Statement of Teaching

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I deeply value teaching and wish to convey my enthusiasm for computer science in general and experimental systems in particular to all of my students. Unlike topics that are grounded in absolute truths with mathematical proofs, systems topics emphasize simple and practical solutions that depend on the student's understanding of the system constraints. For example, the preferred operating system scheduling policies depend on the unique requirements of a particular system; whether it is a personal digital assistant, a desktop or a server system. Students need to understand the context within which a particular technique was preferrable. As a fast-moving and technologically sensitive area, I relish the challenge of maintaining the vitality of curricula using constant updates and drawing on state-of-the-art examples from topical research domains. I wish to strike a balance between describing fundamental concepts while introducing variants that are more appropriate for contemporary hardware. For example, over the past few years first simultaneous multithreading and then multicore architectures have become ubiquitous; making multi-threading an indispensable concept. I adapted the operating systems course to slowly increase its focus on threading issues, more than was adapted by the course text book (*Operating System Concepts*, Avi Silberschatz, Peter Galvin and Greg Gagne).

At Notre Dame, I had redesigned the core *Graduate Operating Systems* and ugrad *Operating Systems* course. I also developed a new advanced grad course in *Distributed storage*, a new grad/ugrad and ugrad course in *Computer Networks* grad/ugrad course in *Multimedia Systems* and a grad/ugrad course on *Networked Sensor Systems*. Since our department is small, student enrollment requires that these specialized courses be offered every three years or so. My courses are project oriented with a significant course project. Some students who can commit to significant time and effort beyond the course have widened the scope of their course projects into research publications. Two course projects led to publications [1, 2] and two other projects had formed the basis for continuing dissertation research. Next, I briefly summarize a core undergraduate course that I taught at Notre Dame.

Junior level core Operating Systems

Operating systems manage system resources such as CPU, memory and storage. Each of these subsystems uses variants of the same fundamental techniques. In order to make these similarities and differences clear, I organize my course around five different modules: *Process Management*, *Process Synchronization*, *Memory Management*, *Storage Management* as well as a module that focuses on understanding the interplay between these various concepts, especially in the context of servers, desktops, laptops and PDAs. Student understanding of each module is evaluated using a quiz, homework assignment, homework project and a module exam as well as a final exam. All my course material are publicly available from my home page (`http://www.nd.edu/~surendar/teach/`).

Also, earlier research had shown the value of lecture videos as an effective review tool. For the past six semesters, I have captured my lectures on video and made them publicly available on the web, podcast as well as made available in Google video. Podcasts of course offerings of Operating Systems (Spr '06, Spr '07, Spr '08 and Fall '08), Multimedia Systems (Fall '06) and Networked Sensor Systems (Fall '07) were subscribed by 9,562 unique addresses. The audio and video objects were downloaded

from the web for a total of 677,791 times and in Google video for 81,840 times. I had shown [3] that technology improvements can allow any instructor to perform these operations with reasonable effort. I presented my positive educational experiences as well as the pitfalls of video capture in a colloquium at the Kaneb Center for teaching and learning at Notre Dame. I am a member of the University iTunesU Advisory Group that will make lecture contents from all courses available through the Apple iTunesU system. The lecture video access traces also serve as the workload for my storage research.

References

[1] **Thread Migration to Improve Synchronization Performance**. *Srinivas Sridharan, Brett Keck, Richard C. Murphy, Surendar Chandra and Peter M. Kogge*. IEEE/ACM Workshop on Operating System Interference In High Performance Applications (OSIHPA '06), (held in conjunction with PACT '06), Seattle, WA, September, 2006.

[2] **Mosaicing videos to stream over multiple independent channels**. *Chris Boehnen, Allison Regier, Deborah Thomas, Surendar Chandra and Patrick Flynn*, 17th ACM workshop on Network and Operating Systems Support for Digital Audio & Video (NOSSDAV '07), pages 3–8, Urbana, UL, June, 2007.

[3] **Lecture video capture for the masses**. *Surendar Chandra*. ACM 12th Annual conference on Innovation and Technology in Computer Science Education (iTiCSE 2007), pages 276–280, Dundee, Scotland, June, 2007.