idea

Grading

• 20% Midterm
• 20% Paper Evaluations + Class Participation
• 10% Research Paper Presentation
• 40% Term Project
• 10% Final Presentation
• These may be subject to change

Honor Code

• Will be strictly enforced in this class
• Do not cheat
  – Observe collaboration policy outlined in syllabus
• Do not plagiarize
  – Use proper citations
• Read the policies posted on the website
  – Note reference to “codes of ethics used by professional societies in the United States (my emphasis)”
• If in doubt, ask!

Reading List

• Topics reflect what I think is important, and what I find interesting
  – You are encouraged to suggest papers as well – please provide citation + URL.
• Preliminary reading list posted online
  – please send me 1st, 2nd, and 3rd choice of paper you wish to present
  – please send me 1st, 2nd, and 3rd choice of Thursday on which you wish to present
• Need two volunteers who will present September 2nd

Reading List: Selected Topics

• Kernel Structure
  – Monolithic vs. microkernel
  – Extensible Kernels: Exokernel, SPIN, L4
• Grid Computing
  – Legion, Globus
Lecture Topics

• Distributed System Design
• Interprocess Communication
• Concurrency
• Replication and Consistency
• …